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Air Cargo Airport Feasibility Study

The Economic Future of the San Joaquin Valley

Master Developer Article

I-5 Corridor Industrial/ Business Park Feasibility Study

COUNTY OF STANISLAUS

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1 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

Stanislaus County is considering the potential for development of industrial/business park uses at one of five areas located in the western portion of the county. The five sites being considered are located along Interstate 5 (I-5) and include: Howard Road—Westley Triangle, Sperry Road Interchange Area, Fink Road Interchange Area, Stuhr Road—Newman Interchange Area, and Crows Landing (Exhibit 1-1).

The purpose of this report is to provide the County a feasibility analysis for considering the development potential of each of the study areas. The feasibility discussion in this report is based on land use policy and planning, water supply, wastewater treatment and disposal, interchange evaluation, San Joaquin kit fox mitigation requirements and an economic feasibility evaluation. Recommendations about the priority of each study area for development are made for consideration by the County.

1.2 STUDY AREAS

Five potential sites, or study areas, are examined in this report. Four of the study areas are located at interchanges along I-5. The fifth study area includes the NASA Crows Landing Flight Facility. Each of the study areas is described below.

Howard Road—Westley Triangle ▸ The study area is approximately 5.5 miles long, from the San Joaquin/Stanislaus County line on the north to Howard Road on the south, between I-5 on the west and the California Aqueduct on the east. Total acreage encompassed in the Howard Road—Westley Triangle study area is approximately 1,300 acres.

Sperry Road Interchange Area ▸ The Sperry Road Interchange study area is approximately 800 acres and is located generally at the Sperry Road/I-5 interchange (County Road J17). The study area is bordered on the west by the California Aqueduct, which generally parallels I-5, and is partially bordered along the east by the City of Patterson. The Delta-Mendota Canal, also paralleling I-5, traverses north-south through the study area,.

Fink Road Interchange Area ▸ The Fink Road study area is approximately 1,000 acres, located mostly on the west side of I-5. It is bordered on the east by the California Aqueduct (located east of I-5), and generally on the west by existing Pacific Gas and Electric (PG&E) overhead transmission lines; the western boundary is not firm and may be changed to suit potential development opportunities. The northern study area boundary is formed by the southern boundary of APN 025-12-33. The southern boundary generally follows Fink Road and section lines on the west side of I-5.

Stuhr Road—Newman Interchange Area ▸ The Stuhr Road-Newman Area is approximately 600 acres, situated along both sides of I-5. This study area is bordered on the south by Orestimba Road, on the east by the Delta-Mendota Canal, and on the west by the California Aqueduct. I-5 bisects the study area in a north-south direction.

Crows Landing ▸ The Crows Landing study area consists of approximately 2,500 acres, including approximately 1,500 acres within the NASA Crows Landing Flight Facility (formerly a Naval Auxiliary Landing Field [NALF]), and surrounding acreage. The study area is located 1 mile west of State Route 33 and 1 mile east of I-5. The Crows Landing study area is bounded by the Delta-Mendota Canal on the west, Bell Road on the east, Fink Road on the south, and Marshall Road on the north. (The study area is referenced in this report as "Crows Landing" because it includes the NASA Crows Landing Flight Facility; however, it doe snot include the nearby community of Crows Landing.)

1.3 FEASIBILITY FACTORS ANALYZED

The feasibility of developing any one of the study areas under consideration is based on an analysis of a variety of factors. Each is described below.

Land Use Planning, Policy, and Regulatory Considerations ▸ All of the five study areas are located within the boundaries of the Stanislaus County General Plan. The General Plan, Zoning Ordinance, and other applicable planning and environmental documents have been reviewed for relevant policies and regulations. Key issues include Williamson Act cancellations, airport land use compatibility, and relationship to City spheres of influence. The NASA Crows Landing Flight Facility (a federally-owned property) is examined relative to its potential transfer to Stanislaus County.

Water Supply ▸ The five study areas are evaluated for water supply issues related to commercial/industrial development. Both the technical merits and costs of water supply options suitable for the types of development considered are analyzed. A conceptual cost estimate for the most viable approach is provided for each study area.

Wastewater Treatment and Disposal ▸ A technical and cost evaluation of wastewater treatment and disposal systems suitable for commercial/industrial uses is provided. The evaluation includes consideration of conveyance, treatment, and handling/disposal of effluent. A conceptual cost of the most viable approach for each study area is provided.

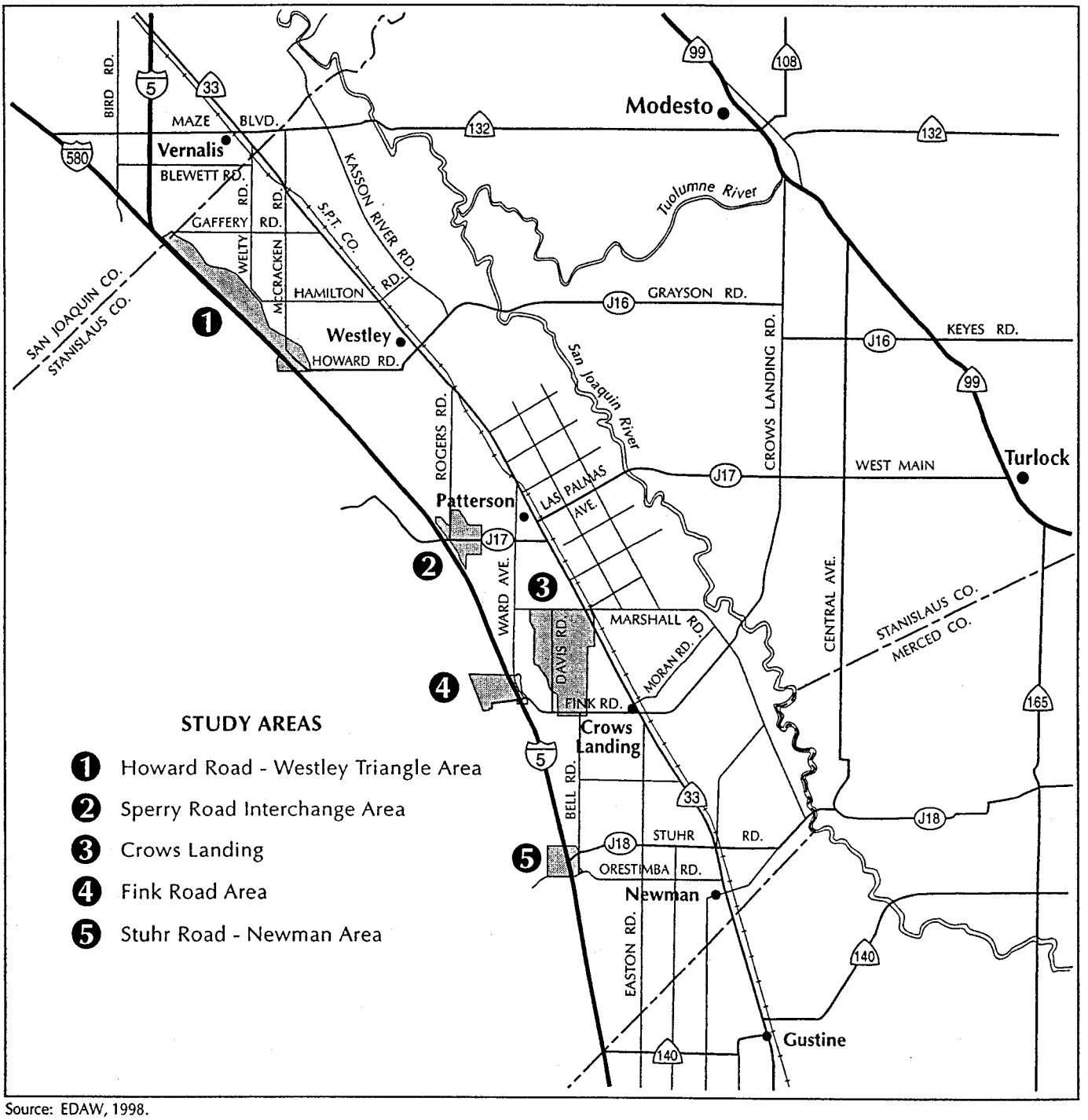
Interchange Evaluation ▸ An interchange capacity evaluation is presented for each of the study areas. The evaluation is based on available daily a.m. and p.m. peak hour traffic counts from the County, Caltrans, and published data. Key intersections near the interchanges serving the study areas are examined. Future projections from the SAAG model are used as a base in determining future interchange volumes. Traffic generated by the development scenario at each study area is added to future forecasts to estimate total traffic with the developments. Interchange and major access road improvements are identified to support projected traffic from the development of each study area. An estimate of the conceptual construction cost for one set of potential interchange and roadway improvements is provided for each study area.

San Joaquin Kit Fox Evaluation ▸ San Joaquin kit fox could potentially be present on any of the study areas. As a result, an approach to provide mitigation for impacts to San Joaquin kit fox is described for each of the five study areas, based on typical resource agency requirements. In addition, the possibility of establishing a mitigation bank on the Fink Road study area is presented.

Economic Feasibility Evaluation ▸ A market update of data on absorption rates and land prices in the area was conducted for application to all of the study areas. The market data and cost data are organized and synthesized to aggregate development costs and possible revenue produced by developed land for each study area. Cost data includes the cost estimates for major water, wastewater, and interchange infrastructure. A marketability schedule and pricing program was formulated based on absorption rates and cost/revenue information. Information is presented in spreadsheet form showing costs versus revenues in an all cash program spread over time. Appendix B of this report presents the complete economic analysis.

Other factors revealed through investigations for this report are also included, as relevant, to individual study areas.

Feasibility conclusions are presented in the Executive Summary, Chapter 2, of this report.



Source: EDAW, 1998.

Interstate 5 Corridor Study Areas

EXHIBIT 1-1

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

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2 EXECUTIVE SUMMARY

2.1 INTRODUCTION

This *I-5 Corridor Industrial/Business Park Feasibility Study* evaluates the feasibility of developing commercial and industrial uses at five locations along the I-5 corridor in western Stanislaus County. The County has been investigating economic development potential along the I-5 corridor for several years. The purpose of the study is to help the County Board of Supervisors consider actions that could encourage industrial/business park development in the corridor. The five study areas were evaluated based on the following factors: location, existing land uses, general plan designations and policies, environmental regulatory issues, interchange access, water supply, wastewater treatment and disposal, San Joaquin kit fox mitigation, land values, and economic demand.

In addition, the study evaluates the feasibility of establishing a mitigation bank for San Joaquin kit fox and other species at one location on the west side of I-5.

This summary contains the following:

- A summary description of the five study areas and the potential San Joaquin kit fox mitigation bank.
- A summary of the development scenarios considered for the five study areas.
- Key findings for each of the study areas.
- A summary of feasibility conclusions and recommendations for next actions.

2.2 SUMMARY DESCRIPTIONS OF THE PROPOSED STUDY AREAS

Five locations were identified by county staff as areas where interest in potential industrial/business park development has been expressed in the past. Boundaries of the study areas were established based on proximity to I-5 interchanges at four locations and association with the NASA Crows Landing Flight Facility at the fifth study area, as well as considering the unique characteristics of each interchange site. The selection of the study areas and boundaries serve to focus the evaluation, but are not intended to exclude the County's consideration of other property for economic development. Each study area is described below.

HOWARD ROAD—WESTLEY TRIANGLE AREA

The Howard Road—Wesley Triangle study area is approximately 5.5 miles long, stretching from the San Joaquin/Stanislaus County line on the north to Howard Road on the south, between I-5 on the west and the California Aqueduct on the east. Total acreage encompassed in the Howard Road—Westley Triangle study area is approximately 1,300 acres. Howard Road—Westley Triangle is the northernmost of the locations under consideration.

SPERRY ROAD INTERCHANGE AREA

The Sperry Road Interchange study area consists of approximately 800 acres located east of I-5 at the at the Sperry Road—Patterson interchange (County Road J17). The study area is bordered on the west by the California Aqueduct, which generally parallels I-5, and extends east toward the City of Patterson. The Delta-Mendota Canal crosses north-south through the study area. The study area is located within the City of Patterson's Sphere of Influence.

FINK ROAD INTERCHANGE AREA

The Fink Road Interchange Area consists of approximately 1,000 acres, located mostly on the west side of I-5, north of Fink Road. The study focuses on an area north of the Fink Road Landfill in the vicinity of the interchange. The boundaries are not fixed, but reflect a logical geographic target for the analysis. The area is bordered on the east by the California Aqueduct and on the west by existing Pacific Gas and Electric (PG&E) overhead transmission lines. On the north, the boundary is formed by the southern edge of APN 025-12-33. The southern boundary generally follows Fink Road and property lines west of I-5.

STUHR ROAD—NEWMAN INTERCHANGE AREA

The Stuhr Road—Newman Interchange Area consists of approximately 600 acres centered on the interchange and situated along both sides of I-5. This study area is bordered on the south by Orestimba Road, on the east by the Delta-Mendota Canal, and on the west by the California Aqueduct. I-5 bisects the study area in a north-south direction. The Stuhr Road—Newman Interchange Area is the southernmost of the five locations under consideration.

CROWS LANDING

The Crows Landing study area consists of approximately 2,500 acres, including approximately 1,500 acres within the NASA Crows Landing Flight Facility airfield (which Stanislaus County is acquiring from the Federal government). The study area is located 1 mile west of State Route 33 and 1 mile east of I-5, near the Fink Road interchange. The Crows Landing study area is bounded by the Delta-Mendota Canal on the west, Bell Road on the east, Fink Road on the south, and Marshall Road on the north.

FINK ROAD MITIGATION BANK STUDY AREA

The study area evaluated as a possible San Joaquin kit fox mitigation bank consists of approximately 3,900 acres mostly west of I-5 near the Fink Road interchange. It is generally bounded by Solada Creek on the north and Crow Creek on the south. The area generally surrounds the existing Fink Road Landfill and proposed landfill expansion area.

2.3 SUMMARY OF DEVELOPMENT SCENARIOS

Development scenarios were formulated to test cost and feasibility issues. At the four interchange study areas, the scenarios are based on market conditions and the typical sequence of commercial and industrial development occurring near freeway interchanges in the region.

The scenarios are divided into three "generations" that reflect the typical economic progression of uses at each interchange.

Due to the unique features of the Crows Landing site, a different scenario was developed for this study area, based on market potential related to airfields.

FIRST GENERATION DEVELOPMENT SCENARIO

First generation development at an interchange area would typically include "highway commercial" uses serving truckers and travelers using I-5. Highway commercial uses may include, but are not limited to motels and hotels, fast-food and sit-down restaurants, gas stations with mini-marts, truck service and repair establishments, recreational vehicle goods and services, and recreational vehicle parks.

These uses typically develop with a Floor Area Ratio (FAR) of 0.2 (i.e., 1 building square foot per 5 square feet of land, or about 8,700 square feet of development per acre). Highway commercial sites are typically developed with large landscape and parking areas and extra wide streets to accommodate truck turn lanes. The typical FAR allows for future expansion.

SECOND GENERATION DEVELOPMENT SCENARIO

The second generation of development that would typically include some types of industrial and heavier commercial uses. Uses that can take advantage of a location next to a regional and interstate freeway would be expected. These uses could include, but are not limited to distribution centers, warehousing, agricultural services, trucking and storage businesses, freight forwarding, and freight interchange.

Second generation uses would typically develop with a FAR of 0.17 (i.e. 1 building square foot per 6 square feet of land, or about 7,300 square feet of development per acre). Industrial and heavy commercial uses as envisioned are typically developed with buffers around buildings, large areas of landscaping, large parking or storage areas, and extra wide streets to accommodate trucks. The FAR allows for future expansion.

THIRD GENERATION DEVELOPMENT SCENARIO

As second generation development matures and infrastructure is expanded, a third generation of development could emerge. Third generation development could include large scale sales and marketing facilities (e.g. high technology), mixed use regional and local industry, or special uses. The arrival of these businesses would also typically need the development of housing supply close enough to support potential employees.

Although large-scale development can vary in intensity, for purposes of this study, the third generation uses are anticipated to develop with a FAR of 0.17.

CROWS LANDING DEVELOPMENT SCENARIOS

The Crows Landing site is unique among the study areas. It is not located at an interchange. More specifically, its distinguishing features are the presence of an landing field and facilities to

support aviation activities. The site also has some constraints due to the presence of contamination in association with its prior use as a Naval Auxiliary Landing Field.

Because of the uniqueness of this site, and given historic development trends and no proactive marketing intervention, Crows Landing would likely develop with atypical uses, not following the first, second, third generation development scenario pattern described above. Instead, the uses envisioned for this would be oriented to aviation. Possible uses include specialized air freight distribution or specialty aviation-related recreation, such as hot air ballooning, sky diving, etc. Other possible aviation oriented uses could include training, recreational commercial flying, glider facilities, schools or training centers, rental opportunities, and regional/state competitions and events.

Stanislaus County may, however, intervene to stimulate the rate or type of growth at Crows Landing. The site access to I-5, the railroad, waste energy plant, and existing air facilities could make this site opportune for air freight-ground distribution throughout the central valley and Bay Area.

SAN JOAQUIN KIT FOX MITIGATION BANK

To accommodate a habitat mitigation bank, the development of the property would be restricted. Lands would generally be maintained as habitat for the species covered by the bank. Some existing agricultural uses could be converted to habitat, or maintained for the foreseeable future with the prospect of future conversion.

2.4 SUMMARY OF STUDY AREA FINDINGS

The key findings of the evaluation are summarized below for each of the five study areas. Please refer to the discussions in Sections 4 and 5 for the details of each analysis.

HOWARD ROAD—WESLEY TRIANGLE AREA

The study area has been developing first-generation, highway commercial uses. Existing uses include gas stations, several fast food and sit-down restaurants, lodging, and a truck stop with a card lock fueling facility. A new motel is currently under construction. Development is occurring immediately around the interchange. The land use within the study area north of the interchange to the county line is primarily agriculture, with seven parcels under active Williamson Act contracts. In this northern part of the area, access is limited and the property has a long, narrow configuration contained between the freeway and the aqueduct.

Interchange Access

The current interchange can continue to serve near-term development. To provide adequate access for full development in the Howard Road—Wesley Triangle study area, modifications to the existing tight diamond interchange configuration would be needed. These could include ramp intersection improvements, underpass widening, and a new "hook" ramp to northbound I-5 from McCracken Road. Costs for the interchange improvements are estimated to be approximately $5 million.

Water Supply

Currently, development in the Howard Road—Wesley Triangle area is served by onsite wells. It is within the Del Puerto Water District which supplies agricultural water to the area. As development expands, a more reliable water supply source would need to be identified. Use of groundwater appears to be the most feasible. Components necessary to provide water to the study area include a groundwater well, a water treatment system, pumping stations, storage tanks and a conveyance system. Costs for water infrastructure to accommodate all three generations of development are estimated to be $5.9 million.

Wastewater Treatment and Disposal

Existing development in the Howard Road—Wesley Triangle study area is served by onsite septic systems. A wastewater conveyance and treatment system would be needed to provide for full future development in the study area. Costs for a new system total approximately $15.5 million.

San Joaquin Kit Fox Mitigation

Based on typical ratios of mitigation property to affected habitat in this study area, its full development would require substantial acquisition of land for kit fox mitigation. The need for mitigation land is estimated to be approximately 800 acres. Affected land west of I-5 would be of greater concern to the USFWS, than land east of I-5, because it has higher existing habitat values for the kit fox.

Economic Feasibility Conclusions

The presence of first generation development at the Howard Road—Wesley Triangle study area make it a major commercial and transportation node along I-5 within Stanislaus County. Fifty acres near the interchange are currently developed as commercial uses. No industrial uses are developed in the study area. Based on the findings of the economic analysis, the Howard Road—Wesley Triangle study area has a short-term (i.e., over the next 5 to 15 years) potential for 220 acres of industrial development and 80 acres of commercial development. Economic conditions could favor commercial development at this location, because of the needs for water and wastewater facilities for industrial uses. Development north of the interchange area is not likely in the short term, because of access constraints and the active agricultural preserve contracts on several parcels.

Capital costs for the necessary offsite improvements (interchange, water and wastewater) would cost approximately $34,000 per acre (including carrying costs). Onsite improvements would cost approximately $40,000 per acre bringing total onsite and offsite costs to $74,000 per acre. In total, breakeven for the Howard Road— Wesley Triangle study area would be around $157,000 per acre which would equate to approximately $3.60 per square foot.

SPERRY ROAD INTERCHANGE AREA

First-generation commercial development has begun within the Sperry Road Interchange Area. The northeast corner of the Sperry Road—I-5 interchange is known as "Villa del Lago" (formerly Patterson Gateway). This development occupies the entrance to the City of Patterson which is

located approximately 1.5 miles to the east of the interchange. Villa del Lago is currently developed with a gas-station/convenience store and one fast food restaurant located off Rogers Road. Additional development parcels are available and a large monument sign has been constructed to identify the interchange for travelers.

This study area is located within the SOI of the City of Patterson with all the land designated in the Patterson General Plan for urban development. Seven parcels in the study area are in active Williamson Act Contracts; two other parcels have filed for non-renewal of their contracts.

Interchange Access

The Sperry Road Interchange study area could be served with the existing tight diamond interchange configuration for early stages of development. However, improvements are recommended at both the north and southbound on- and off-ramps to accommodate the full future development. As part of the proposed roadway improvements, all ramp intersections should be signalized. The overpass structure should be widened to accommodate additional lanes and standard shoulders. The overpass improvement is a costly project because of the length of structure needed to span the aqueduct and accommodate local topography. Total costs for improvements to the interchange and roadways would be approximately $7.4 million.

Water Supply

Development at the Sperry Road Interchange study area is served with water from the City of Patterson which recently extended infrastructure west to serve unincorporated areas within its Sphere of Influence. No additional costs are associated with providing the major facilities needed for water service to the Sperry Road Interchange study area. The availability of water service provides a substantial competitive advantage to this area.

Wastewater Treatment and Disposal

Development at the Sperry Road Interchange study area receives wastewater conveyance and treatment from the City of Patterson which recently extended infrastructure west to serve unincorporated areas within its Sphere of Influence. The city is planning the expansion of its wastewater treatment plant at this time. No additional costs are associated with providing wastewater service to the Sperry Road Interchange study area. The availability of wastewater service is a substantial competitive advantage to this study area.

San Joaquin Kit Fox Mitigation

The study area is east of the aqueduct in farm land and urban development, so it is not considered to be as valuable for kit fox habitat as land west of I-5. Based on typical ratios of mitigation property to affected habitat in this study area, its full development would require a moderate amount of land acquisition for kit fox mitigation. The need for mitigation land is estimated to be approximately 120 acres.

Economic Feasibility Conclusions

The Sperry Road Interchange area is in the early stages of first generation development as described above. Economic analysis for the study area revealed an immediate short-term (i.e. 5 to 15 years) potential for development of upscale commercial and, to a somewhat lesser degree, industrial uses. The opportunity for more upscale, retail uses is unique among the study areas, because of the proximity to Patterson. Approximately 700 acres of the total area would be available for development in the short-term (i.e. the next 5—15 years). Of this amount, approximately 40 acres have short-term potential for commercial development.

The location of the study area in a city's SOI, the proximity to housing supply in Patterson, and the presence of adequate water and sewer infrastructure make this study area one of the first priority ranked locations for future commercial and industrial development. Investment in the interchange improvement would take care of the one major infrastructure capacity constraint for substantial development.

Major offsite capital costs relate to the interchange only, because water and sewer services are available. Offsite capital costs are approximately $15,000 per acre. Onsite improvements would cost approximately $40,000 per acre, bringing total costs to $55,000 per acre. Total breakeven costs per acre within the Sperry Road Interchange study area would be around $125,000 per acre which would equate to a breakeven cost of $2.90 per square foot based on all three generations of development.

FINK ROAD INTERCHANGE AREA

The Fink Road Area is undeveloped and predominantly cultivated in orchards. The only paved access to the Fink Road Area is provided from the Fink Road exit off I-5. Several unpaved dirt roads provide access to the orchards and vacant areas to the west of the orchards. Further to the west beyond the orchards, the topography rises more steeply to elevations of approximately 400 feet. The entrance to the Fink Road Landfill is located at the south boundary of the study area.

Land use in the Fink Road Area is governed by the Stanislaus County General Plan and zoning ordinance. Current designations are all agricultural. This study area is not located within the SOI of any neighboring cities. None of the parcels in the study area are in active Williamson Act contracts.

Interchange Access

The existing interchange can serve a limited amount of commercial development. To accommodate the full development scenario within the Fink Road study area, improvements are recommended at both the north and southbound on- and off-ramps. As part of the proposed roadway improvements, all ramp intersections should be signalized. Further, the overpass structure should be widened to accommodate additional lanes and standard shoulders. Total costs for the necessary improvements at the Fink Road Area would be approximately $5.3 million.

Water Supply

With only agricultural uses located on the Fink Road Area, a potable water supply is not present. To provide potable water to support future development, the Fink Road Area would require installation of a complete water system, including groundwater well, construction of a water treatment system, pumping stations, storage tanks, and a conveyance system. Costs for water infrastructure to accommodate all three generations of development are estimated to be $3.7 million.

Wastewater Treatment and Disposal

Because the Fink Road Area is currently used for agriculture, it does not have any wastewater services or infrastructure. To provide for full future development, a complete wastewater conveyance and treatment system would be required. Costs for a new system total approximately $24.3 million.

San Joaquin Kit Fox Mitigation

San Joaquin kit fox sightings have historically occurred on the Fink Road Study Area. Although the study area consists of orchards (which are not used much by the species), USFWS considers habitat west of I-5 as important, high quality kit fox habitat. Consequently, substantial land acquisition would be expected to mitigate for kit fox impacts. The mitigation requirement is estimated to be approximately 1,100 acres of habitat.

Economic Feasibility Conclusions

The Fink Road Interchange study area is currently isolated from any types of commercial or industrial development. Basically, 700 acres could conceivably be developed out of the total 1,000-acre study area. However, the economic analysis did not identify any developable acreage in the short-term (i.e. the next 5 - 15 years), because the study area did not appear to be economically feasible in the absence of other nearby development (i.e. Crows Landing). In the long-term, there is potential for 130 acres of commercial and 570 acres of industrial development to occur. However, long-term potential development may be contingent on development of Crows Landing and expansion of the Fink Road—I-5 interchange.

Capital costs (i.e. interchange, water, wastewater) would cost approximately $56,000 per acre. Onsite improvements would cost approximately $40,000 per acre bringing total onsite and offsite capital costs to $96,000 per acre. In total, breakeven costs per acre within the Fink Road study area would be around $196,000 per acre which would equate to approximately $4.50 per square foot based on all three generations of development.

STUHR ROAD—NEWMAN INTERCHANGE AREA

Development at the Stuhr Road interchange is limited to agricultural uses. Westbound Stuhr Road currently ends at the I-5 overpass. Therefore, the area west of I-5 within the study area is currently unaccessible from Stuhr Road. The study area is dominated by agricultural land. The northeast corner of the interchange (east of I-5 and north of Stuhr Road) is currently undeveloped land. This area is dominated by riparian vegetation associated with Orestimba Creek, including

a large stand of California sycamores. The remainder of the study area consists of approximately 55 acres of orchards, 60 acres of cropland, and 238 acres of non-native grassland.

Land use in the Stuhr Road—Newman Interchange Area is governed by the Stanislaus County General Plan and zoning ordinance. This study area is not located within the SOI of any neighboring cities. One parcel in the study area is in an active Williamson Act contract.

Interchange Access

The existing interchange has capacity to handle some commercial development on the east side of I-5. To accommodate the full development scenario within the Stuhr Road—Newman Interchange study area, improvements are recommended at both the north and southbound on- and off-ramps. All ramp intersections should be signalized and the overpass structure should be widened to accommodate additional lanes and standard shoulders. Topography at this site is easier for interchange construction, which helps costs stay lower than other locations. Total costs for the necessary improvements at the Stuhr Road-Newman Interchange Area would be approximately $1.1 million.

Water Supply

The Stuhr Road—Newman Interchange area is primarily vacant with some agricultural uses, so a potable water supply system is not present. To provide potable water to support future development, the Stuhr Road—Newman Interchange area would require installation of a complete system, including a groundwater well, construction of a water treatment system, pumping stations, storage tanks, and a conveyance system. Costs for water infrastructure to accommodate all three generations of development are estimated to be $2.6 million.

Wastewater Treatment and Disposal

The Stuhr Road—Newman Interchange area has no sewer system, because it is primarily vacant with some agricultural uses. To support future development, the Stuhr Road—Newman Interchange area would require a complete wastewater conveyance and treatment system. Costs for wastewater infrastructure to accommodate all three generations of development are estimated to be $10.7 million.

San Joaquin Kit Fox Mitigation

The study area has land that is both east and west of I-5. It also contains an important riparian area west of the freeway. Based on typical ratios of mitigation property to affected habitat in this study area, its full development would require a substantial amount of land acquisition for kit fox mitigation. The need for mitigation land is estimated to be approximately 730 acres.

Economic Feasibility Conclusions

The Stuhr Road—Newman Interchange area has potential to develop over the long-term (i.e., 20 years), but is constrained by the lack of infrastructure in the short-term. Conceivably, much of the total 600 acres of the study area could be developed, assuming avoidance of the important habitat areas. However, the economic analysis did not identify any developable acreage in the

short-term (i.e. the next 5 to 15 years), because near-term development did not appear to be economically feasible due to capital costs for water and wastewater. In the long-term, there is potential for 90 acres of commercial and up to 510 acres of industrial development to occur.

Capital costs (i.e. interchange, water, wastewater) would cost approximately $41,000 per acre. Onsite improvements would cost approximately $40,000 per acre bringing total capital costs to $81,000 per acre. Total breakeven costs would be approximately $170,000 or $3.90 per square foot based on all three generations of development.

CROWS LANDING STUDY AREA

In 1994, NASA took over operation of the Naval Auxiliary Landing Field (NALF) Crows Landing from the U.S. Navy. Since this time, the facility has been known as the NASA Crows Landing Flight Facility. The facility includes an airfield consisting of two concrete runways and related taxiways. Facilities located on the east side of the runway include a control tower, administrative offices, maintenance areas, and fire/rescue facilities. The north end of the facility includes a NASA satellite flight research site and test area. The remaining land is outleased to a private tenant for agricultural uses. Support facilities include storage areas, buildings, equipment, and roads.

The portion of the Crows Landing study area occupied by the NASA Crows Landing Flight Facility does not have designations within the Stanislaus County General Plan, because it is federal property. The remainder of the area, however, is subject to county jurisdiction and is designated for agriculture. The Crows Landing study area includes seven active Williamson Act contracts.

Interchange Access

Unlike the other locations, the Crows Landing study area is not adjacent to an I-5 interchange. Access to the area is available from the Fink Road—I-5 interchange to the west or State Route 33 to the east. With full development, traffic at the Fink Road interchange would increase. To accommodate the full development scenario within the Crows Landing study area, full signalization of the north and southbound ramp intersections is recommended. Additional lanes and ramp widenings are also suggested to facilitate traffic flows associated with increase traffic. Total costs for the recommended improvements would be approximately $4.4 million.

Water Supply

Because of its prior use as a NALF, Crows Landing has an onsite water system in place. However, the presence of coliform bacteria was discovered in the water system in August 1993. Although NASA inundated the system with chlorine to destroy the bacteria, the system can never be used to supply potable water. Therefore, a new water supply system is necessary to serve future development. Components necessary to provide water to the study area include a groundwater well, a water treatment system, pumping stations, storage tanks and a conveyance system. Costs for water infrastructure to accommodate all three generations of development are estimated to be $9.8 million.

Wastewater Treatment and Disposal

The Crows Landing study area currently has onsite wastewater service. However, due to the poor condition of the existing system, and Stanislaus County's new regulations and guidelines regarding disposal of wastewater, a new wastewater treatment and conveyance system would be required. Costs for wastewater infrastructure to accommodate all three generations of development are estimated to be $25.2 million.

San Joaquin Kit Fox Mitigation

Development of the Crows Landing study area would be expected to be aviation, specialized air freight distribution, and specialty recreation. Consequently, it is reasonable to expect that new development would occur primarily on already developed land within the flight facility. It is not likely, given the availability of the flight facility grounds, that new buildings would be constructed in undeveloped agricultural areas. Therefore, no removal of San Joaquin kit fox foraging or denning habitat is expected and no need for mitigation land would arise.

Economic Feasibility Conclusions

The Crows Landing study area has economic development potential for commercial and industrial uses primarily because it has a history of "industrial" use and can be planned as a unit, developed, and marketed by a public entity. Timing for planning, development and marketing for the NASA Crows Landing Flight Facility is currently unknown due in part to uncertainties surrounding potential transfer of the property to Stanislaus County. In the planning process, resolving the water and wastewater infrastructure constraints would be very important to establish competitive advantage and limit cost exposure for future tenants.

Approximately 1,750 acres (of the total 2,500) are available for development in the short-term. This acreage is currently undesignated but a spilt of 320 commercial acres and 1,430 industrial acres is a reasonable estimate for study purposes, or other mixes of use can be implemented, given the opportunity for comprehensive planning of the area.

Capital costs (i.e., interchange, water, wastewater) total approximately $27,000 per acre. Onsite improvements would cost approximately $40,000 per acre bringing total onsite and offsite capital costs to $67,000 per acre. In total, breakeven costs per acre within the Crows Landing study area would be approximately $83,000. This equates to a breakeven cost of approximately $1.90 per square foot based on all three generations of development.

MITIGATION BANK FEASIBILITY CONCLUSIONS

Establishing a San Joaquin kit fox mitigation bank would require land acquisition, restoration of orchards and row crops to grassland habitat, and long-term maintenance. Mitigation banks often require substantial front-loaded costs to set up the bank and receive approval from the resources agencies. It is important to find properties with relatively low land values and good habitat values or cost effective habitat restoration opportunities.

The Fink Road area has certain attributes that are important for habitat mitigation. It is in a region where the need for a mitigation land exists, recognizing the long term plans for

development in areas considered by USFWS to be kit fox habitat. Non-native grasslands, like are present in rolling hillside parts of the study area, have considerable kit fox habitat value. The study area is located on the west side of I-5 where USFWS is most interested in conserving habitat.

The Fink Road Mitigation Bank Study Area does not, however, appear to be the most economically advantageous location for a bank, because of relatively high land values and restoration costs. Much of the study area contains orchards or row crops, and the majority of the orchard areas are mature. The presence of row crops and orchards increases the land value, compared to the kit fox's preferred habitat of non-native grassland. The need to restore orchards, particularly mature orchards, to grassland substantially increases restoration costs. If the parts of the study area that are currently non-native grassland were protected, by an easement for example, that land by itself could serve as valuable kit fox habitat mitigation for a development project. Nonetheless, the concept of creating an economically self-sustaining, mitigation bank from the 3,900-acre study area does not appear to be feasible at this location, recognizing the costs of land and restoration.

The Nature Conservancy recently purchased approximately 95 square miles in the vicinity of the Stuhr Road interchange, and plans to manage most of these lands as conservation areas. Initiating mitigation banking programs near either the Fink Road or Stuhr Road interchanges may provide an opportunity for contiguous habitat preservation and mitigation credit acquisition for other developments along the Interstate 5 corridor.

2.5 FEASIBILITY CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS REGARDING THE FIVE STUDY AREAS

Table 2-1 presents a comparison of economic factors affecting the feasibility of industrial/ business park development at the five study areas. It also includes a relative ranking of the recommended priority for economic development of the areas.

First Priority for Economic Development

Two study areas, the Howard Road—Wesley Triangle Area and Sperry Road Interchange Area, have competitive advantages over Crows Landing, Fink Road Interchange Area, and the Stuhr Road—Newman Interchange Area. Both the Howard Road—Wesley Triangle and Sperry Road Interchange areas have a competitive advantage due to the current level of development and available land for immediate development. The conditions at the Howard Road—Wesley Triangle area appear to be more conducive to highway commercial than industrial because of the need for water and wastewater facilities, although both uses could occur over time. The Sperry Road area has an additional advantage, because of the availability of municipal water supply and wastewater treatment and disposal. This is encouraging to both industrial and highway commercial development, and in the long-term could help support higher intensity industrial development. Also, more upscale, retail commercial uses could be viable in the Sperry Road area because of its proximity to Patterson. The Howard Road—Wesley Triangle and Sperry Road Interchange, therefore, have immediate short-term (next 5 to 15 years) potential. These two locations warrant the highest priority for economic development actions.

Actions to consider include amending general plan land uses in the study areas to increase the amount of land under development designations. Also, at the Sperry Road Interchange Study Area, the improvement of the interchange could be pursued, in a coordination between the county, City of Patterson, and Caltrans, to resolve the one major infrastructure constraint at that location.

Second Priority for Economic Development

The Crows Landing area has substantial potential primarily because it has a history of "industrial" use and can be planned as a unit, developed, and marketed by a public entity. Its airfield is a unique asset for specialized development and uses. Uncertainties about when the county can acquire the flight facility and the costs of substantial water and wastewater infrastructure improvements may delay the timing of major development. Additional land use planning and detailed investigations of the most cost-effective approaches for resolving water supply and wastewater issues are needed before the study area can be aggressively marketed for development. This study area warrants a second priority for short-term economic development, with more detailed planning to appropriately prepare the area for longer term development of its special, aviation-related assets and previously industrial land.

When the flight facility is acquired from the federal government, the county should prepare a specific plan for the study area to define planned uses more precisely and take care of environmental review requirements. The water, wastewater, and access infrastructure requirements of specific plan development and financing approaches would need to be investigated in more detail and made a part of the implementation program of the specific plan. Also, although not evaluated in detail in this study, resolution of remediation responsibilities would be very important where contamination is still present on the flight facility. This is expected to occur in conjunction with the county's acquisition of the facility. With a specific plan, implementation program, and environmental clearances in place, the Crows Landing area could be aggressively marketed to secure tenants that can take advantage of its unique airfield assets and regional location.

Third Priority for Economic Development

Both the Fink Road Interchange Area and Stuhr Road—Newman Interchange Area have economic disadvantages compared to the other locations. Isolation from development, lack of water and wastewater infrastructure, and presence of sensitive San Joaquin kit fox or other habitats are the key constraints identified in this study. These two study areas warrant a third priority for economic development actions. They could have important development potential for the county to recognize as longer term opportunities (i.e., 15 - 20 years and thereafter) in the general plan. In the short term, these two study areas are the least attractive of the areas examined for industrial/business park economic development.

Table 2-1
SUMMARY OF KEY FINDINGS

STUDY FACTOR	STUDY AREAS				
	Westley Triangle	Sperry-Patterson	Fink Road	Stuhr Road	Crows Landing
Interchange Cost of Improvement ($)	$5 M	$7.4 M	$5.3 M	$1.1 M	$4.4 M
Water Supply Cost of Improvement ($)	$5.9 M	None [1]	$3.7 M	$2.6 M	$9.3 M
Wastewater Cost of Improvement ($)	$15.5 M	None [2]	$24.3 M	$10.7 M	$25.2 M
Estimated Kit Fox Mitigation (acres and $) [3]	800 ac $0.8 M	120 ac $0.12 M	1,100 ac $1.1 M	730 ac $0.73 M	None [4] $0
Land in Williamson Act	612.11 ac	253.04	0	93.6	914.85
Total Development Cost per SF ($) [5]	$3.60	$2.90	$4.50	$3.90	$1.90
Priority Rank for Indust./Bus. Park Development	First	First	Third	Third	Second
Short-Term Rating for Commercial	Good	Very Good	Marginal	Marginal	Good
Short-Term Rating for Industrial	Very Poor	Marginal	Very Poor	Very Poor	Marginal
Expected Types of Development Uses [6]	HW Com. Industrial	HW Com. Upsc. Com. Industrial	HW Com. Industrial	HW Com. Industrial	Gen. Com. Industrial Av. & Recr.

1 Major water supply facilities are available from the City of Patterson.
2 Major wastewater facilities are available from the City of Patterson.
3 Based on a cost of $1,000 per acre for annual grassland.
4 At Crows Landing, development is assumed to occur generally within previously developed areas of the flight facility.
5 These costs do not include the land acquisition fees associated with kit fox mitigation.
6 "HW Com." is highway commercial. "Upsc. Com." is upscale commercial, which typically consists of retail businesses with higher value products. "Gen. Com." is general commercial. "Av.& Recr." is aviation-related recreation and training.

M = million
ac = acre

Source: EDAW 1998

3 METHODOLOGY AND FEASIBILITY ANALYSIS

This section provides a discussion of the methodology used in: selecting the sites for inclusion in this feasibility study, formation of the proposed development scenarios for the four sites located at interchanges along I-5 as well as the Crows Landing study area, the process of collecting and evaluating the data, and the formulation of recommendations based on an assessment of all factors involved in developing each of the study areas.

The Feasibility Analysis provided in this section has been prepared based on information from a variety of sources including site reconnaissance, review of documents, agency contacts, and technical reports. Each study area is analyzed relative to its location and physical characteristics; consistency with relevant planning, policy and regulatory considerations from the Stanislaus County General Plan, Stanislaus County Zoning Ordinance and any other applicable documents; adequacy of existing interchanges with identification of possible improvements and associated costs; availability and feasibility of water supply and wastewater treatment and disposal and associated costs; potential for San Joaquin kit fox and appropriate mitigation; economic considerations; and other factors. Based on the analysis, conclusions are drawn as to the feasibility of developing the study areas with the proposed commercial/ industrial uses.

3.1 METHODOLOGY FOR CONDUCTING THE FEASIBILITY ANALYSIS

The feasibility analysis has been a collaborative effort between County staff and the consultant team. The process for conducting the analysis included:

- Identification of Available Land: County staff provided an analysis of the land currently zoned for industrial/business park uses throughout the County that was still available (i.e., undeveloped). The size of available parcels was also evaluated noting that most were smaller in size (e.g., 5-15 acres).

- Definition of Sites: The location and acreage of the five potential development sites were defined with county staff. Site attributes (e.g., assessors parcel numbers, parcels under Williamson Act contract, and other relevant features) were entered into the County's geographic information system (GIS), which then generated site maps.

- Formation of Development Scenarios: The most probable development scenarios were formed for the study areas based on their locations, parcel sizes, proximity to I-5, general development intensity/patterns in the vicinity, and other factors. The development intensity and typical study area needs (e.g., wide roadway rights-of-way, abundant landscaping) were defined based on typical marketplace conditions in the region. A different development scenario was developed for Crows Landing, because with its airfield it is unique among the study areas.

- Collection and Evaluation of Data: The primary sources of information for this feasibility study include existing reports and staff reports; consultation with local public agency staff (e.g., Stanislaus County, City of Patterson, City of Newman), the U.S. Navy, National Aeronautics and Space Administration (NASA), and various agencies (e.g., U.S. Fish and Wildlife Service, Del Puerto Water District);

and site reconnaissance (Chapter 6, References and Personal Communications, of this report).

- Evaluation of Data and Recommendations: The data was evaluated based on typical development needs, market considerations, site characteristics, the ability/viability of providing infrastructure, and other factors. The specific methodologies are contained, as relevant, in the body of this report. Based on review of the data, conclusions and recommendations relative to development of commercial/industrial uses are provided for each of the study areas.

AVAILABLE INDUSTRIAL/BUSINESS PARK LANDS

According to 1997 County records, approximately 3,220 acres of land are zoned to allow industrial/business park uses. Most of the existing industrial sites in the county are along Highway 99 or within Beard Tract Industrial Park. The 1997 data regarding the percentage of these acres that are undeveloped is not available. However, 1994 County records indicate that a large portion of this land is developed: 600,000 s.f. in leaseable office space and a similar amount in industrial use. An additional 418,000 s.f. has been developed in designated retail space. In 1994, approximately 1,665 acres were undeveloped, zoned for industrial/business park uses, and available to a new user. The County estimates that this available acreage would provide an inventory of land available for industrial/business park uses for nearly seven years based on the existing 5% growth rate. However, most available acreage is in small parcels, i.e., 5-15 acres. Therefore, any prospective user seeking large lots for industrial/business park purposes would have few available sites.

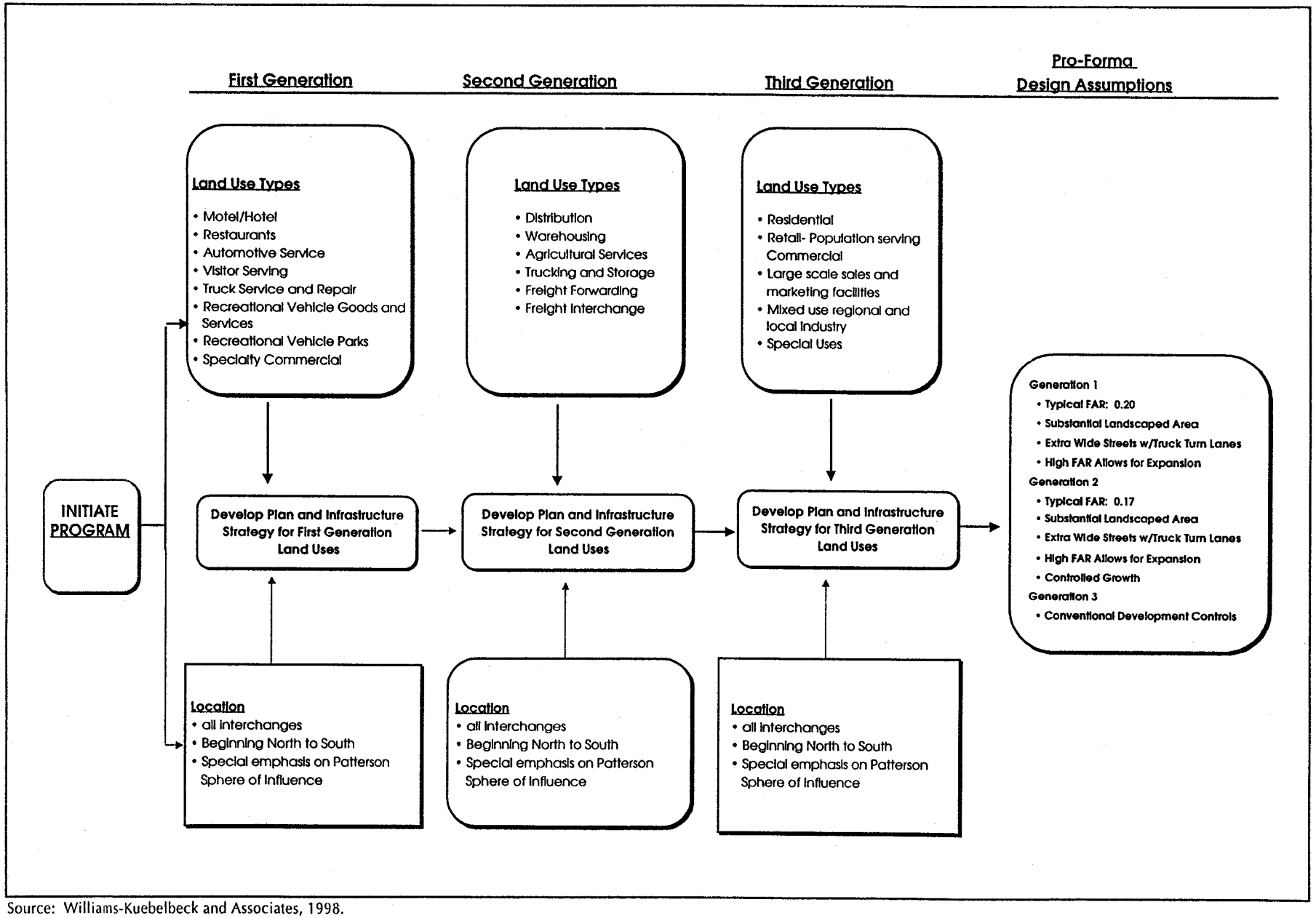
DEVELOPMENT SCENARIOS

Four of the five study areas, Howard Road—Westley Triangle, Sperry Road Interchange, Fink Road Area, and Stuhr Road—Newman Area, are located at interchanges along I-5. For these study areas, land uses and characteristics are considered according to developing in three "generations" that progressively expand the diversity of uses at each interchange. Over time, development would occur at the study area consistent with the following progression of land uses. Exhibit 3-1 provides an overview of the development scenarios.

First Generation Development

Land Uses: Based on typical market trends, the first types of uses that would be likely to locate at the study areas adjacent to interchanges would include the following (generally called 'highway commercial'):

- motel/hotel (e.g., serving commuters traveling between northern and southern California, and other passers-by)
- restaurants
- automotive service
- visitor-serving commercial
- truck service and repair
- recreational vehicle goods and services
- recreational vehicle parks
- specialty commercial
- destination recreation



Source: Williams-Kuebelbeck and Associates, 1998.

Development Chronology and Phasing at Interchange Areas

EXHIBIT 3-1

Characteristics: These uses would typically develop with a Floor Area Ratio (FAR) of 0.2 (i.e., 1 square foot (sq. ft.) of building per 5 sq. ft. of land). Highway/commercial uses are typically developed with large areas of landscaping, and extra wide streets with truck turn lanes. The FAR allows for future expansion.

Second Generation Development

Land Uses: Given some time and after development of first generation uses, a new generation of more industrial or heavy commercial uses could typically locate at the study areas, including:

- distribution (e.g., automobile maker distribution centers)
- warehousing
- agricultural services (e.g., uses with crop variety, high/heavy equipment use and repair services)
- trucking and storage
- freight forwarding
- freight interchange

Characteristics: These uses would develop with a FAR of 0.17 (i.e., 1 sq. ft. of building per 6 sq. ft. of land). Industrial or heavy commercial uses are typically developed with large areas of landscaping, and extra wide streets with truck turn lanes. The FAR allows for future expansion within the study area.

Third Generation Development

Land Uses: With maturation of development in the study area and availability of infrastructure, the next type of development that could occur is larger-scale sales and marketing facilities (select industries, potentially including high technology), mixed-use regional and local industry, or special uses.

Characteristics: These uses would also likely develop with a FAR of 0.17 (i.e., 1 sq. ft. building per 6 sq. ft. of land). Large scale sales and marketing facilities are typically developed with conventional development controls.

Crows Landing

Due to the uniqueness of Crows Landing as a former Naval Auxiliary Landing Field and NASA flight facility (with existing facilities, aviation availability, and constraints due to possible contamination and age/adequacy of facilities), this study area would likely develop with atypical uses, not following the development pattern described above. In the short term, the site has potential for commercial uses, such as aviation related recreation or specialized air freight distribution where smaller aircraft can suffice. These uses could include high-value agricultural product distribution, hot air ballooning, sky diving training and commercial recreation, glider training and rental, aviation schools or training centers, aviation rental, or regional/state aviation competitions or events. The short-term commercial use potential of the site was investigated for costs and feasibility.

Although the site appears to be marginal for short-term industrial development (such as air and/or ground freight distribution), it was considered in the study for longer-term development

potential. The total development cost for industrial uses would be higher than the current industrial market, which leads to its marginal feasibility. However, because development cost reduction approaches could decrease costs to make the site's potential industrial development more attractive, industrial use is addressed in this study for the longer-term future.

Fink Road San Joaquin Kit Fox Mitigation Bank

An alternative to the commercial/industrial (described under Development Scenarios above) for the Fink Road study area was also explored. Under this alternative scenario, the study area would be used as a mitigation bank for San Joaquin kit fox, a listed endangered species. The discussion includes a general cost estimate including land acquisition costs and habitat creation/restoration costs.

3.2 FEASIBILITY ANALYSIS

To avoid redundancy within the discussion of each specific study area, general information that pertains to multiple study area is provided below.

LAND USE, PLANNING, POLICY AND REGULATORY CONSIDERATIONS

General Plan Land Use Designations

The Stanislaus County General Plan (1994) provides various land use designations intended to further the goals and policies of the Land Uses Element. Four land use designations occur within the study areas. A description of each land use designation, including allowable uses, is provided below for reference.

Highway Commercial Planned Development

The Highway Commercial Planned Development designation is intended for land located at freeway interchanges where it is necessary to provide services to highway travelers. Principal land uses allowed under the Highway Commercial/Planned Development designation are limited to truck stops, restaurants, motels, service stations, overnight recreational vehicle camping, and fruit stands. Other uses such as towing service, minor emergency automobile repair, convenience market and wine tasting may be permitted, but only when they are accessory to the principal allowable uses.

The Highway Commercial Planned Development designation is appropriate only for parcels adjacent to a freeway interchange. No property can be designated Highway Commercial Planned Development and rezoned Planned-Development (P-D) unless the change will not be detrimental to the agricultural productivity of the surrounding property and that subject property is not considered to be one of the County's Most Productive Agricultural Areas.

Industrial

The Industrial land use designation indicates areas suitable for various forms of light or heavy industrial uses, including, but not limited to, manufacturing and warehousing. In general, the Industrial designation is used in areas where public sewer and water are available, within or adjacent to the Sphere of Influence (SOI) of a city or special district which serves an

unincorporated town. [A Sphere of Influence is a plan for the ultimate physical boundaries and service area of a local agency].

Almost all existing industrial areas are within or adjacent to the SOI of a city or special district Only one industrial area in the county is removed from an established urban area. The County has established criteria for designating sites for industries that need very large sites. The criteria include adequate access, provision of sewage disposal and water service, availability of utilities, suitable topography, absence of Williamson Act contracts, no conflicts with surrounding properties, consistency with the City General Plan if located in the City's SOI, and consistency with the Countywide Integrated Waste Management Plan.

Agriculture

The Agriculture designation recognizes the value and importance of agriculture by acting to preclude incompatible urban development from agricultural areas. It is intended for areas of land which are presently or potentially desirable for agricultural usage. These are typically areas which possess characteristics with respect to location, topography, parcel size, soil classification, water availability, and adjacent usage which, in proper combination, provide a favorable agricultural environment.

The Agriculture designation establishes agriculture as the primary land use, but also allows dwelling units, limited agriculturally related commercial services, agriculturally related light industrial uses, and other uses which by their unique nature are not compatible with urban uses, provided they do not conflict with the primary use. The Agriculture designation is appropriate in areas where the agricultural land is productive or potentially productive. It is also appropriate in areas the General Plan identifies as suitable for open space, recreational use and ranchettes.

Planned Development

The Planned Development designation is intended for land which, because of demonstrably unique characteristics, may be suitable for a variety of uses, without detrimental effects on other property.

The Zoning Ordinance indicates that all applications for planned development should be consistent with the General Plan. The following are considered to be valid uses of the planned development designation consistent with the intent of the Land Use Element:

a. Applications for uses of unique character (not otherwise allowed as proposed in other zoning districts) for which findings can be made as to the appropriateness of the locations and the absence of detrimental effects to the surrounding area.

b. Applications falling within an area designated by this element as a Planned Development area, subject to those resolutions within the appendix of this element that define special policy for planned development uses in the following areas:

   (1) Upper McHenry Avenue, Resolution No. 87-01

   (2) East F Street, Highway 108/120 Oakdale, Resolution No. 87-02

(3) Freeway Interchange and Frontage Roads adjacent to major highways and freeways, Resolution No. 87-03.

Resolution No. 87-03

Resolution No. 87-03 was adopted in May, 1987 by the Stanislaus County Planning Commission. The Resolution applies to all interchanges within Stanislaus County located along either Interstate 5 or State Highway 99 (Freitas, pers. comm., 1998). The Resolution establishes policies with respect to development of "Planned Development" designations on freeway interchanges and adjacent frontage roads.

According to the provisions of the Resolution:

Planned Development Applications for freeway and adjacent frontage roads should be for only those uses that service highway oriented traffic and would not be more properly located in any of the zoning districts existing in the County of Stanislaus or any of the cities within the County.

All planned development applications for adjacent freeway frontage roads should include provisions for the ultimate usage of entire contiguous ownerships. However, the application may provide for the phasing of development.

All planned development approvals shall include as an exhibit thereto, a signed agreement in a form satisfactory to the appropriate City Attorney and Stanislaus County Counsel guaranteeing that the property on which the planned development is applicable will be annexed to the appropriate city and/or connected to a public sewer system when such annexation or sewer connection is demanded by said city with the approval of the Stanislaus County Board of Supervisors.

All planned development applications should provide for consistence with County of Stanislaus standards with respect to landscaping, off-street parking, sign control and street improvements.

The Planning commission should review all divisions of land within the planned development designation to insure that such divisions are consistent with the above policies and approved land uses.

Conversion of Agricultural Land

The Agricultural Element of the General Plan recognizes the importance of agriculture to the economy of Stanislaus County. The purpose of the Element is to promote and protect local agriculture through the adoption of policies designed to achieve three main goals which include: 1) strengthening the agricultural sector of the County's economy, 2) preserving agricultural lands for agricultural uses, and 3) protecting the natural resources that sustain agriculture in the County.

The Agricultural Element also contains policies intended to demonstrate the County's commitment to specific programs and strategies that will ensure the continued success of agricultural industries and productivity of agricultural lands throughout the County. In particular, criteria regarding conversion of agricultural land is pertinent to a discussion of the proposed project.

According to the criteria contained in the General Plan Agricultural Element, conversion of agricultural land to urban uses shall be approved only if the Board of Supervisors makes the following findings:

1. Overall, the proposal is consistent with the goals and policies of the General Plan, and specifically is consistent with Policies 2.4 [To the greatest extent possible, development shall be directed away from the county's most productive agricultural areas[1]] and 2.5 [New areas for urban development (as opposed to expansion of existing areas) shall be limited to less productive agricultural areas[2]] of the Agriculture Element.

2. There is evidence on the record to show a demonstrated need for the proposed project based on population projections, past growth rates and other pertinent data.

3. No feasible alternative site exists in areas already designated for the proposed uses.

4. Approval of the proposal will not constitute a part of, or encourage, piecemeal conversion of a larger agricultural area to non-agricultural uses, and will not be growth-inducing (as used in CEQA).

5. The proposed project is designed to minimize conflict and will not interfere with agricultural operations on surrounding agricultural lands or adversely affect agricultural water supplies.

6. Adequate and necessary public services and facilities are available or will be made available as a result of the development.

7. The design of the proposed project has incorporated all reasonable measures, as determined during the CEQA review process, to mitigate impacts to fish and wildlife resources, air quality, water quality and quantity, or other natural resources.

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[1] Most Productive Agricultural Areas are defined as Agricultural areas that should be preserved for long-term agricultural use. Currently, there is no countywide map depicting these areas (Freitas, pers. comm., 1998). Until identified on a countywide basis, "Most Productive Agricultural Areas" will be identified on a case-by-case basis when a proposal is made for the conversion of agricultural land. Factors to be considered include, but are not limited to: soil types and potential for agricultural production, the availability of irrigation water, ownership and parcelization patterns, uniqueness and flexibility of use, the existence of Williamson Act contracts, and existing uses and their contributions to the agricultural sector of the local economy. As an example, some grazing lands, dairy regions and poultry-producing areas as well as farmlands can be considered "Most Productive Agricultural Areas." Failure to farm specific parcels will not eliminate them from being considered as "Most Productive Agricultural Areas."

Areas considered to be "Most Productive Agricultural Areas" will not include any land within Local Area Formation Commission (LAFCO) approved Spheres of influences of cities or community services districts and sanitary districts serving unincorporated communities. Agricultural lands outside these boundaries and not considered to be "Most Productive Agricultural Areas" will be considered "Less Productive Agricultural Areas." (Stanislaus County 1994, p. G-2).

[2] Less Productive Agricultural Areas. Agricultural lands outside LAFCO-approved SOI's and not considered to be "Most Productive Agricultural Areas." (Stanislaus County 1994, p. G-2)

Williamson Act Contracts

The Williamson Act (also known as the California Land Conservation Act of 1965), is a tax relief measure intended to conserve open space and agricultural land by providing landowners with property tax relief. The Williamson Act includes a voluntary contract between landowners and local governments in which the landowner agrees to restrict use of the property to agriculture, open space, or related uses and, in return, the local government agrees to assess property taxes based on the restricted uses of the land, instead of the property's fair market value (Stanislaus County 1994, p. G-4).

Although the Williamson Act typically prevents development of agricultural lands, some uses are allowed on contracted lands. Section 21.20.045 of the County Zoning Ordinance (Uses on Lands Subject to Williamson Act Contracts) sets forth the following principles of compatibility for proposed uses on such lands. The Code states:

1. The use will not significantly compromise the long-term productive agricultural capability of the subject contracted parcel or parcels or on the contracted lands in the A-2 zoning district.
2. The use will not significantly displace or impair current or reasonably foreseeable agricultural operations on the subject contracted parcel or parcels or on other contracted lands in the A-2 zoning district. Uses that significantly displace agricultural operations on the subject contracted parcel or parcels may be deemed compatible if they relate directly to the production of commercial agricultural products on the subject contracted parcel or parcels or neighboring lands, including activities such as harvesting, processing, or shipping.
3. The use will not result in the significant removal of adjacent contracted land from agricultural or open-space use.

Unless the Planning Commission and/or Board of Supervisors makes a finding to the contrary, construction, alteration or maintenance of gas, electric, water or communication facilities, farm labor camps and farm employee housing are hereby determined to be consistent with the principles of compatibility and may be approved on contracted land. Uses requiring a permit, such as stationary facilities necessary to support agricultural activities (e.g. dehydrators, weigh stations, etc.), produce markets and permanent housing for persons employed on a full-time basis, in connection with the agricultural use occurring on the property, are also deemed consistent for Williamson Act lands.

Stanislaus County Zoning

The Stanislaus County Zoning Ordinance contains a description of the purpose of each zoning district, permitted uses, uses requiring a permit, etc. Two zoning districts A-2, (General Agriculture District) and P-D (Planned Development District), occur in the study areas. A description of each is provided below:

A-2 (General Agriculture District)Zoning

The minimum allowable area for creation of a parcel under A-2 zoning is 3, 5, 10, 20, 40, or 160 acres. The minimum parcel area is noted following the zoning designation (e.g. A-2-10).

According to Stanislaus County Zoning Ordinance, the following uses are permitted in areas zoned A-2: one single-family dwelling, a mobile home, detached accessory buildings, produce stands, lagoons or ponds for the storage of animal wastes, Christmas tree sales lots, fireworks stands, etc. and all agricultural uses not requiring staff approval or a use permit pursuant to Sections 21.20.030 (Uses Requiring a Use Permit) and 21.20.040 (Uses Requiring Board of Supervisors Approval).

Uses requiring a use permit are divided into three "tiers". Tier one includes uses closely related to agriculture, and may be allowed when the planning commission finds that the use will not be detrimental to or in conflict with agricultural use of other property in the vicinity. Tier two includes agriculture-related commercial and industrial uses. Tier three uses are not directly related to agriculture but may be necessary to serve the A-2 District or may be difficult to locate in urban areas. A-2 zoning also requires minimum 70-foot setbacks from the existing centerline of the street, or a minimum of 15 feet from the planned street line on a major street or expressway, whichever is greater.

Yards are required in A-2 districts. Front yards are to be a minimum of 70 feet from the existing centerline of the street, or 15 feet from the planned street line on a major street or expressway, whichever is greater.

P-D (Planned Development District) Zoning

P-D zoning generally applies to larger scale, integrated development and provides opportunities for creative and cohesive design concepts. The P-D zoning district is intended to allow modification of requirements established by other districts, and diversification in the relationship of different uses, buildings, structures, lot sizes, and open spaces, while ensuring compliance with, and implementation of, the General Plan.

The P-D designation requires projects located in a City or Special District Sphere of Influence to connect to public sanitary, sewer and approved public water systems where or when such facilities are available. Package sewer treatment facilities may be allowed when public sanitary sewer is not available. Sanitary sewer is generally considered as being available whenever an existing sewer system is located within 2,640 feet of any part of the parcel on which the project is located.

All uses are permitted within P-D zoning when consistent with the General Plan, and subject to the approval of the development plan by the Planning Commission. Minimum lot size, setback and parking requirements, and maximum height, density and percentage of coverage shall be established for each P-D district in the development plan approved by the Planning Commission. No P-D zoning shall be adopted unless a development plan has been approved for the area. Minimum lot size setback and parking requirements, and maximum height, density, and percentage of coverage shall be established for each P-D district in the development plan approved by the Planning. Commission.

INTERCHANGE EVALUATION

Traffic generation and assignment forecasting was prepared by TJKM Transportation Consultants (1998) to identify improvements necessary at the following interchanges: Ingram Creek

Road—Howard Road, Del Puerto Canyon Road—Sperry Road, Fink Road—Fink Landfill, Fink Road—Crows Landing and Stuhr Road—Newman area.

EXISTING CONDITIONS

All four intersections are designed as tight-diamonds (i.e., on and off-ramps form a diamond on either side of I-5). Ingram Creek Road (Howard Road—Westley Triangle), Del Puerto Canyon Road (Sperry Road Interchange) and Fink Road (Fink Road Area and Crows Landing) are built as underpasses (below I-5 freeway structures). Stuhr Road (Stuhr Road—Newman Area) is built as an overpass structure above I-5.

Each of the ramp intersections is two-way STOP controlled. with the ramps being controlled and the surface roadways being uncontrolled. One-lane on-ramps and off-ramps serve traffic at each of the ramp intersections. All roadway approaches to ramp intersections are one-lane as well. Wide shoulders are adjacent to each of the study area off-ramps. Westbound approaches are available to all of the northbound on-ramps with the exception of Fink Road. Wide shoulders accommodate some right-turning traffic and thereby reduce delay slightly.

Based on traffic volumes listed in *1996 Ramp Volumes on the California State Freeway System* (Caltrans 1997) and roadway counts obtained from Stanislaus County, existing peak hour volumes on all ramps and roadways are estimated not to exceed 300 vehicles per hour at any location. Given existing conditions, all intersections are currently operating at acceptable levels of service.

CONSTRAINTS

As part of the interchange evaluation, capacity and physical constraints were examined for each of the study areas. The following discussion of constraints applies to all of the study areas.

Capacity Constraints

Capacity constraints increase the degree of improvements necessary in order to serve the amount of traffic generated by new development. Even with some wide shoulders, given one-lane approaches to the ramp intersections, there is not sufficient capacity to accommodate increased traffic volumes anticipated with the development scenarios proposed at each study area.

Physical Constraints

Physical constraints limit the amount of improvement that is possible by physically limiting the amount of space available for expansion outward. Similarly, physical constraints can substantially increase the cost of improvements, potentially to the point where an otherwise preferable option would be infeasible.

ASSUMPTIONS

Development of the Howard Road—Westley Triangle, Sperry Road Interchange, Fink Road and Stuhr Road—Newman study areas is assumed to be captured by an industrial park designation with an average Floor Area Ratio (FAR) of 0.17. The Floor Area Ratio is the amount of building coverage divided by the area of lot on which it is constructed. While it is understood that some

"highway" commercial and distribution activities at densities up to FAR = 0.20 could be expected, it is assumed that the disparities in traffic would be negligible given the overall scale of the study areas and the scope of the analysis.

Crows Landing was analyzed based on a land use called Multi-Purpose Recreational Facility, from *ITE Trip Generation, 6th Edition,* 1997, which consists of uses such as golf driving range, batting cages, miniature golf, etc.

Cost

The following assumptions were used in calculating costs for each of the study areas.

1) I-5 will be constructed to an 8-lane facility as part of an entirely separate Caltrans I-5 improvement project prior to construction of interchange modifications.

2) Soundwalls and mainline pavement improvements will be constructed as necessary as part of the Caltrans I-5 improvement project.

3) With minor exceptions, roadway improvements along (currently) rural roads outside of existing Caltrans right-of-way will be incorporated into the cost of proposed future development.

Cost summaries for each study area are provided in Sections 4.1.4, 4.2.4, 4.3.4, 4.4.4, and 4.5.4.

WATER SUPPLY

A water supply feasibility analysis was prepared for each of the proposed study areas by SCS Engineers (1998) drawing from the *Critical Environmental Constraints Analysis, Fink Road Landfill and Surrounding Lands, Stanislaus County, California* (SCS Engineers 1997). A summary of the background, assumptions, and costs which are pertinent to each of the study areas is provided below. Information specific to each study area relative to water supply and cost is provided in Sections 4.1.5, 4.2.5, 4.3.5, 4.4.5 and 4.4.5.

BACKGROUND

Water supply within Stanislaus County is provided primarily through wells developed and operated by municipal water agencies. In 1995, the Stanislaus County Local Area Formation Commission (LAFCO) was responsible for consolidating eleven water districts (i.e. Hospital, Kern Canon, Del Puerto, Salado, Sunflower, Orestimba, Foothill, Davis, Mustang, Quinto, and Romero) into the Del Puerto Water District (Cotter, pers. comm., 1998). The boundaries of the districts did not change, only the internal divisions between previous districts disappeared to form one consolidated district that encompasses approximately 45,000 acres.

The Del Puerto Water District (District) contracts with the U.S. Bureau of Reclamation (Bureau) to provide water to local users from the Delta-Mendota Canal. In a normal water year, water users can expect to receive a water allocation equal to 3.1 acre-feet per year (ac-ft/yr). This quantity is subject to substantial reduction by the Bureau in drought years. During the most recent drought, many users received only 25% of their normal year allocation. The Bureau's

current contracted amount to the Del Puerto Water District is 142,210 ac-ft/yr (Cotter, pers. comm., 1998).

Approximately 99% of total water supply from the District is provided to agricultural users. The only Municipal and Industrial (M&I) user in the District is the Fink Road Landfill which uses trucks to pump water from the Delta-Mendota Canal. The water is trucked over to the landfill where it is used for dust control purposes (Cotter, pers. comm., 1998).

District water would be available for additional M&I uses (i.e. non-agricultural uses such residential and commercial uses) with a written request to the Bureau. However, the Del Puerto District's Board of Director's does not encourage M&I water uses. M&I uses typically require more reliable water supplies than agricultural users, which are able to adjust more readily to short-falls in water availability. Further, the increase in demand for reliably available water associated with M&I uses could potentially decrease the reliability of remaining agricultural water supplies.

ASSUMPTIONS

In preparing the water supply analysis, development is described in three stages, or generations, referred to as "development scenarios." The first generation development scenario is based on preliminary information provided by Williams-Kuebelbeck & Associates. The first generation development scenario includes commercial businesses such as motels, restaurants, automotive services, and visitor services. The second development scenario includes industrial businesses such as distribution, warehousing, and agricultural services. Finally, with maturation of development in the area and availability of infrastructure, the third generation development scenario could include industrial and commercial businesses such as larger scale sales facilities, mixed use regional and local industry, or special uses.

Demand

The demand for potable water based on potential development was estimated for each study area (with the exception of Sperry Road Interchange study area which receives water service from the City of Patterson) in order to design a basic water supply system. The preliminary water supply system was designed using the ultimate water demand when the area completes its third generation of development. Each study area is envisioned for commercial (i.e. business) and industrial uses in the proposed development scenario. Therefore, typical water duties (or water use factors) for commercial and industrial uses are examined to estimate water demand.

Water Demands

Water agencies typically use water duties to estimate demand for a particular land use. The water duty is multiplied by the number of gross acres in order to achieve a water demand result in acre-feet per year (ac-ft/yr). A water duty range of 1.5 to 2.5 ac-ft/acre/year was used in the *Critical Environmental Constraints Analysis Fink Road Landfill and Surrounding Lands Stanislaus County, California* for industrial uses (SCS Engineers 1997). This range is typical for the industrial uses that would potentially be developed at each study area. However, because both commercial and industrial development is planned for each study area, a range of water duties or factors for commercial uses must also be determined. To determine commercial water duties, typical commercial per capita demand values were compared to the aforementioned industrial water

duties. Based on this comparison, water duties for commercial development were extrapolated. From this calculation, a range of 0.67 to 1.11 ac-ft/ac per year was estimated. It was also assumed that approximately 10% of the gross area in commercial and industrial areas would be irrigated for landscaping purposes at a rate of 4.5 acre-feet/acre per year (SCS Engineers 1997). Water demand for each study area is including in Sections 4.1.5, 4.3.5, 4.4.5 and 4.5.5. Demand calculations are provided in Appendix A.

Water Supply

Obtaining water from Del Puerto Water District's allotment from the California Aqueduct and Delta-Mendota Canal was not considered a viable option due to the limited amount of water available from the District. The County may consider purchase or transfer of water rights from other users using either of these systems. (Western Hills Water District has recently purchased rights to approximately 8,000 acre-feet per year from a downstream district using the California Aqueduct. The precise costs for acquisition, permitting, and treatment of California Aqueduct or Delta-Mendota Canal water are speculative at best, but would significantly increase the costs of development of the site.

Groundwater is the major source of domestic and industrial water within western Stanislaus County. Local groundwater flow for the area originates in the Coast Range to the west and continues to the San Joaquin River. This groundwater is accessed by installing subsurface wells. According to United States Geologic Surveys (USGS), the average yield of wells in the San Joaquin Valley is about 1,100 gallons per minute (gpm), and the maximum expected yield is about 3,200 gpm. Therefore, the Howard Road—Westley Triangle, Fink Road, and Sturh Road—Newman study areas would each require one well to supply the water necessary to serve the proposed development. The Crows Landing study area would require two wells at minimum.

The USGS reports that the thickness of the aquifer saturated with fresh ground water extends upward from a depth of more than 1,500 feet below ground surface. Water quality in the ground water of the region is degraded by elevated concentrations of naturally occurring salts and minerals which have leached into the soil over time due to irrigation (Tetra Tech 1994). Nitrate and selenium levels in groundwater currently exceed the United States Environmental Protection Agency's (U.S. EPA) maximum recommended levels for drinking water. However, these contaminants appear to be confined mainly to the shallow parts of the aquifer. As a result, a deep well, approximately 500 feet in depth, was chosen as part of the assumptions in order to avoid the nitrate and selenium contamination. Groundwater well construction and installation cost estimates are provided in Appendix A.

Treatment System

A basic water treatment system filters out unwanted residues and solids and disinfects the water prior to storage. However, according to the Stanislaus County Department of Environmental Resources, high levels of total dissolved solids (e.g., solids such as sand or clay suspended in water) have been reported in all areas of the County. Therefore, additional processes to treat the water for this constituent are necessary.

The proposed treatment system to provide potable water is a generic design by Robert Holt & Associates. The system consists of a chlorine chemical feed system for disinfection and oxidation of iron; a multimedia filter for the removal of particulates in the water greater than 10

microns in size; a duplex water softener for the removal of calcium and magnesium hardness, barium, iron and strontium that may be found in the raw water and could potentially foul the reverse osmosis (RO) membranes that follow; a sodium bisulfite chemical feed system for the removal of residual chlorine which will have a detrimental effect on the RO membranes; a 10 micron cartridge filter for mechanical protection of the RO membrane; an RO booster pump to increase the water pressure to 150-225 pounds per square inch gauge (psig); and RO membranes with pressure vessels for reduction of total dissolved solids.

Water Storage

After the water has been treated, it would be stored in a storage tank. A storage tank must be designed to accommodate fluctuations in flow due to varying uses throughout the day as well as provide for adequate fire flow in case of an emergency. Although the overall volume of water used for fighting fires is quite low relative to most other uses, the amount of water required to fight a fire for several hours puts a heavy strain on a system for a relatively short duration. Because fire flow requirements are so high, relative to other uses, they are usually the controlling criteria in the design of storage. A minimum of 2 to 3 days storage is also required to be added to storage capacity as an emergency supply reserve. For the purposes of this study, fire flow and emergency requirements are assumed to be potable water. Computations for water storage tank capacity are provided in Appendix A.

Distribution

From storage, water would be conveyed through a network of distribution pipes. Distribution systems are designed specific to each study area and described in detail in Sections 4.1.5, 4.3.5, 4.4.5 and 4.5.5.

COSTS

Development of each study area is described in terms of three generations of development. The capital cost reflects the third generation of development, which assumes that each study area will be completely developed. These costs were based on unit costs, (e.g. $4.00 per linear foot of pipe), as well as actual budgetary estimates provided by vendors in the Stanislaus area. However, land requirements, operation and maintenance, and amortization costs were not included. Only capital expenditures were considered and are to be used for budgetary purposes only. The costs are summarized in a table for the Howard Road—Westley Triangle, Sperry Road, Sturh Road—Newman and Crows Landing study areas in Sections 4.1.5, 4.3.5, 4.4.5 and 4.5.5.

WASTEWATER TREATMENT

A wastewater treatment feasibility analysis was prepared for each of the proposed study areas by SCS Engineers (1998). A summary of the background, assumptions and costs used in the analysis is provided below and is applicable to each of the study areas (with the exception of Sperry Road Interchange). Information specific to each study area relative to wastewater generation, treatment and cost is provided in Sections 4.1.6, 4.2.6, 4.3.6, 4.4.6 and 4.4.6.

BACKGROUND

Stanislaus County currently does not provide wastewater services to development within its jurisdiction. Each of the study areas (with the exception of the Sperry Road study area which receives wastewater service from the City of Patterson) is also outside the existing boundaries of any wastewater services provided by cities or communities nearest to the individual study areas (i.e. Patterson, Newman, Crows Landing, or Westley).

Local municipalities service and treat wastewater within their service boundaries, and septic systems are used in unincorporated areas. However, due to the distance from the closest cities and communities, connecting a wastewater pipeline to existing municipal services would not likely be feasible. For this reason, the development of an on-site facility would be necessary to provide wastewater treatment, with subsequent discharge to a leach field.

Currently, development in any of the study areas must provide for wastewater treatment and comply with Stanislaus County Department of Environmental Resources guidelines for building an on-site wastewater treatment facility. The quality of the effluent discharged must meet the U.S. EPA's Secondary Treatment Guidelines. Currently, all existing individual commercial businesses located at the Howard Road—Westley Triangle study area have installed and are operating their own package sewage treatment systems with corresponding leach fields.

ASSUMPTIONS

Since the County does not have its own wastewater treatment system and no outlying cities can provide this service, it may be practical for a centralized wastewater facility to be developed at any of the study areas. This would consolidate individual on-site wastewater treatment systems, thereby decreasing the amount of area required for treatment and increasing the amount of land available for development.

For potential development in the Howard Road—Westley Triangle, Fink Road, Sturh Road—Newman and Crows Landing areas, the amount of wastewater produced must be estimated in order to develop a preliminary design for a general wastewater treatment system. A preliminary wastewater treatment system was sized using the ultimate sewage production when each of the areas completes its third generation of development. The Howard Road—Westley Triangle, Fink Road, Sturh Road—Newman and Crows Landing study areas are proposed for commercial/industrial development; therefore, average production coefficients provided in the *Critical Environmental Constraints Analysis Fink Road Landfill and Surrounding Lands, Stanislaus County, California* (Constraints Analysis) (SCS Engineers, 1997), for both commercial and industrial demands, were used. The Crows Landing study area will be used for more commercial type development. Therefore, the average production coefficient provided in the Constraints Analysis (SCS Engineers 1997) for commercial development was used.

Wastewater Generation

Wastewater generation for each study area is provided in Sections 4.1.6, 4.3.6, 4.4.6 and 4.5.6. Wastewater generation data for each study area is included in Appendix A.

Wastewater Conveyance

A generic sewage conveyance system was developed for purposes of determining budgetary costs. This analysis assumes that one treatment system will receive all waste by using gravity flow through laterals, submain, and main piping systems to the lowest elevation defined in USGS maps. Pipe placement and lengths were chosen arbitrarily, based on the topography of the area. Calculations for the conveyance system at each study area are contained in Appendix A.

Treatment System

The sanitary wastewater treatment system was developed by Robert Holt and Associates based on their design of the Zenon Environmental Systems Membrane Bioreactor (MBR) process (also known as the Cycle-Let Wastewater Treatment System). The system includes a trash trap for the removal of grit, plastics, and other trash; an equalization basin which provides uniform flow; a single sludge aerobic and anoxic biological system for denitrification and aerobic digestion; membrane filtration which removes particulates at the molecular level; an activated carbon system to remove color and odors; and disinfection.

The effluent quality received from this system meets or exceeds the effluent standards described in U.S. EPA's Secondary Treatment Guidelines. In addition, the system eliminates the need for a leach field since effluent from this system will meet California's Title 22 requirements for reclaimed and recycled water.

COSTS

Development is described in terms of three generations (highway commercial, industrial /distribution, high technology). The capital cost reflects development through the third generation. These costs were based on unit costs, for example $4.00 per linear foot of pipe, as well as actual budgetary estimates provided by vendors in the Stanislaus area. However, land requirements, operation and maintenance, and amortization costs were not included. Only capital expenditures were considered and are to be used for budgetary purposes only. The costs for the components of the wastewater system are summarized in the tables included in Sections 4.1.6, 4.3.6, 4.4.6 and 4.5.6. A wastewater treatment cost summary is included in Appendix A.

SAN JOAQUIN KIT FOX EVALUATION AND MITIGATION

This section contains a discussion of the existing conditions, and known or anticipated occurrences of San Joaquin kit fox in each of the development areas. A summary of the methodology for determining potential impacts to San Joaquin kit fox, and a discussion of appropriate mitigation measures designed to reduce those impacts to a less-than-significant level, are also included. A detailed discussion of impacts and mitigation for each specific area is included in Sections 4.1.7, 4.2.7, 4.3.7, 4.4.7 and 4.5.7.

METHODOLOGY

EDAW staff independently reviewed all previous biological studies completed for the proposed study areas for technical accuracy and adequacy. This included a review of the *Critical Environmental Constraints Analysis Fink Road Landfill and Surrounding Lands* (SCS Engineers 1997), *Naval Auxiliary Landing Field Crows Landing, California Baseline Environmental Report*

(Tetra Tech 1994), and *Draft EIR for the Lakeborough Specific Plan, General Plan Amendment, and Rezoning* (Western Ecological Services Company Inc [WESCO] 1990). Relevant information from these documents is incorporated and referenced as appropriate.

EDAW staff conducted habitat assessments of the study areas on April 16 and June 5, 1998. Habitat types encountered during the survey are characterized primarily by dominant and subdominant plant species. Animal use of the study areas is described based on known and anticipated occurrences. Most species were recorded as present if they were observed, if species-specific vocalizations were detected, or if diagnostic field sign was found (i.e., scat, calls, tracks, pellets). Some species known to occur in the region, for which suitable habitat is present, were recorded as "expected, but not observed." Plant taxonomy is based on the Jepson Manual (Hickman, ed. 1993) and wildlife taxonomy on Laudenslayer, *et al.* (1991).

Vegetation communities found on each of the proposed study areas discussed below. Plant species composition of each habitat type is discussed at the first mention of the habitat; for all subsequent references, only habitat location is included.

When assessing kit fox impacts for each of the proposed study areas (excluding Crows Landing), it was assumed that the entire site would be developed and that removal of suitable habitat would be mitigated. It is recognized that development would not occur on the entire site; however, it is speculative to attempt to determine actual acreage lost at this time. Because of the uniqueness of the Crows Landing area and the proposed uses, for the purposes of this analysis, it is assumed that only changes to the existing sewer and water infrastructure would occur. No additional land disturbance is expected to occur at this study area.

Proposed mitigation measures were developed using knowledge of the study areas and vicinity, and through preliminary consultation with the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG). Also, review of CDFG 2081 and 2090 Agreements, and USFWS take permits issued for San Joaquin kit fox in San Joaquin and Stanislaus counties was conducted. Based on this review, mitigation for impacts to foraging and/or denning habitat for San Joaquin kit fox would likely be replaced at a ratio of 3:1 for non-native grassland, 1.1:1 replacement ratio for 300 feet within the perimeter of orchards and cropland (rowcrop and grain crop) and 3:1 replacement ratio for alfalfa fields. Although the agencies typically determine mitigation ratios on a project by project basis, and there may be some flexibility, these ratios were used to determine the approximate mitigation requirement for each development area.

ECONOMIC FEASIBILITY ANALYSIS

An economic analysis was prepared for each of the five study areas by Williams-Kuebelbeck & Associates (WK&A 1998). The analysis examined demand and supply of retail and industrial acreage based on population projections for Stanislaus County. The analysis does not encompass a complete industrial and commercial demand study for the entire County, but instead focuses on the five study areas as potential suppliers for general County demand. Support documentation for the findings of this analysis are included in Appendix B.

POPULATION GROWTH

In the 12 years between 1986 and 1998, population in Stanislaus County increased 39% (approximately 120,000 people). San Joaquin County, Stanislaus County's neighboring county to the north, experienced a population increase of 28%, adding virtually the same number of residents as Stanislaus County. Combined growth for both counties was approximately 33%, or an addition of approximately 240,000 residents. Both counties' growth outpaced the State, which grew 24% over the period from 1986 - 1998. Table 3.2-1 shows population growth for this period for San Joaquin and Stanislaus County as well as their combined population compared to the State.

While growth in population over this 12 year period has been substantial, projections for the next two decades are anticipated to surpass historical growth. According to population projection estimates, Stanislaus County is estimated to grow by 47% (or approximately 200,000 additional residents) between 1998 and 2010. This exceeds the increase anticipated in San Joaquin County (37%) and the State (23%). Population projections for the period 2000 - 2020 are shown in Table 3.2-2.

Table 3.2-1
POPULATION ESTIMATES
1986 - 1998

YEAR	SAN JOAQUIN	STANISLAUS	COMBINED	STATE TOTAL
1986	425,365	307,278	732,643	26,741,621
1987	441,578	318,900	760,478	27,388,477
1988	454,778	331,741	786,519	28,060,746
1989	466,337	346,393	812,730	28,771,207
1990	477,665	365,119	842,784	29,557,836
1991	490,300	382,000	872,300	30,296,000
1992	499,900	392,100	892,000	30,845,000
1993	507,200	400,400	907,600	31,303,000
1994	513,100	407,100	920,200	31,661,000
1995	519,800	411,300	931,100	31,910,000
1996	528,900	416,100	945,000	32,223,000
1997	535,400	419,500	954,900	32,609,000
1998	545,200	427,600	972,800	33,252,000

Source: WK&A (California Department of Finance, 1992; Spring 1997, May 1997, and 1998)

Table 3.2-2 POPULATION PROJECTIONS 2000 - 2020				
YEAR	SAN JOAQUIN	STANISLAUS	COMBINED	STATE TOTAL
2000	585,600	477,300	1,062,900	34,704,000
2010	745,500	628,400	1,373,900	40,939,000
2020	920,900	793,300	1,714,500	47,507,000
Source: WK&A (California Department of Finance, Demographic Research Unit, April 1997)				

As demonstrated in Tables 3.2-1 and 3.2-2, the population growth trend in the county and State is expected to continue. Based on the estimated anticipated growth of approximately 200,000 residents in the county projected for the next 12 years (1998 - 2010), an estimated 8,000+ acres of residential development would be required (assuming 3.0 persons per household and approximately 8 dwelling units per acre). This growth in population would also promote demand for goods and services. Assuming expenditures of $9,067 per household (California State Board of Equalization, 1996) approximately $1.8 billion in new demand for goods and services would be generated by the anticipated population growth. The majority of goods and services would be trucked into the county via I-5 or Highway 99, the major north-south routes into the county. In addition, growth in population would create demand for jobs, which would increase demand for land to locate new business in the County.

DEMAND

Given the projected growth anticipated for the county, demand for land to locate commercial and industrial uses was calculated. The first step in developing demand for commercial and industrial uses was to establish historic occupation and industry trends for the County. This was accomplished by using Labor Market Information reports from the California Employment Development Department (EDD) (June 1996). EDD data was reviewed for the period 1993-2000 based on five-digit Standard Industrial Classification (SIC). Based on the proposed development scenario, four SIC categories were selected to project future commercial and industrial land use demand. The SIC categories included Goods Producing, Service Producing, Transportation, and Trade and Business Services. The projected growth in employment in these categories from 1993 - 2000 would result in 16,600 additional jobs (refer to Table A-1 in Appendix B). This number was used as a base for determining demand allocation for commercial and industrial uses.

Based on the types of industry deemed appropriate for interchanges along I-5 (Goods Producing, Service Producing, Transportation, etc.) an allocation was made regarding capture rates, based on a perceived set of locational market driven assumptions (refer to Table A-2 in Appendix B). (Capture rates refer to a property's ability to capture demand).

Using conventional employment to building ratios, building square footage was determined based on a 1:6 building coverage ratio (i.e., FAR) for each SIC category. This resulted in a total of 25.8 acres per year (refer to Table A-2 in Appendix B).

From the base period information, a forecast was made of average annual absorption by five-year increments, assuming that some increase would occur each five year period over the 1998 base year (refer to Table A-4 in Appendix B). (Absorption is the rate at which land is demanded for development). In order to allow for increased demand over time, an adjustment upwards of 10% for each five year period was assumed. Table 3.2-3 shows the absorption rates in acres for each five year period by industry.

Based on these absorption rates, demand for commercial and industrial space between 1998 and 2015 is estimated to total 530 acres. The breakdown of demand between 216 acres of commercial and 314 acres of industrial land use is shown in Table 3.2-4. Wholesale Trade, primarily goods storage and movement, is included in the 314 acres of industrial.

Historically, demand for commercial and industrial uses along I-5 has been substantially less than projected in this feasibility report. Research indicates the lack of development is attributable to two factors: 1) economic slow down in the late 1980's and early 1990's; and 2) lack of available land with water and sewer.

Table 3.2-3
PERIOD ABSORPTION
(IN ACRES)

INDUSTRY	1998-2000	2001-2005	2006-2010	2011-2015	TOTAL
Industrial					
Manufacturing	3	7	8	8	26
Service Producing	6	12	13	14	45
Transportation	12	27	30	32	101
Wholesale Trade[1]	17	38	41	46	142
Subtotal-Industrial	**38**	**84**	**92**	**100**	**314**
Commercial					
Retail Trade	18	39	42	46	145
Business Services	8	19	21	23	71
Subtotal-Commercial	**26**	**58**	**63**	**69**	**216**
Total	64	142	155	168	530

[1] Classified as industrial land use for this analysis.

Source: WK&A 1998 (Labor Market Information for Stanislaus County, Industrial Outlook, Occupational Outlook).

Table 3.2-4
PROJECTED DEMAND[1]
FOR RETAIL AND INDUSTRIAL ACREAGE - I-5 CORRIDOR
YEAR 1998 - 2015

PERIOD	COMMERCIAL	INDUSTRIAL	TOTAL
1998 - 2000	26	38	64
2001 - 2005	58	84	142
2006 - 2010	63	92	155
2011 - 2015	70	99	168
Total	217	313	530

[1] Does not include possibility of unique large-scale user needing a large site (25 acres or more) along I-5

Source: WK&A 1998

Given the emergence of development at Villa del Lago at the I-5—Sperry Road interchange and expansion occurring at the Howard Road—Westley Triangle Area, the projected demand for commercial and industrial land used in this report is considered reasonable.

SUPPLY

Supply of commercial and industrial land was developed based on discussions with property owners, developers and brokers regarding specific and proprietary plans and strategies for their respective properties. Because parcel information such as size, shape and topography were not available to provide a basis for determining development capability of each parcel, site inspections of each study area were conducted. In addition, assessors maps for each parcel within the study areas were reviewed.

Although total acreage examined for all five study areas totaled 6,185 acres, WK&A's analysis of developer plans, siting of parcels, access and location indicate that, realistically, approximately 3,600 acres have development potential. Of the 3,600 acres possible, approximately 1,050 acres are considered available for development in the short-term (next 15-20 years). This "available" acreage is approximately double the projected demand of 530 acres exclusive to the I-5 Corridor. This projection excludes potential at the Crows Landing study area, which should share in the general commercial and industrial demand occurring countywide. Table 3.2-5 summarizes supply and demand for commercial and industrial acreage.

Additional economic analysis specific to each study area including current potential for commercial and industrial acreage, and onsite and offsite cost, is provided in Sections 4.1.8, 4.2.8. 4.3.8, 4.4.8 and 4.5.8.

Table 3.2-5
SUPPLY VS. POTENTIAL DEMAND
I-5 INTERCHANGE STUDY AREAS
1998 - 2015

I-5 STUDY AREAS	TOTAL ACRES	1998 - 2015 DEMAND	SUPPLY AS A PERCENT OF DEMAND
Total Acreage Studied (assumes 1,000 acres for Fink Road Area)	6,200		
WK&A Survey [1]	3,600		
Short-Term Potential (15- 20 years)	1,050	530	198%
Commercial	290	220	132%
Industrial	750	310	242%
Vacant (Long-Term Potential 20 years +)	4,000 - 5,000		

Note: Numbers may not add due to independent rounding.

[1] Realistic Acreage Developable in the short-term

Source: WK&A (Site inspection, discussion with developer, local brokers, parcel and map analysis).

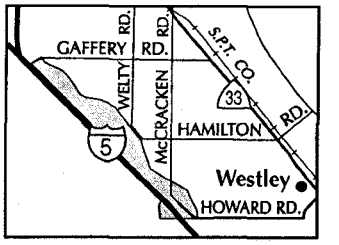
4 STUDY AREAS

INTRODUCTION

The results of the feasibility analysis conducted for the five study areas are presented in this section. Detailed information is provided for each study area regarding location; access, land use, and habitats; planning, policy, and regulatory considerations; interchange capacity; water supply; wastewater treatment and disposal; San Joaquin kit fox mitigation requirements; and economic considerations. The analysis is based on the development of industrial/business park uses, as described in the development scenarios in Section 3.

Refer to the Executive Summary, Section 2 of this report, for the feasibility conclusions and recommendations for each study area. The analysis in Section 4 provides the foundation for the report's conclusions.

4.1 HOWARD ROAD—WESTLEY TRIANGLE



4.1.1 LOCATION

The Howard Road—Westley Triangle is the northernmost of the five study areas being considered by the County for commercial /industrial development (Exhibit 1-1). The study area is approximately 5.5 miles long, from the San Joaquin/Stanislaus County line on the north to Howard Road on the south, between I-5 on the west and the California Aqueduct on the east. Total acreage in the Howard Road—Westley Triangle study area is approximately 1,300 acres.

Major access to the Howard Road—Westley Triangle study area is available from McCraken Road in the south of the study area. Howard Road/Grayson Road (County Road J16) and Gaffrey Road provide access from the south and north, respectively. County Road J16 provides linkage to the unincorporated Town of Westley, which is located approximately 4 miles to the east of the Howard Road interchange on State Highway 33.

Ingram Creek Road crosses underneath I-5 and provides linkage between the east and west sides of the freeway.

The study area is located on the Salyo 7.5 Minute Quadrangle, Township 4 South, Range 6 East, Sections 16, 17, 21, 22, 26, 27, 35, and 36. The study area consists of 32 parcels (Exhibit 4.1-1). Seven parcels are in active Williamson Act Contracts. The Assessors's Parcel Numbers (APNs), acreage, Williamson Act status and zoning for each parcel are shown in Table 4.1-1.

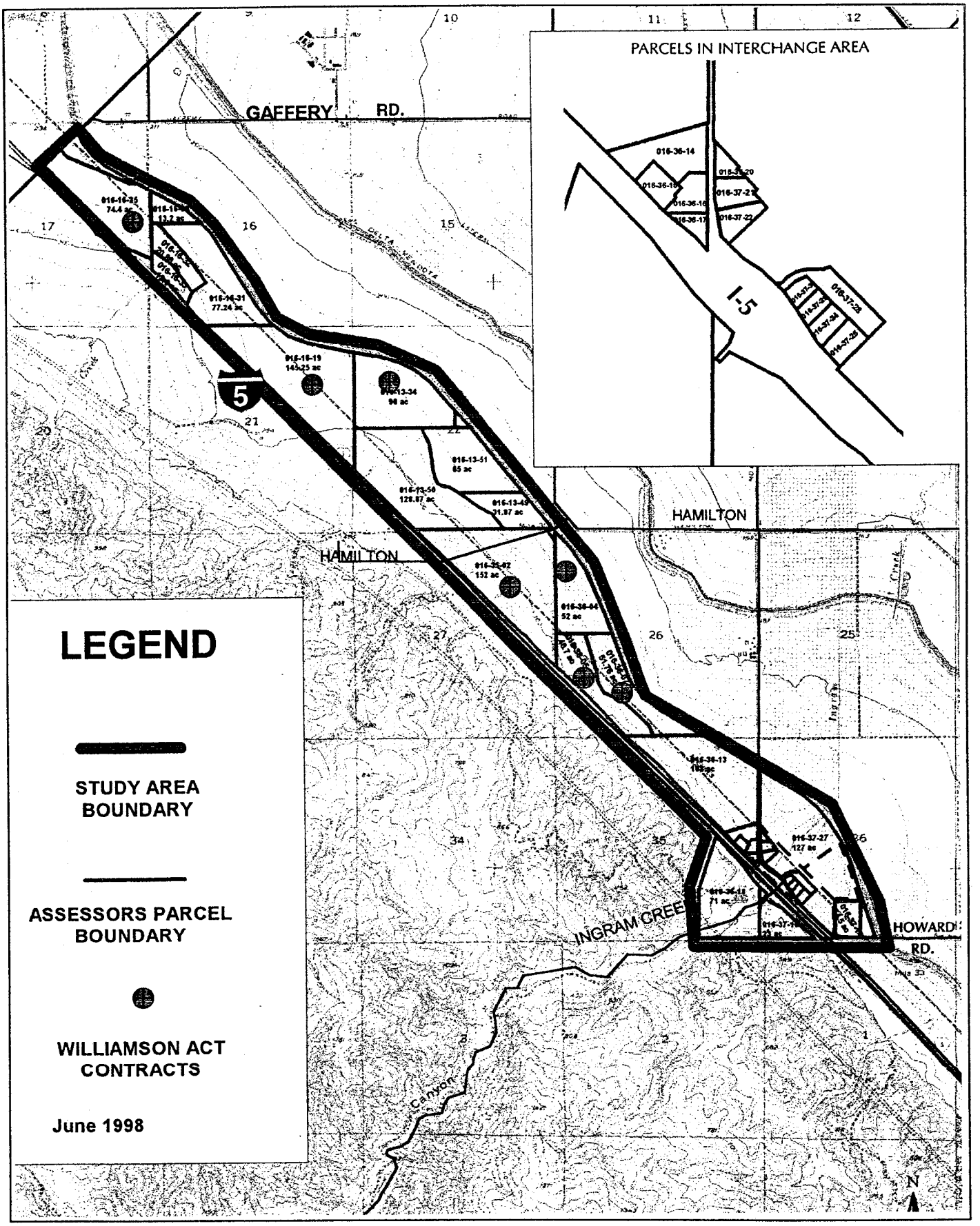
4.1.2 CHARACTERISTICS

ACCESS AND LAND USE

Development of highway commercial uses has already begun within the Howard Road—Westley Triangle study area, near the I-5—Howard Road interchange. Travelers along I-5 are the primary customers to these uses as the nearest town (Westley) is approximately 4 miles away. Access to the study area is available from Ingram Creek Road (which provides access between the east and west sides of I-5), Howard Road from the east and McCracken Road from the north.

Existing uses in the study area include gas stations, several fast food and sit-down restaurants, lodging accommodations and a truck stop with card lock fueling facility. A new motel is currently under construction at this location as well (Exhibit 4.1-2, photo 1).

Land to the east of the study area, between the California Aqueduct and Delta-Mendota Canal, is primarily flat and vacant. Both the aqueduct and the canal generally parallel I-5. Telephone poles are located on parcels adjacent to Ingram Creek Road and Howard Road. Light poles and signage are served with electric infrastructure beneath Howard Road. Signage for individual establishments are elevated approximately 30 to 40 feet. A new sign, approximately 50 to 60 feet in height, is currently under construction (Exhibit 4.1-2, photo 2). When complete, the new sign would be visible from several miles away to travelers headed either north or south on I-5.



Source: Stanislaus County, 1998.

Howard Road - Westley Triangle Area

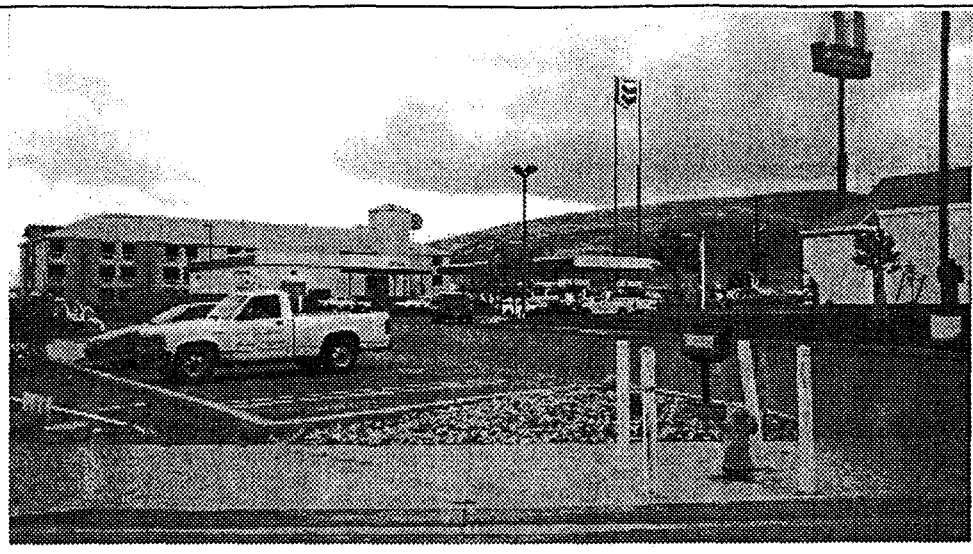
EXHIBIT 4.1-1

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

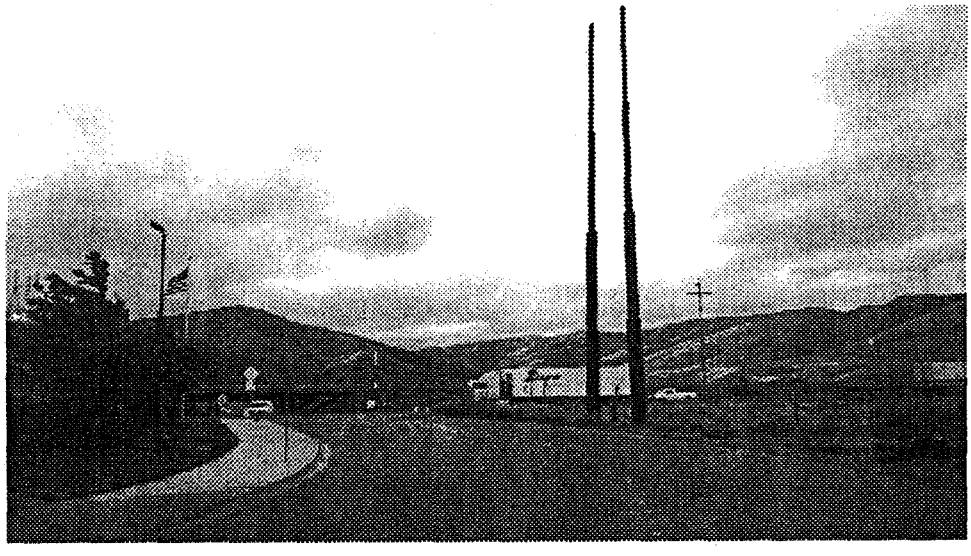
0 1/2 1 MILES

NORTH

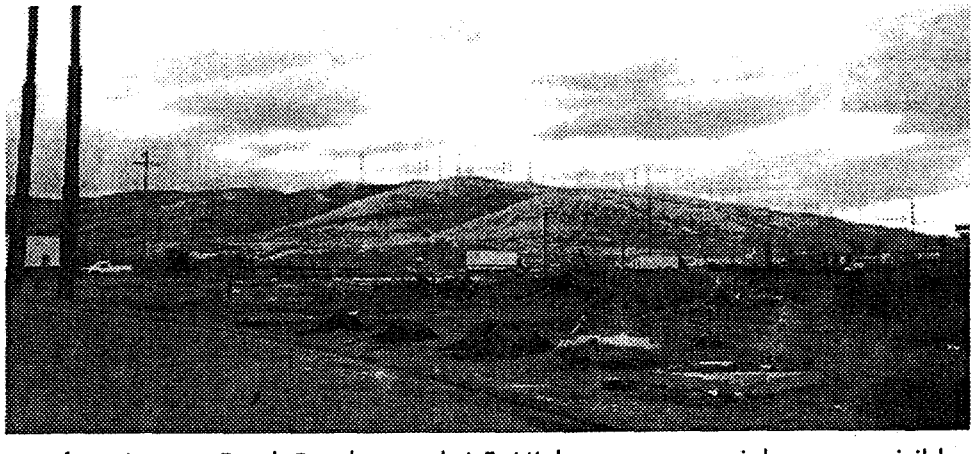
EDAW



1. View south on Ingram Creek Road just east of I-5. This view shows the typical development pattern emerging at this interchange, including fast-food restaurants, gas stations and lodging (including a new motel under construction).



2. View west along Ingram Creek Road towards the I-5/Ingram Creek Road interchange. The poles at center of photo are in place for new signage which would be visible along I-5 from several miles away in either direction.



3. View northwest from Ingram Creek Road towards I-5. Highway commercial uses are visible at right. PG&E infrastructure lines the hills west of I-5.

Source: EDAW, Inc., 1998.

Howard Road - Westley Triangle Area Photographs

EXHIBIT 4.1-2

Table 4.1-1
HOWARD ROAD-WESTLEY TRIANGLE STUDY AREA PARCEL SUMMARY

ASSESSOR'S PARCEL NUMBER (APN)	PARCEL ACREAGE	WILLIAMSON ACT STATUS (Expiration Date)	ZONING
016-16-25	74.40	Active	A-2-40
016-16-09	13.20		A-2-40
016-16-32	20.86		A-2-40
016-16-33	13.60		A-2-40
016-16-31	77.24		A-2-40
016-16-19	145.25	Active	A-2-40
016-13-34	90.00	Active	A-2-40
016-13-50	128.87		A-2-40
016-13-51	65.00		A-2-40
016-13-49	31.87		A-2-40
016-35-02	152.00	Active	A-2-40
016-36-04	52.00	Active	A-2-40
016-36-05	46.70	Active	A-2-40
016-36-07	51.76	Active	A-2-40
016-36-13	108.00	(Expired - no date)	A-2-40
016-37-27	127.00		A-2-40
016-37-14	14.50		A-2-40
016-36-18	71.00		A-2-10
016-37-16	23.03		A-2-10
016-37-20	1.29		P-D
016-37-21	2.00		P-D
016-37-22	2.02		P-D
016-37-30			P-D
016-37-29			P-D
016-37-24	1.20		P-D
016-37-28			P-D
016-37-25	2.02		P-D
016-36-14	5.86		P-D
016-36-15	2.00		A-2-10
016-36-16	2.24		P-D
016-36-17	1.08		P-D
016-13-36	2.31		A-2-40
Total Acreage	1328.30		
Total Acres in Active Williamson Act		612.11 acres	

Source: EDAW 1998

Two creeks cross the study area. Ingram Creek is located just north of the Howard Road—I-5 overpass and flows from the southwest into the San Joaquin River. Existing development near the Howard Road exit has avoided Ingram Creek.

Martin Creek is approximately 3 miles north of the Howard Road—I-5 overpass. This creek also flows from the southeast, crossing the California Aqueduct and terminating at the Delta-Mendota Canal. Areas surrounding Martin Creek are primarily undeveloped agricultural lands.

To the west beyond I-5, the topography transitions to foothills with elevations as high as 1,700 feet. PG&E 230 kilovolt (kv) electrical transmission towers are aligned north/south along ridge lines in this area (Exhibit 4.1-2, photos 2 and 3). The study area is not currently served by public water and sewer. Existing development uses well water and septic systems to meet water and sewer needs.

Vegetation

Areas surrounding the existing development include non-native grassland, orchards and croplands. Most orchards in the study area are only recently planted and have an understory of weedy vegetation, including yellow star thistle (*Centaurea solstialis*), wild radish (*Raphanus sativus*), common sunflower (*Helianthus* sp.), and bull thistle (*Cirsium vulgare*). Approximately 790 acres of the study area consist of orchards and 220 acres are cropland.

Non-native grassland is present north of the commercial development east of I-5 and west of the truck stop on the west side of I-5, and encompasses approximately 160 acres of the site. These areas are highly disturbed and are dominated by non-native grasses and weedy species. Non-native grasses include wild oats (*Avena* sp.), rip-gut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), Italian ryegrass (*Lolium multiflorum*), and foxtail (*Alopecurus* sp.). Common weed species include tarweed (*Hemizonia* sp.), yellow star thistle, wild radish, storksbill (*Erodium botrys*), mustard (*Brassica* sp.), Russian-thistle (*Salsola tragus*), and curly dock (*Rumex crispus*).

The banks of Ingram Creek are rip-rapped east of I-5, and highly degraded riparian scrub habitat is present west of I-5 (adjacent to the truck scales). Dominant species found in these areas include a few scattered arroyo willows (*Salix lasiolepis*), white horehound (*Marrubium vulgare*), poison hemlock (*Conium maculatum*), and broad-leaved cattails (*Typha latifolia*).

Wildlife

The majority of the study area consists of cropland and orchard. Although these areas do not represent high-quality wildlife habitat, they are frequently used by common wildlife species that are adapted to highly disturbed areas with human activity. Species typically found in these areas include house finch (*Carpodacus mexicana*), Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), and American crow (*Corvus brachyrhynchos*). Some crops support a prey base for foraging raptors, including red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), black-shouldered kite (*Elanus leucurus*), great horned owl (*Bubo virginianus*), and American kestrel (*Falco sparverius*).

Non-native grassland represents habitat for a variety of rodents, which in turn serve as a prey base for raptors and carnivores such as hawks and owls, coyote (*Canis latrans*), and grey fox

(*Urocyon cinereoargenteus*). Although few birds nest in grassland areas, a number of species forage in this habitat, including mourning dove (*Zenaida macroura*), white-crowned sparrow (*Zonotrichia leucophrys*), lesser goldfinch (*Carduelis psaltria*), song sparrow (*Melospiza melodia*), western bluebird (*Sialia mexicana*), western meadowlark (*Sturnella neglecta*), and several raptor species. Other species expected to occur include California vole (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), black-tailed jackrabbit (*Lepus californicus*), western fence lizard (*Sceloporus occidentalis*), northern alligator lizard (*Gerrhonotus coeruleus*), and gopher snake (*Pituophis melanoleucus*).

Degraded and sparse riparian habitat is found on the study area. Wildlife species expected to occur in freshwater and seasonal marsh habitats are those typically found in aquatic environments, including Pacific chorus frog, red-winged blackbird, great blue heron (*Ardea herodius*), snowy egret (*Egretta thula*), song sparrow, marsh wren (*Cistothorus palustris*), and lesser goldfinch (*Carduelis psaltria*). Pools and other surface water along the main tributaries to creeks are a likely source of drinking water for many of the birds and mammals during the summer.

4.1.3 LAND USE PLANNING, POLICY, AND REGULATORY CONSIDERATIONS

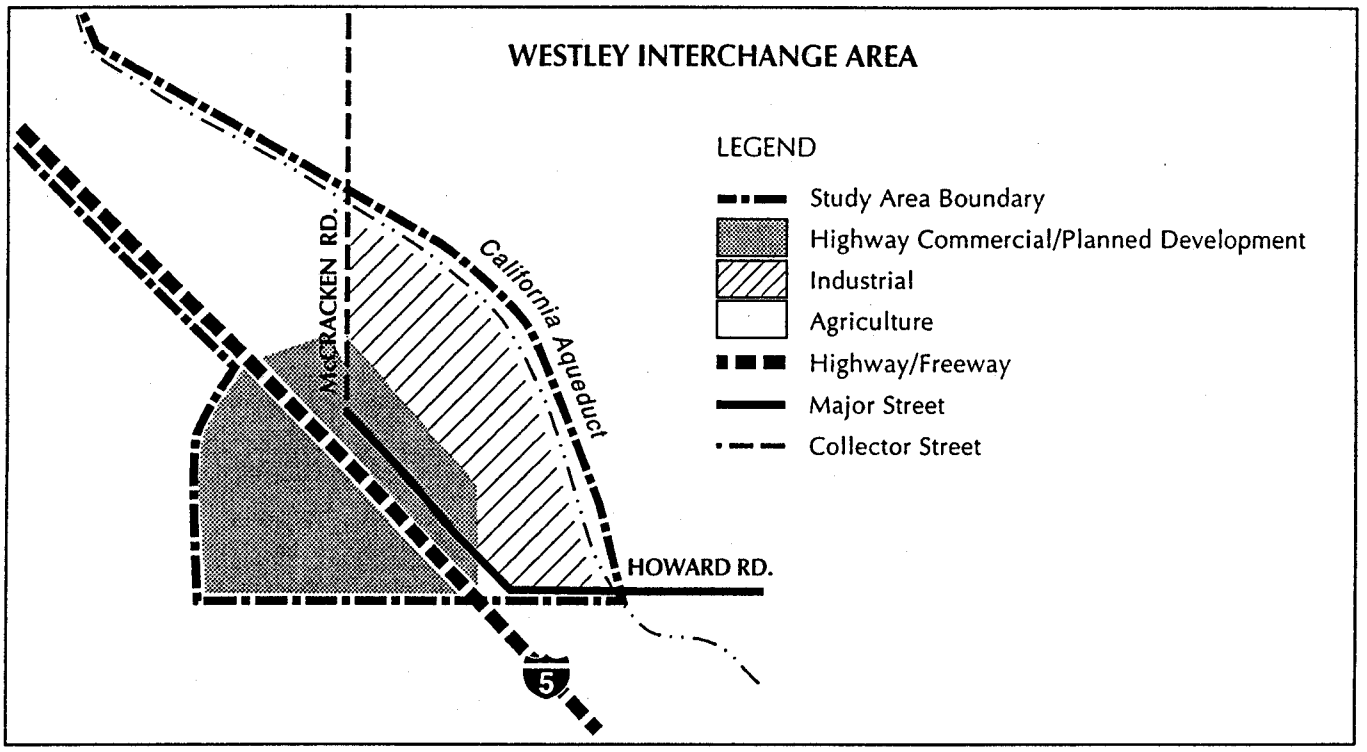
STANISLAUS COUNTY GENERAL PLAN

The Stanislaus County General Plan designates the southernmost portion of the Howard Road—Westley Triangle (i.e. the Howard Road—I-5 interchange area) as Highway Commercial/ Planned Development and Industrial (Exhibit 4.1-3). The area between Howard Road and the east side of I-5 is designated Highway Commercial/Planned Development. A strip of Highway Commercial/Planned Development also borders the east side of I-5, then transitions to Industrial eastward to the California Aqueduct. Agricultural land surrounds the remainder of study area. For a description of these designations, refer to General Plan Land Use Designations in Chapter 3, Methodology and Feasibility Analysis.

The area is currently developing with uses prescribed under the Highway Commercial/Planned Development designation consistent with the provisions of Resolution 87-3 (described in Chapter 3). The existing and projected development is also consistent with the project development scenario which envisions first generation (motel/hotel, restaurants, truck repairs) second generation (distribution, warehousing, heavy equipment repair), and third generation (large scale sales and marketing facilities, mixed uses, local and regional facilities) uses. Second generation uses would be allowed consistent with existing Industrial zoning. Agricultural lands would require a General Plan Amendment and rezone before development identified in the proposed development scenario could occur.

Relevant General Plan Policies

As previously stated, development has started within the Howard Road—Westley Triangle study area at the Howard Road interchange. Aside from the cluster of emerging highway commercial development at the interchange, the remainder to the study area is primarily vacant or cultivated agricultural lands. Two creeks traverse the study area.



Source: Stanislaus County, 1998.

Howard Road - Westley Triangle Area County General Plan
Land Use Designations

EXHIBIT 4.1-3

The Stanislaus County General Plan (Stanislaus County 1994) and Agricultural Element (Stanislaus County 1992) provide policies to direct development. Based on the general characteristics of the study area, a number of policies from several different elements are applicable to possible commercial/industrial development of the Howard Road—Westley Triangle. Table 4.1-2 summarizes these policies.

Table 4.1-2
STANISLAUS COUNTY GENERAL PLAN POLICIES RELEVANT TO HOWARD ROAD—WESTLEY TRIANGLE STUDY AREA

ELEMENT & POLICY NO.	POLICY
Land Use - Policy 7	Riparian habitat along the rivers and natural waterways of Stanislaus County shall to the extent possible be protected.
Land Use - Policy 14	Uses shall not be permitted to intrude into or be located adjacent to an agricultural area if they are detrimental to continued agricultural usage of the surrounding area.
Land Use - Policy 16	Agriculture, as the primary industry of the county, shall be promoted and protected.
Land Use - Policy 17	Promote diversification and growth of the local economy.
Land Use - Policy 23	New development shall pay its fair share of the cost of cumulative impacts on circulation and transit systems.
Conservation and Open Space - Policy 11	In areas designated "Agriculture" on the Land Use Element, discourage land uses which are incompatible with agriculture.
Agriculture - Policy 1.5	Limited visitor-serving commercial uses shall be permissible in agricultural areas if they promote agriculture and are secondary and incidental to the area's agricultural production.
Agriculture - Policy 1.8	Concentrations of commercial and industrial uses, even if related to surrounding agricultural activities, are detrimental to the primary use of the land for agriculture and shall not be allowed.
Agriculture - Policy 2.7	Proposed amendments to the General Plan diagram (map) that would allow the conversion of agricultural land to non-agricultural uses shall be approved only if they are consistent with the County's conversion criteria.
Agriculture - Policy 2.12	When the County determines that proposed conversion of agricultural land to non-agricultural uses could have a significant effect on the environment, the County shall fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects of the conversion.

Source: EDAW 1998

Continued development of the Howard Road intersection within the Howard Road—Westley Triangle Study Area would provide additional employment opportunities in the County. Jobs would be created in the short-term in association with construction of buildings and infrastructure in the study area. Some long-term employment would be created through the proliferation of motels, restaurants and other visitor-serving/highway commercial establishments which would occur during first generation development. Second generation uses, including distribution centers, warehouses, agricultural services, etc., would complement the existing agricultural economic base while providing additional jobs and diversification. Third generation

uses, such as high-technology industries, would serve to further expand and diversify the County's economy and provide more opportunities for jobs requiring skilled labor.

The size of the Howard Road—Westley Triangle study area would lend itself to all three generations of development. Further, the existing General Plan land use designations (Highway Commercial/Planned Development and Industrial) allow for the types of development envisioned in the proposed development scenario. Therefore, continued development within the Howard Road—Westley Triangle study area would support diversification and growth of the local economy consistent with the intent of Land Use Policy 17.

Land Use Policy 7 addresses protection of riparian habitat along rivers and natural waterways. Both Ingram Creek and Martin Creek flow out of the hills west of I-5 and traverse the Howard Road—Westley Triangle study area. Existing development at the Howard Road interchange has avoided Ingram Creek through the use of setbacks. Currently, there is no development in the vicinity of Martin Creek. Growth in the study area would require measures to protect these watercourses and any associated riparian habitat.

Because there are agricultural lands as well as Williamson Act Contracts within the Howard Road—Westley Triangle study area, policies from the Land Use Element, Conservation and Open Space Element and the Agricultural Element apply to the study area. Land Use Element Policies 14 and 16, Conservation and Open Space Policy 11, and Agriculture Element Policies 1.5 and 1.8 support the preservation of agricultural lands in the County. Because the study area is primarily designated Agriculture on the Stanislaus County General Plan, introducing non-agricultural uses into agricultural areas is inconsistent with Agricultural Policy 11 and Land Use Policies 14 and 16. Policy 1.8 of the Agriculture Element also discourages non-agricultural uses, even if related to surrounding agricultural activities.

Policy 1.5 of the Agricultural Element addresses limited visitor-serving commercial uses. Although certain uses aside from growing crops are allowed on agricultural lands (refer to General Plan Land Use Designations in Chapter 3), the types of uses envisioned by the proposed development scenario (i.e. commercial, warehousing, high technology industries) would not be consistent with the intent of this policy. While the areas near the interchange are currently designated for non-agricultural uses on the General Plan land use map (Highway Commercial/Planned Development and Industrial), the remainder of the study area is designated for Agriculture (refer to Exhibit 4.1-3). Prior to any development in these areas, an amendment to the General Plan land use map would be necessary. Policy 2.7 of the Agriculture Element requires all agricultural land conversions to meet the County's conversion criteria (refer to Conversion of Agricultural Land in Chapter 3) prior to receiving approval for a change in land use. According to the criteria contained in the General Plan Agricultural Element, conversion of agricultural land to urban uses shall be approved only if the Board of Supervisors makes certain findings relative to the conversion criteria.

Satisfying all of the criteria could be problematic, particularly with regard to items 1 and 6. Because Stanislaus County is primarily an agriculture based economy with policies to protect agricultural lands, making a finding consistent with item 1 would require substantive justification for the proposed conversion. According to the General Plan, "Most Productive Agricultural Areas" are currently determined on a case-by-case basis when a proposal is made for the conversion of agricultural land. The area north of the interchange could potentially be

considered as one of the County's Most Productive Agricultural Areas based on its current use and adherence to the definition of Most Productive Agricultural Areas (refer to Chapter 3, definition of Most Productive Agricultural Areas).

In terms of public services pertinent to conversion criteria item 6, the study area is not served by public water (even though it is located in the Del Puerto Water District) or wastewater. Existing development uses receive water from wells. Septic systems provide wastewater service. Because the study area is removed from any major urban area, extension of services to meet demands of new development would not be feasible in the near future.

Another factor which could inhibit development of the Howard Road—Westley Triangle study area is the presence of 7 Williamson Act Contracts (refer to Chapter 3 for a description of Williamson Act Contracts). Because the contracts are all active (i.e., none are in non-renewal), the time horizon for the potential conversion is unknown. As a general rule, there is no incentive for property owners to file for non-renewal unless there is speculation that the value of contracted lands would increase. If development continues to expand at the Howard Road interchange as allowed in the existing land use designations, property owners to the north within the study area may begin to feel pressure to file for non-renewal. Until these lands are taken out of Williamson Act Contracts (which would be a minimum of 9 years if the owners were to file for non-renewal the last day of the calendar year) development of commercial/industrial uses would be precluded. Furthermore, even after expiration of Williamson Act Contracts, these parcels would also require a General Plan Amendment from Agriculture before any use proposed in the development scenario could occur. As described above, conversion of agricultural land would have to be consistent with Policy 2.7 of the Agricultural Element.

Although the Williamson Act typically prevents development of agricultural lands, some uses are allowed on contracted lands. Section 21.20.045 of the County Zoning Ordinance (Uses on Lands Subject to Williamson Act Contracts) sets forth principles of compatibility for proposed uses on such lands (refer to Williamson Act Contracts in Chapter 3).

Development which is incompatible with the types of uses allowed under Section 21.20.045 of the County Zoning Ordinance cannot occur on contracted parcels. Therefore, development of non-agricultural commercial uses in the study area could not occur until existing contracts subsequently (i.e. 9 - 10 years or more) expire. In the short-term, development could expand to adjacent non-contracted lands to the north (APN 016-36-13) and west (APN 016-36-18 and 016-37-16) with a General Plan amendment and re-zone.

Circulation Policy 1 requires development to be adequately served with circulation infrastructure. The proposed development would overburden the existing interchange and roadways. Therefore, circulation improvements would be necessary to accommodate development proposed in within the study area. In accordance with Land Use Policy 23, new development would be required to pay its fair share of the cost of cumulative impacts.

Whenever the County is confronted with converting agricultural land, it must determine whether such action will result in a significant effect on the environment. Policy 2.12 directs the County to fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects of the conversion.

STANISLAUS COUNTY ZONING

The study area is predominantly zoned A-2 (General Agriculture District). Numbers following the A-2 designation (i.e. -10, 40, 160) indicate the minimum parcel size. Currently, the parcels within the study area are zoned either A-2-160, A-2-40, A-2-10 or P-D (Planned Development) (see Table 4.1-1) and (Exhibit 4.1-4). These designations are consistent with the provisions of the General Plan, which directs land within Highway Commercial/Planned Development designation to be zoned General Agriculture District (A-2) until rezoned to Planned Development (P-D). The General Plan further states that no property shall be designated Highway Commercial/Planned Development and re-zoned P-D unless findings are made that the change will not be detrimental to the agricultural productivity of the surrounding property and that the subject property is not considered to be one of the County's Most Productive Agricultural Areas. The existing parcels designated P-D in the study area have gone through the findings process prior to being re-zoned.

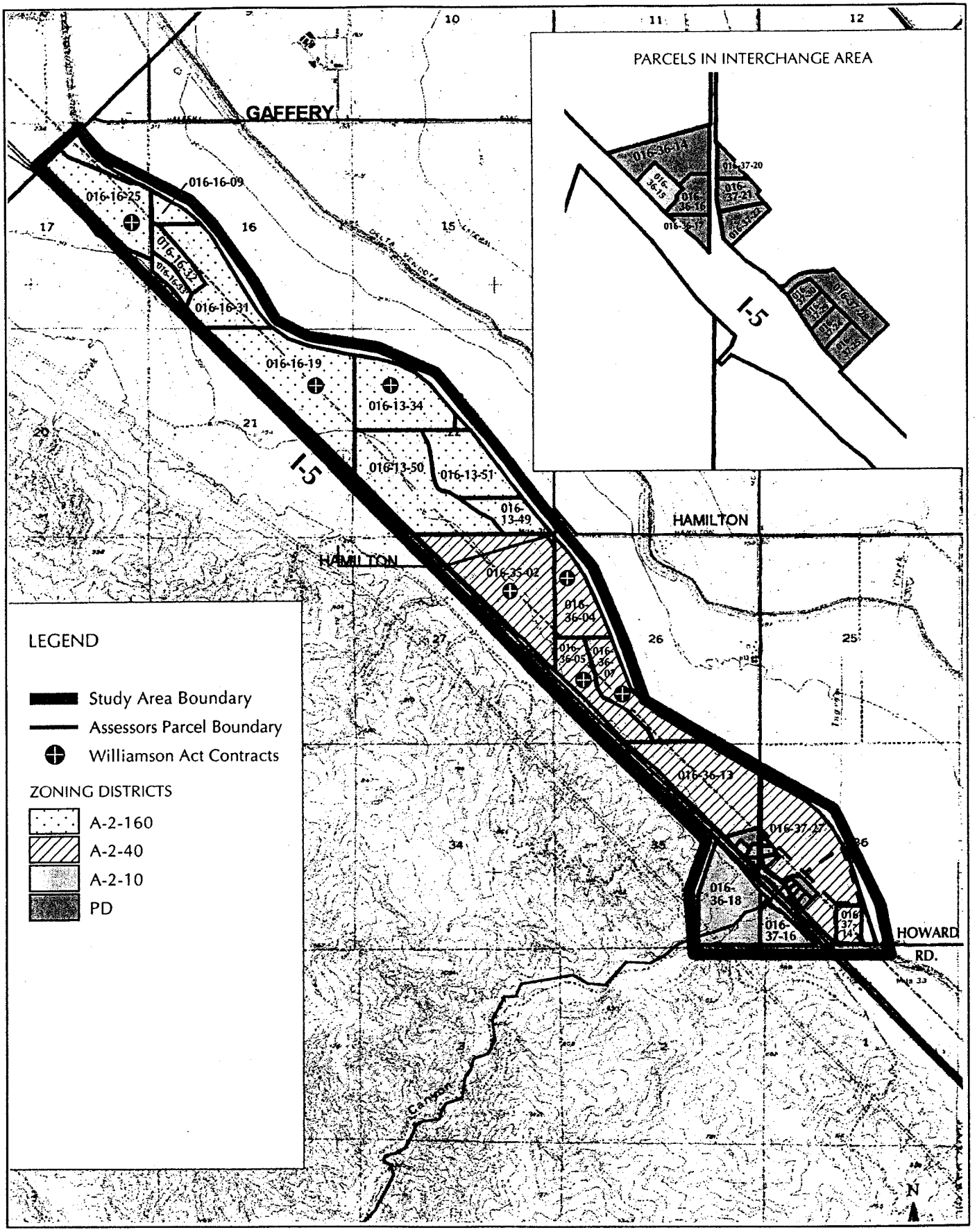
Seven parcels are currently in active Williamson Act Contracts. Approved uses other than agriculture may occur, with provision of a use permit on Williamson Act Contracts, in A-2 zoning. However, approved uses requiring a use permit must not significantly compromise the long-term productive agricultural capability of a contracted parcel or other contracted lands in the A-2 zoning district, displace or impair current or reasonably foreseeable agricultural operations on the subject contracted parcel or parcels or on other contracted lands in the A-2 zoning district, or result in the significant removal of adjacent contracted land from agricultural and open-space use.

The proposed development scenario would not be compatible with allowable uses on parcels with Williamson Act Contracts. Moreover, the uses proposed in the project development scenario would not be consistent with what is currently allowed under the A-2 zoning designation. In order to proceed with development envisioned in the development scenario, parcels with A-2 zoning would have to be re-zoned P-D. Following re-zone, the proposed development scenario would be consistent with the provisions of P-D zoning.

ANY OTHER PLANS/REGULATIONS THAT APPLY

In addition to being governed by the Stanislaus County General Plan (1994), the Stanislaus County Agricultural Element (1992), and the Stanislaus County Zoning Ordinance, the Howard Road—Westley Triangle study area is also located within the jurisdiction of several districts. The districts do not have any regulatory authority over projects located within their boundaries. However, they are acknowledged here as entities which should be consulted prior to proceeding with development within the Howard Road—Westley Triangle study area.

West Stanislaus Resource Conservation District. The West Stanislaus Resource Conservation District serves as a local contact for the U.S. Department of Agriculture regarding resource conservation related to soils, air and other natural resources. The Resource Conservation District is involved primarily with aggregate mining projects. The Resource Conservation District may also review General Plan Amendments involving conversion of agricultural land, but has no approval authority (McElhiney, pers. comm. 1998).



Source: Stanislaus County, 1998.

Howard Road - Westley Triangle Area Zoning Districts

EXHIBIT 4.1-4

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 3/99

0 1/2 1 MILES

NORTH

EDAW

Del Puerto Water District. The Del Puerto Water District conveys water from the Delta-Mendota Canal for agricultural purposes. The District has a contract with the Bureau of Reclamation to divert 140,210 acre-feet from the canal. Although the District does not currently provide treated water for municipal and industrial uses, such as would be required by the proposed development scenario, all proposals for development should be submitted to the District for review by the District's Board of Director's (Cotter, pers. comm. 1998).

Howard Road—I-5 Redevelopment Area. The Howard Road—I-5 Redevelopment Area includes a portion of the Howard Road—Westley Triangle Study Area surrounding the Howard Road Interchange. Development proposals within the redevelopment area may be eligible for financial incentives and should be submitted to the County Redevelopment Agency for review. Development within the Redevelopment Area should be consistent with the General Plan (Duval, pers. comm., 1998).

County Service Area. The Board of Supervisors and Westley Study Area commercial landowners recently set up a County Service Area (CSA) to provide improvements in lighting and landscaping. They are currently in the process of determining what specific improvements are subject to the CSA. Infrastructure improvements such as water, wastewater, and roadway improvements would not fall under the shell of the CSA, and if proposed, would need to be funded through another mechanism.

4.1.4 INTERCHANGE EVALUATION

Traffic generation and assignment forecasting was prepared by TJKM Transportation Consultants (1998) to identify improvements necessary at the Ingram Creek Road—Howard Road interchange. Existing conditions are described Chapter 3. The following is a description of constraints that are anticipated to occur with implementation of the proposed development scenario.

INTERCHANGE CONSTRAINTS

The volume of traffic projected with implementation of the proposed generations of development would grossly exceed the capacity of the existing lane geometry and could not be served by STOP sign control. Furthermore, with development anticipated on the east and west sides of the freeway, left-turns onto and off of the freeway ramps would conflict with through-traffic on Ingram Creek Road at both on- and off-ramp intersections.

The proximity of the northbound on- and off-ramps to the intersection of Ingram Creek Road/McCracken Road/Howard Road prevents significant expansion of ramp capacity. Slopes to the east of the freeway would require retaining structures along portions of the southbound ramps to accomplish widening. Developed properties located close to the Caltrans right-of-way would interfere with any significant realignment of existing ramps or roadways (e.g. replacing diamond ramps with loop ramps). The existing freeway overpass structure is constructed so that additional lanes cannot be added underneath along Ingram Creek Road.

Based on these constraints, development of the entire acreage of the Howard Road—Westley Triangle study area would not be possible with the existing tight-diamond interchange.

RECOMMENDED IMPROVEMENTS

To accommodate the proposed development within the Howard Road—Westley Triangle study area, improvements are recommended at both the north and southbound on- and off-ramps. These improvements are described below and depicted in Exhibit 4.1-5. As part of the proposed roadway improvements, all ramp intersections should be signalized. All underpass and overpass structures should be widened to accommodate additional lanes and standard shoulders.

Southbound Ramps

Full signalization of the southbound on- and off-ramp intersections is proposed. An exclusive southbound left-turn lane should be added to the southbound off-ramp A second through lane and an exclusive right-turn lane should be added to the eastbound approach on Ingram Creek Road. An exclusive left-turn lane should also be added to the westbound approach and left turns should be permitted from both lanes (split phase). The southbound on-ramp should be widened to allow for two lanes at the intersection that merge to one onto the freeway.

Northbound Ramps

The existing northbound on-ramp should be abandoned and replaced with a new "hook" ramp extending from McCracken Road to northbound I-5 (Exhibit 4.1-5). The northbound off-ramp should be integrated into the Howard Road/McCracken Road/Ingram Creek intersection and the new five-leg intersection should be fully signalized. The east leg of this intersection should be converted to one-way (two outbound lanes only). On the southbound approach, this new intersection should provide two through-lanes and an uncontrolled "free" right-turn lane. The northbound approach should provide two through-lanes and a left-turn pocket. The northbound on-ramp should be widened to allow for two lanes at the intersection that merge to one lane onto the freeway.

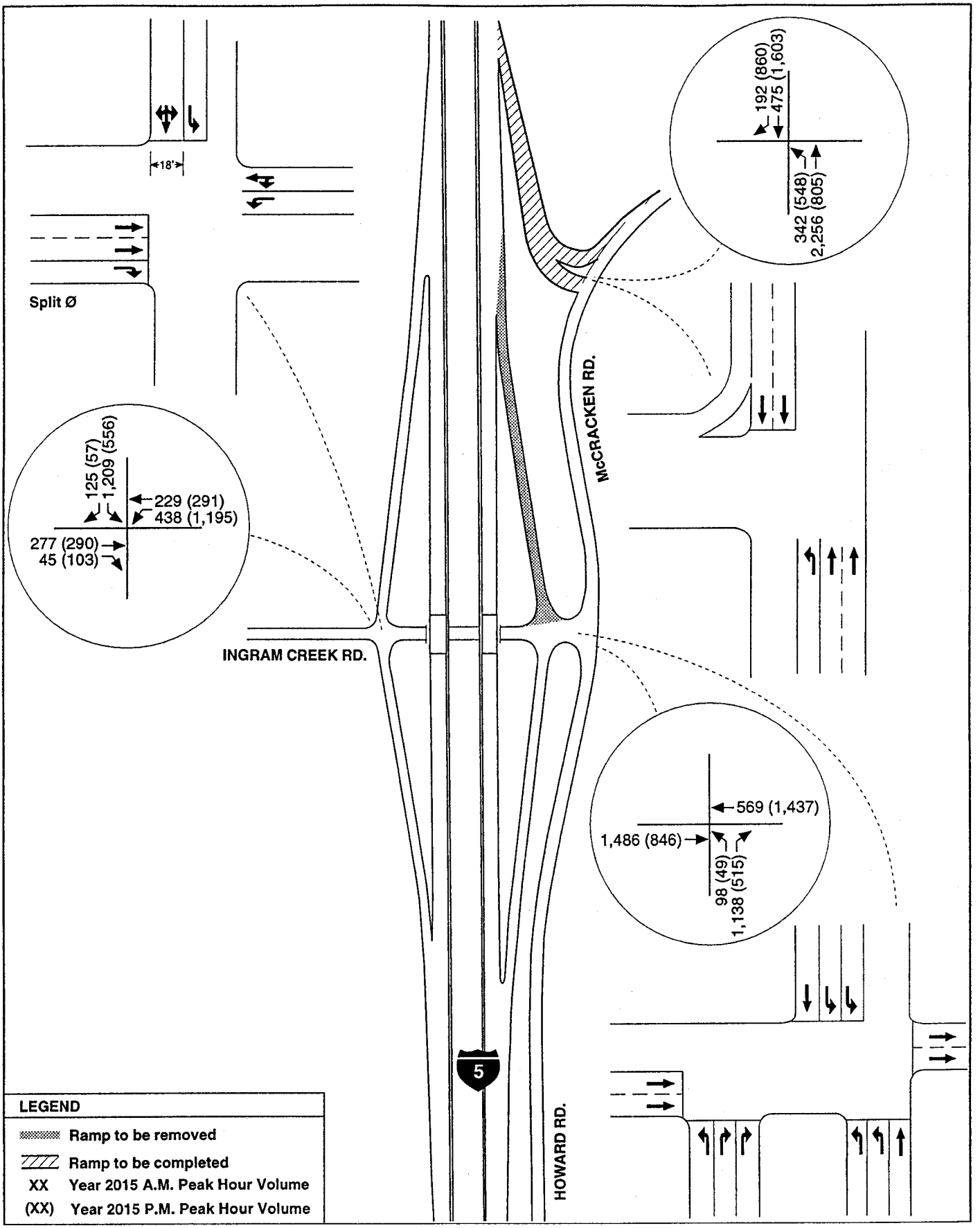
CalTrans should be contacted to discuss and determine if a different ramp configuration is needed. This report recommends the use of a "hook" ramp, but CalTrans is often opposed to this type of ramp. Construction of other types of ramps and related frontage road improvements could substantially increase costs associated with this interchange.

COSTS

Costs for the recommended roadway improvements in the Howard Road—Westley Triangle study area would be approximately $5.1 million. This includes expenses for roadway construction/reconstruction retaining structures, freeway structures, signals, right-of-way, and contingencies which should include design work, minimal standard items and other miscellaneous expenses (cost assumptions are provided in Chapter 3). Table 4.1-3 provides a breakdown of roadway improvement costs for the Howard Road—Westley Triangle study area.

4.1.5 WATER SUPPLY

As discussed in Chapter 3, a public water system is currently not available to serve the Howard Road—Westley Triangle Study Area. Existing uses in the area purchase untreated groundwater from a private supplier for non-potable uses. Background and assumptions are provided in



Source: TJKM Transportation, 1998.

Proposed Northbound Hook Ramp Intersection Configuration Improvements – Howard Road - Westley Triangle Area

EXHIBIT 4.1-5

Chapter 3. For the purpose of this study, fire flow and emergency requirements were assumed to be potable (i.e. treated) water.

Based on calculations prepared by SCS Engineers (1998), the water demand for the Howard Road—Westley Triangle Area is estimated to be 1,825 acre feet per year (ac-ft/year) or 1,630,000 gallons per day (gpd). This equates to a demand of 2,260 gallons per minute (gpm), based on a 12-hour pumping schedule. A water supply system was sized to accommodate this flow with the following basic components: one groundwater well, pumping stations, water treatment facilities, storage tanks, and conveyance system infrastructure.

Based on 12-hour operating average daily flow, fire demand (using a typical hotel with two floors to calculate maximum fire flow), and emergency reserves, the Howard Road—Westley Triangle study area would require three 2 million gallon capacity storage tanks.

Table 4.1-3
ROADWAY CONSTRUCTION COST SUMMARY [1]

	COST PER ACRE [2]	COST / 1,000 SQ FT	COST PER TRIP	TOTAL COST
Roadway	**$1,020.77**	**$137.84**	**$137.84**	**$1,425,000**
Pavement	$465.62	$62.87	$62.87	$650,000
Signals	$214.90	$29.02	$29.02	$300,000
Contingency (50%)	$340.26	$45.95	$45.95	$475,000
Structures	**$2,596.70**	**$350.64**	**$350.64**	**$3,625,000**
Structures	$2,077.36	$280.51	$280.51	$2,900,000
Contingency (25%)	$519.34	$70.13	$70.13	$725,000
TOTAL	**$3,617.48**	**$488.48**	**$488.48**	**$5,050,000**

1 Assumes 10,338 square feet of roadway improvements and 9,601 trips
2 Assumes 1,396 acres

Source: TJKM 1998

From storage tanks, water would be conveyed to users through a network of distribution pipes. For purposes of this study, it was assumed that one main water supply pipe would be located along the longest path of the area (29,040 feet). Individual developments connecting to the system must provide their own access to the main water line. From these assumptions, hypothetical pumping requirements were calculated and necessary pumps were sized.

Table 4.1-4 WATER SYSTEM COMPONENT COSTS	
System Components	**Capital Costs**
Groundwater Well	$75,000
Water Treatment System	$1,625,000
Pumping Stations	$18,000
Storage Tanks	$1,275,000
Conveyance System	$2,908,000
Total Costs	**$5,901,000**
Source: SCS Engineers 1998	

Table 4.1-4 summarizes the costs for the system components to provide water supply, treatment, storage and conveyance for the Howard Road—Westley Triangle study area.

In order to determine if the water system would be capable of handling a low flow situation, the first generation development scenario was applied to the overall system. The system was capable of accommodating the low flow situation with adequate water pressure. Therefore, the system can be built to provide water through the third generation of development.

4.1.6 WASTEWATER TREATMENT AND DISPOSAL

A wastewater treatment feasibility analysis was prepared for the Howard Road—Westley Triangle study area by SCS Engineers (1998). Background assumptions and general cost information are provided in Chapter 3. Based on the assumptions used, the wastewater produced in the Howard Road—Westley Triangle Area is estimated at 3,532 ac-ft/year or 3,150,000 gpd (SCS Engineers 1997). This equates to 2,189 gpm of wastewater (including infiltration from outside sources) which must be treated. Based on this value, a wastewater treatment system was developed with the basic component of wastewater treatment and conveyance system.

Table 4.1-5 WASTEWATER SYSTEM COMPONENT COSTS	
SYSTEM COMPONENTS	**COSTS**
Conveyance System	$8,000,000
Wastewater Treatment System	$7,500,000
Total Costs:	**$15,500,000**
Source: SCS Engineers 1998	

Table 4.1-5 summarizes the costs for the system components required to provide wastewater conveyance and treatment for the Howard Road—Westley Triangle Study Area to accommodate all three generations of development.

To determine if the system would be capable of handling a low flow situation, the first generation of development was applied to the overall system. As preliminarily designed, the conveyance system would be able to maintain constant flow to the treatment system with only first generation flows. Because the system could accommodate this threshold low flow, it could be built to service the study area through all three stages of development.

4.1.7 SAN JOAQUIN KIT FOX MITIGATION

LOCATION OF SAN JOAQUIN KIT FOX

Because the study area consists of commercial development, highly disturbed non-native grassland, immature orchards, and wheat fields, all of which provide minimal or no habitat value to San Joaquin kit fox, this species is not expected to occur onsite. In addition, the nearest known occurrence of San Joaquin kit fox was recorded in 1949 and 1957 approximately 6 miles southwest of the study area (California Natural Diversity Database (CNDDB) 1998). Based on this information it would be highly unlikely for San Joaquin kit fox to occur on the project site. However, U.S. Fish and Wildlife Service (USFWS) has identified aqueducts and canals as San Joaquin kit fox movement corridors and have stated that kit fox occasionally den on the banks of these structures (S. Larson, pers. comm., 1998). Because the California Aqueduct forms the eastern boundary of the site, USFWS and California Department of Fish and Game (CDFG) may consider habitats within the study area appropriate for San Joaquin kit fox, and thus may require mitigation for any impacts. It is assumed that USFWS and CDFG would consider the non-native grassland, orchards, and croplands to be appropriate habitat.

Potential Impacts and Mitigation Measures

It is anticipated that development of the Howard Road—Westley Triangle study area would result in the loss of approximately 160 acres of non-native grassland, 790 acres of orchard, and 220 acres of croplands. Although the study area has been identified as having only minimal value to San Joaquin kit fox, USFWS may require mitigation for impacts to these habitats. For this analysis, it is assumed that mitigation would be required for impacts to non-native grassland and a 300-foot buffer within the perimeter of orchard and cropland on all sides except the western boundary adjacent to I-5. Impacts to non-native grassland would be mitigated at a ratio of 3:1, resulting in purchase of approximately 480 acres of non-native grassland. Impacts within the 300-foot buffer of orchards and cropland would result in purchase of approximately 315 acres. A total of 795 acres of non-native grassland would be purchased for San Joaquin kit fox mitigation.

4.1.8 ECONOMIC CONSIDERATIONS

A planning level economic analysis was prepared for the study area by Williams-Kuebelbeck & Associates (1998). Background information including population trends, supply and demand data are provided in Chapter 3.

The presence of first generation development at the Howard Road—Westley Triangle study area makes it a major commercial and transportation node along I-5 within Stanislaus County. According to data gathered as part of the economic analysis, 50 acres of the study area are currently developed as commercial uses. No industrial uses are developed in the study area. However, based on the findings of the economic analysis, the Howard Road—Westley Triangle study area has an immediate short-term (i.e., over the next 5 to 15 years) potential for 220 acres of industrial development and 80 acres of commercial development. If the 80 acres are developed with commercial uses, the total commercial acreage at this study area would be 125 acres (including the existing 50 acres). Table 4.1-6 shows the current potential acreage at the Howard Road—Westley Triangle study area.

With commercial development already in place and new uses currently being constructed (i.e. a new hotel), prospects for continued growth are favorable. However, the study area lacks onsite water and wastewater systems and would require interchange improvements to support the amount of development demanded in the short-term.

As shown in Table 4.1-7, capital costs for the necessary offsite improvements (interchange, water and wastewater) would be approximately $34,000 per acre (including carrying costs). Onsite improvements would cost approximately $40,000 per acre bringing total onsite and offsite costs to $74,000 per acre. In total, breakeven for the Howard Road—Westley Triangle study area would be around $157,000 per acre which would equate to approximately $3.60 per square foot.

Industrial land sales prices are assumed to range between $.75 and $1.25 per square foot. In contrast, commercial land sales prices are four times as high, ranging from $4.00 to $5.00 per square foot. Upscale commercial (e.g., hotels with amenities, sit down restaurants) ranges from $6.00 to $9.00 per square foot. Both commercial and upscale commercial sales prices exceed breakeven costs per square foot. Only industrial sales prices fail to exceed breakeven cost per square foot of the Howard Road—Westley Triangle study area.

In terms of the short-term potential for each type of development at the Howard Road—Westley Triangle, industrial development is rated as "very poor" while commercial and upscale commercial are rated as "good." This would be expected as total costs per square foot exceed sales prices for industrial development. Sales prices for commercial and upscale commercial development, however, would exceed breakeven costs for interchange improvements, water and wastewater improvements, etc. Therefore, it is economically feasible to develop commercial and upscale commercial uses at the Howard Road—Westley Interchange study area.

Table 4.1-6
POTENTIAL DEVELOPABLE ACRES

STUDY AREA	ACRES	DEVELOPED ACRES	ACRES REMAINING FOR DEVELOPMENT
Total Site	1,300	50	
West Side Total	100	20	80
Commercial	40	20	20
Industrial	0	0	0
Undesignated	60	0	60
Commercial	10	0	10
Industrial	50	25	50
East Side Total	260	25	230
Commercial	50	0	30
Industrial	110	0	100
Undesignated	100	0	100
Commercial	20	0	20
Industrial	70	0	70
Unuseable	10	0	10
Total Developable	360	45	310
Commercial	125	45	80
Industrial	220	0	220
Unusable	10	0	10

Note: Numbers may not add due to independent rounding.

Source: Williams-Kuebelbeck & Associates, 1998 (Site inspection, discussion with developer, local brokers, parcel and map analysis, WK&A).

Table 4.1-7
HOWARD ROAD—WESTLEY TRIANGLE STUDY AREA
TOTAL COSTS VERSUS SALES PRICES [1]

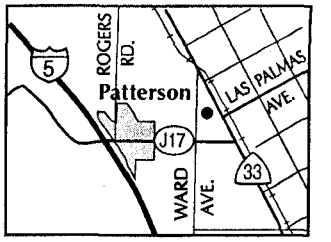
DESCRIPTION	COST
Capital Costs [2]	$20,000
Capital Carrying Costs [10 Years]	$14,000
On Site Costs [Gross Estimate]	$40,000
Land and Holding Costs [Est.]	$15,000
Subtotal	$89,000
Marketing Overhead and Developer's Profit	$29,000
Efficiency Loss	$22,000
Contingency @ 15%	$17,000
Total Breakeven	$157,000
Breakeven [Per Sq. Ft.] [3]	$3.60
Industrial Land Sales Prices	$.75 - $1.25
Commercial Land Sales Prices	$4.00 - $5.00
Upscale Commercial Land sales Prices	$6.00 - $9.00
Short-Term Potential - Industrial	**Very Poor**
Short-Term Potential - Commercial	**Good**
Site Rating for Upscale Commercial	**Good**

Note: With parcel cost allocation [cost spread], some cost shifts may occur among individual parcels that may make industrial development possible at the Howard Road—Westley Triangle study area. Numbers may not add due to independent rounding

1 Rounded to the nearest $1,000
2 Based on costs for interchange improvements from TJKM Transportation Consultants and water and wastewater system costs from SCS Engineers.
3 Rounded to the nearest 10 cents

Source: Williams-Kuebelbeck & Associates.

4.2 SPERRY ROAD INTERCHANGE



4.2.1 LOCATION

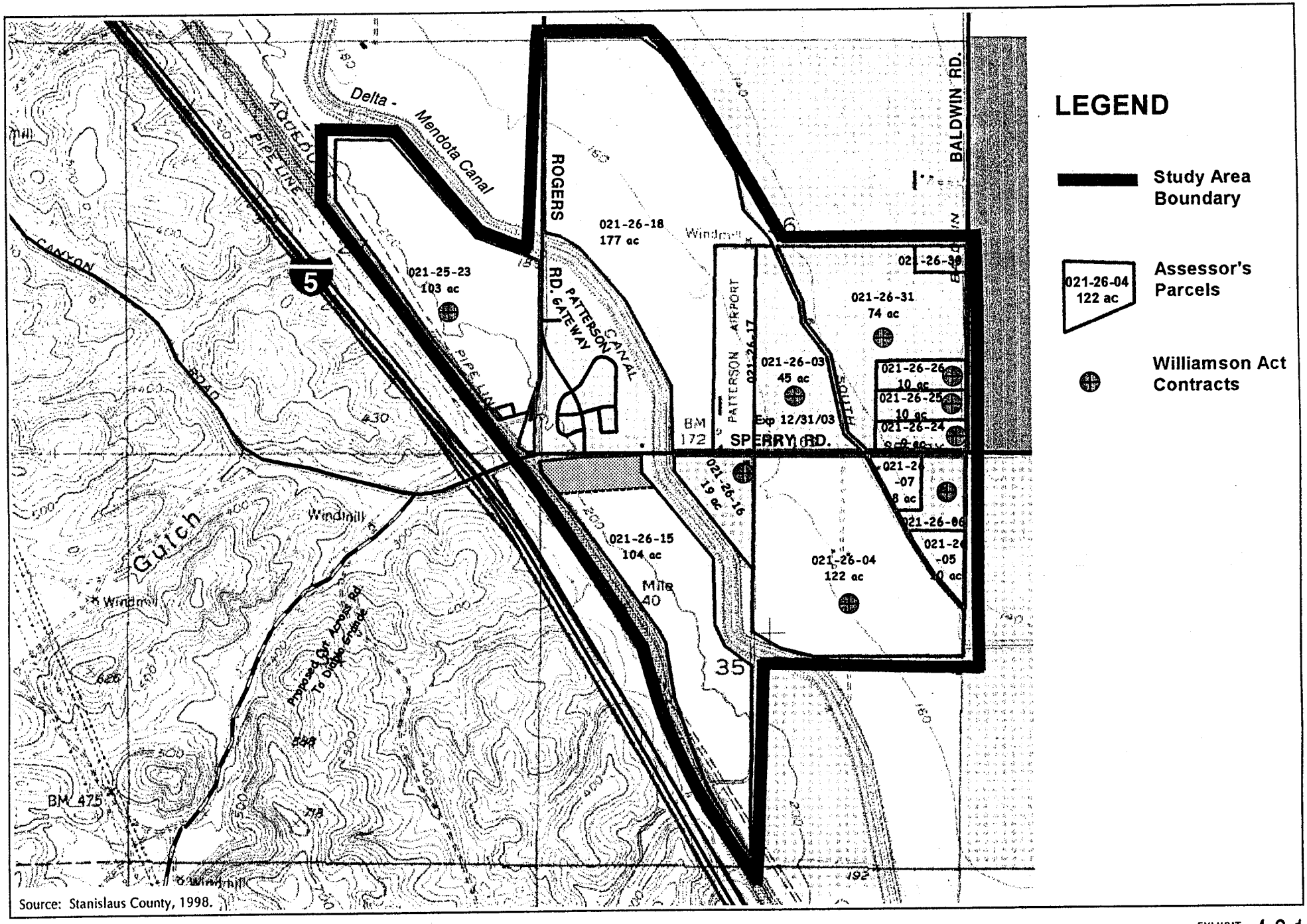
The Sperry Road Interchange study area is approximately 800 acres and is located generally at the Sperry Road/I-5 interchange (County Road J17) (Exhibit 4.2-1). The study area is bordered on the west by the California Aqueduct, which generally parallels I-5, and is partially bordered along the east by the City of Patterson. The Delta-Mendota Canal traverses north-south through the study area, also paralleling I-5.

The Sperry Road Interchange study area is located on the Patterson 7.5 Minute Quadrangle, Township 5 South, Range 7 East, in Sections 26, 27 and 35. The study area consists of 15 parcels. Seven parcels are in active Williamson Act Contracts. Two other parcels are in non-renewal. The Assessors's Parcel Numbers (APNs), acreage, Williamson Act status and zoning for each parcel is shown in Table 4.2-1.

TABLE 4.2-1
SPERRY ROAD INTERCHANGE INTERSECTION STUDY AREA PARCEL SUMMARY

Assessor's Parcel Number (APN)	Parcel Acreage	Williamson Act Status (Expiration Date)	Zoning
021-25-23	103.00		A-2-40
021-26-18	177.00	(Expired 12-31-95)	A-2-40
021-26-17	29.73		A-2-40
021-26-03	45.00	(Expires 12-31-03)	A-2-40
021-26-31	74.00	Active	A-2-40
021-26-26	9.78	Active	A-2-40
021-26-25	9.78	Active	A-2-40
021-26-24	8.94	Active	A-2-40
021-26-07	9.36	Active	A-2-40
021-26-06	13.11	(Expires 12-31-07)	A-2-40
021-26-05	10.00		A-2-40
021-26-04	122.00	Active	A-2-40
021-26-16	19.18	Active	A-2-40
021-26-15	104.00		A-2-40/A-2-10
021-26-19	48.80		P-D
Total Acreage	783.68		
Total Acres in Active Williamson Act	253.04		

Source: EDAW 1998



Source: Stanislaus County, 1998.

Sperry Road Interchange Area

EXHIBIT 4.2-1

I-5 Corridor Industrial/Business Park Feasibility Study

IN 8T[illegible] 7/9[illegible]

0 500 1000 2000 FEET

NORTH

EDAW

4.2.2 CHARACTERISTICS

ACCESS AND LAND USES

The northeast corner of the Sperry Road/I-5 interchange is known as "Villa del Lago" (formerly Patterson Gateway). This development serves as the entrance to the City of Patterson which is located approximately 1.5 miles to the east of the interchange. Villa del Lago is currently developed with a gas-station/convenience store and one fast food restaurant located off Rogers Road. Villa del Lago is bordered by the Delta-Mendota Canal on the north and east, Sperry Road on the south and vacant land on the west.

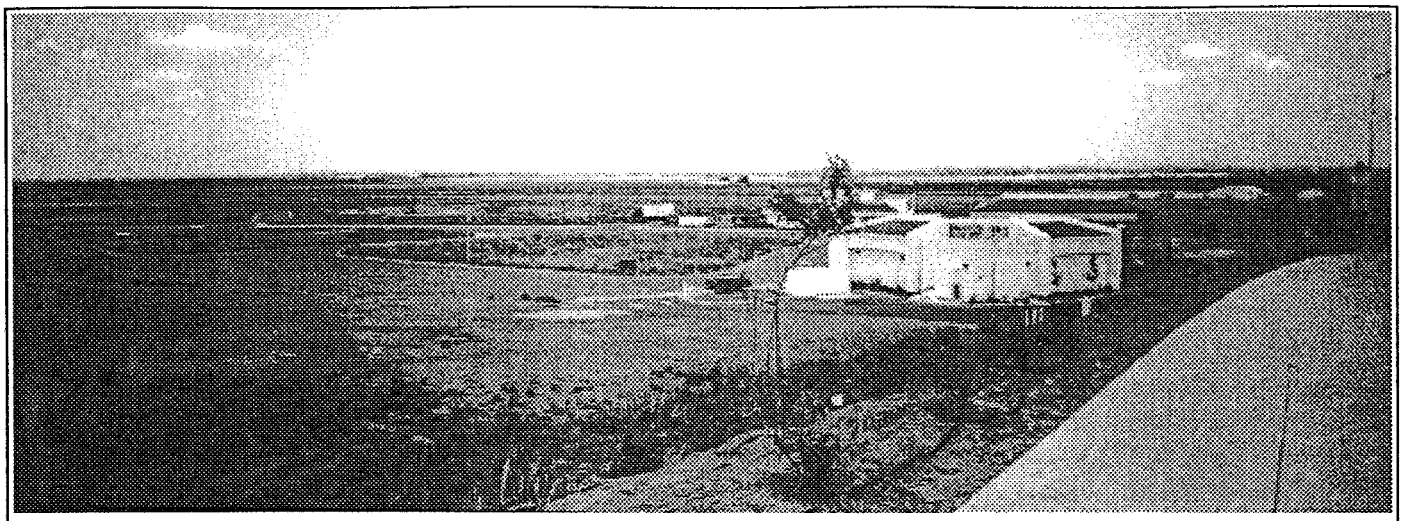
Rogers Road extends north off of Sperry Road, providing access to the existing establishments in Villa del Lago. A looped street network is in place defining future building sites for additional commercial uses (Exhibit 4.2-2, Photo 1). Several hundred feet along the north side of Sperry Road are improved with a sidewalk and a strip of irrigated landscape, including palm trees and low shrubs (Exhibit 4.2-2, Photo 2). These improvements are consistent with the City of Patterson's plans for the Sperry Corridor as the entrance to the City. A large sign, approximately 50 feet high with space for 9 advertisements, is located at the southwest corner of Villa del Lago. The sign is visible to both north and southbound traffic along I-5 from approximately 3 miles away. Adequate access to the study area is available from Sperry Road.

Light poles are provided to illuminate parking lots of the two existing uses. A 3-way traffic signal has been installed (but is not operational) at the intersection of Rogers Road and Sperry Road. The intersection includes one east-bound through-lane, one left-turn lane (providing access to Rogers Road) and two west-bound lanes along Sperry Road to I-5. Rogers Road currently provides access to the north, perpendicular to Sperry Road. Two through-lanes, one left-turn lane and two southbound lanes (terminating at Sperry Road) are located on Rogers Road at its intersection with Sperry Road. The roadway improvements are indicative of accommodating future retail development.

Vacant agricultural land is located south of Sperry Road across from the Villa del Lago development (Exhibit 4.2-2, Photo 3). East of the California Aqueduct, areas south of Sperry Road are either vacant or agricultural lands, including cropland (row and grain crops, approximately 374 acres) and orchards (approximately 200 acres) with a small amount of non-native grassland (3.5 acres). The north side of Sperry Road east of the Delta-Mendota Canal has areas of agriculture as well as the Patterson Airport. The airport is used primarily for crop-dusting but is also available for public use.

VEGETATION

Non-native grassland is located west of Villa del Lago, east of the aqueduct and north of Sperry Road. This area has been highly disturbed and is dominated by non-native grasses and weedy vegetation, including wild oats (*Avena* sp.), rip-gut brome (*Bromus diandrus*), foxtail (*Alopecurus* sp.) wild radish (*Raphanus sativus*), and yellow star thistle (*Centaurea solstialis*).



1. View northeast along Sperry Road east of I-5 at Villa del Lago Development.

2. View northeast towards the intersection of Sperry Road and Rogers Road. Existing uses in the Villa del Lago Development include a fast food restaurant and a gas station/mini-mart.

3. View east along Sperry Road east of I-5. The vacant agricultural land at right is south of the Villa del Lago Development.

Source: EDAW, Inc., 1998.

Sperry Road Interchange Area Photographs

EXHIBIT 4.2-2

WILDLIFE

The majority of the study area consists of vacant and agricultural lands. Although these areas do not represent high-quality wildlife habitat, they are frequently used by common wildlife species that are adapted to highly disturbed areas with human activity. Species typically found in these areas include house finch (*Carpodacus mexicana*), Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), and American crow (*Corvus brachyrhynchos*). Some crops support a prey base for foraging raptors, including red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), black-shouldered kite (*Elanus leucurus*), great horned owl (*Bubo virginianus*), and American kestrel (*Falco sparverius*).

Non-native grassland represents habitat for a variety of rodents, which in turn serve as a prey base for raptors and carnivores such as hawks and owls, coyote (*Canis latrans*), and grey fox (*Urocyon cinereoargenteus*). Although few birds nest in grassland areas, a number of species forage in this habitat, including mourning dove (*Zenaida macroura*), white-crowned sparrow (*Zonotrichia leucophrys*), lesser goldfinch (*Carduelis psaltria*), song sparrow (*Melospiza melodia*), western bluebird (*Sialia mexicana*), western meadowlark (*Sturnella neglecta*), and several raptor species. Other species expected to occur include California vole (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), black-tailed jackrabbit (*Lepus californicus*), western fence lizard (*Sceloporus occidentalis*), northern alligator lizard (*Gerrhonotus coeruleus*), and gopher snake (*Pituophis melanoleucus*).

4.2.3 LAND USE PLANNING, POLICY, AND REGULATORY CONSIDERATIONS

STANISLAUS COUNTY GENERAL PLAN

The Sperry Road Interchange study area, east of Rogers Road, north of Sperry Avenue and west of the Delta-Mendota Canal (i.e. where the Villa del Lago development is located) is designated as Planned Development in the Stanislaus County General Plan. The area west of Rogers Road and I-5, including the California Aqueduct, is designated as Agriculture (Exhibit 4.2-2). A small strip adjacent to the south side of Sperry Road, in between the California Aqueduct and the Delta-Mendota Canal, is designated Highway Commercial/Planned Development. The Villa del Lago development is a planned development for which a General Plan amendment, re-zone, and tentative map were approved in August of 1992 (Kachel, pers. comm., 1998).

The Planned Development designation is intended for land which, because of demonstrably unique characteristics, may be suitable for a variety of uses without detrimental effects on other property (Stanislaus County 1994) (Refer to General Plan Land Use Designations in Chapter 3). The characteristics of the study area which make it unique are its location near an interchange as well as its proximity to the Patterson Airport. The Delta-Mendota Canal also acts as a boundary separating the Villa del Lago commercial uses from agricultural areas to the east.

As represented by the Villa del Lago development, the study area is currently developing with first generation uses allowed under the P-D designation, which would also be complementary to uses allowed under the Highway Commercial/Planned Development designation. The existing development is also consistent with the proposed development scenario which envisions second generation (distribution, warehousing, heavy equipment repair), and third generation (large scale sales and marketing facilities, mixed uses, local and regional facilities) uses surrounding those present at Villa del Lago.

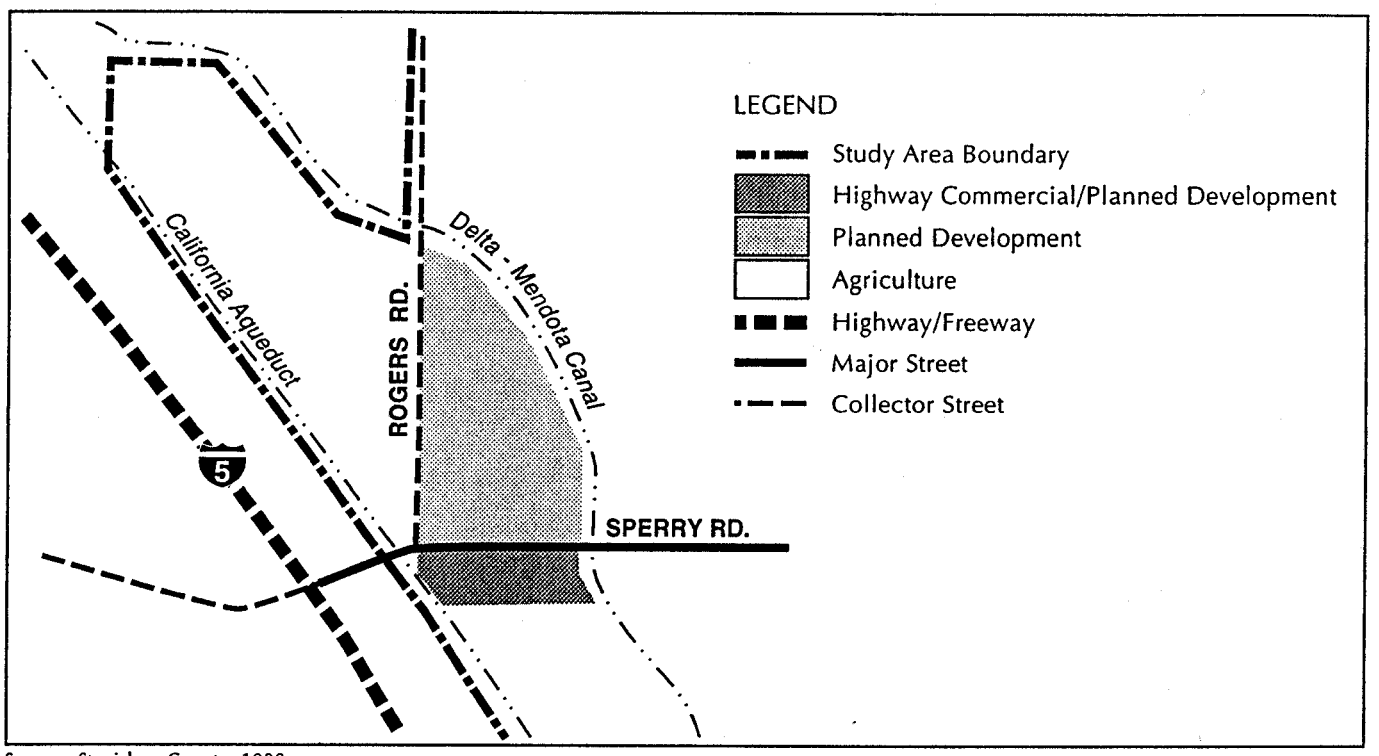
Agricultural lands would require a General Plan Amendment and rezone before development identified in the proposed development scenario could occur.

The Sperry Road Interchange study area is included in the City of Patterson Sphere of Influence (SOI) as shown on the City of Patterson General Plan Land Use Diagram (September 1997). The SOI is a plan for the probable ultimate (i.e., 20 year time horizon) physical boundaries and service area of the city. Stanislaus County typically designates areas within a SOI as "Urban Transition" with A-2 zoning. This designation helps to avoid incompatibilities between city general plans and development approved by the County in unincorporated areas in proximity to a City.

The Sperry Road Interchange study area is not designated as Urban Transition on the County General Plan because Patterson's SOI was expanded in 1997 and the General Plan has not been revised since 1994. As a result, the Study Area is shown as Agriculture, Planned Development and Highway Commercial/Planned Development (Exhibit 4.2-3). On the City of Patterson General Plan Land Use Diagram, the study area is designated as Highway Service Commercial, Light Industrial, Public/Quasi-Public (Patterson Airport) and Medical Professional (Exhibit 4.2-4). Until the land is annexed into the City, the Stanislaus County General Plan and Zoning Ordinance regulate land use in the unincorporated Patterson SOI. However, the County would consult with Patterson if any developments are proposed within the City's SOI prior to annexation. The Villa del Lago development, for example, represents a cooperative effort by both jurisdictions.

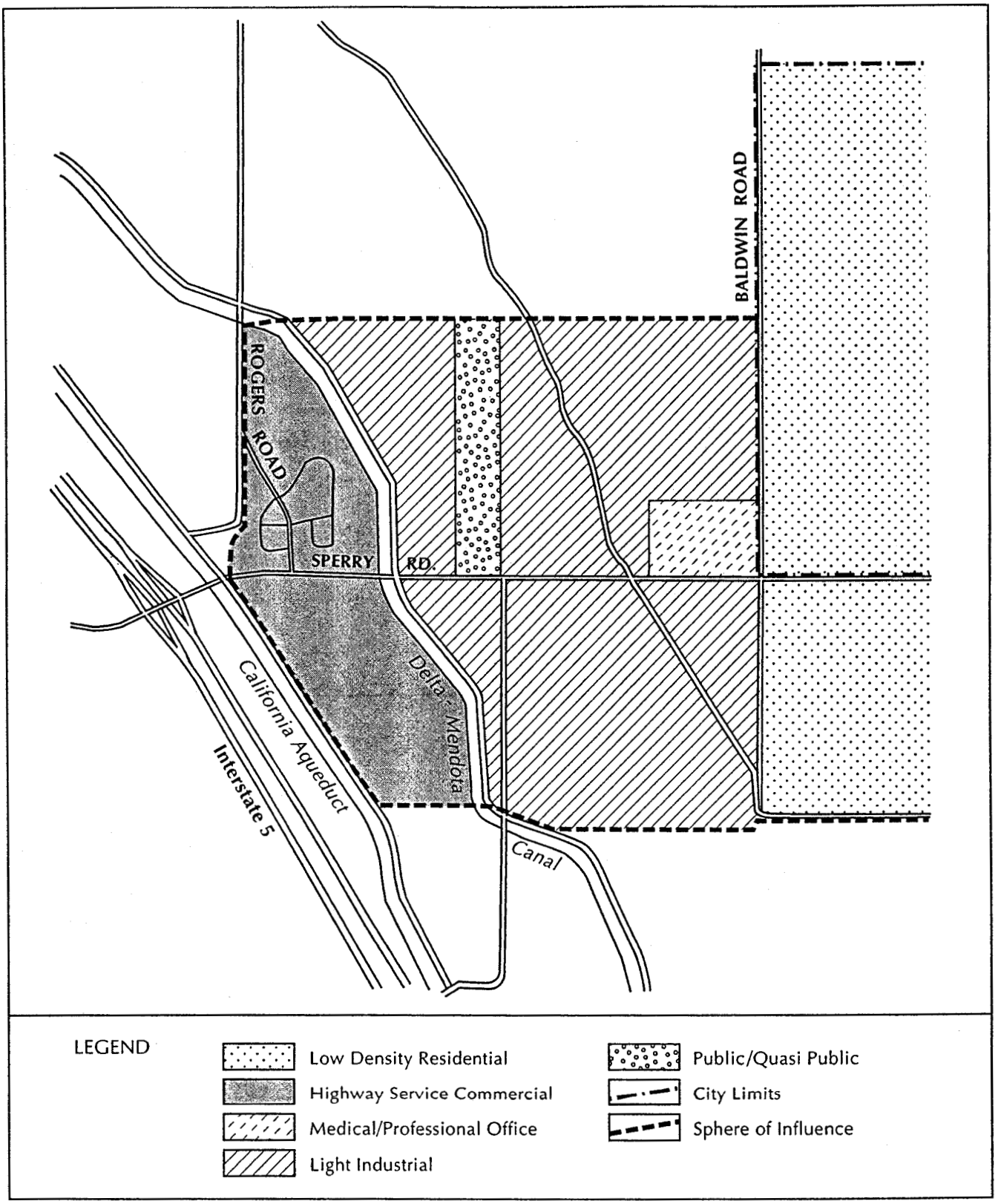
The Patterson Airport is also located within the study area. The facility, approximately 30 acres in size, is used primarily for crop-dusting operations but is also available for public use. Crop-dusting occurs seven days a week from daylight to noon during the periods of February - March and June - September. The Stanislaus County Airport Land Use Commission (ALUC) is responsible for formulating a land use plan that will provide for the orderly growth of each public airport and area surrounding the airport. The ALUC is concerned primarily with the incompatibility of uses surrounding airfields. The airport is currently surrounded with agricultural land, aside from the Villa del Lago development which is approximately 500 feet west of the airport.

No noise contours have been prepared for the Patterson Airport. Based on the frequency of airport use and day/night distribution of aircraft operations, it is expected that the 60 db CNEL contour for this airport is located very close to the airport so that no noise-sensitive uses are impacted (Stanislaus County 1987). No noise sensitive land uses (e.g. homes, day-care, schools, etc.) would be proposed in the development scenario. Therefore, no incompatibility issues are anticipated as a result of placing any of the proposed first, second or third generation land uses adjacent to the Patterson Airport. Plans for development in the vicinity of the airport would be reviewed by the ALUC prior to approval.



Source: Stanislaus County, 1998.

Sperry Road Interchange Area County General Plan Land Use Designations EXHIBIT 4.2-3



Source: City of Patterson, September 1997.

City of Patterson General Plan Land Use Designations for the Sperry Road Interchange Area

EXHIBIT 4.2-4

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

0 1200 2400 4800 FEET

NORTH

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Relevant General Plan Policies

Aside from the emerging highway commercial cluster at the gateway to the City of Patterson (i.e. Villa del Lago), the study area is primarily vacant or cultivated agricultural land. The study area includes the Patterson Airport and a portion of the Delta-Mendota Canal.

The Stanislaus County General Plan (Stanislaus County 1994) and Agricultural Element (Stanislaus County 1992) provide policies to direct development. Based on the general characteristics of the study area, a number of policies from several different elements are applicable to possible commercial/industrial development of the Sperry Road Interchange study area. Table 4.2-2 summarizes these policies.

Table 4.2-2
STANISLAUS COUNTY GENERAL PLAN POLICIES
RELEVANT TO SPERRY ROAD INTERCHANGE

ELEMENT & POLICY #	POLICY
Land Use - Policy 14	Uses shall not be permitted to intrude into or be located adjacent to an agricultural area if they are detrimental to continued agricultural usage of the surrounding area.
Land Use - Policy 16	Agriculture, as the primary industry of the county, shall be promoted and protected.
Land Use - Policy 17	Promote diversification and growth of the local economy.
Land Use - Policy 22	Future growth shall not exceed the capabilities/capacity of the provider of services such as sewer, water, public safety, solid waste management, road systems, schools, health care facilities, etc.
Land Use - Policy 23	New development shall pay its fair share of the cost of cumulative impacts on circulation and transit systems.
Land Use - Policy 24	Development, other than agricultural uses and churches, which requires discretionary approval and is within the sphere of influence of cities or in areas of specific designation created by agreement (e.g., Sperry Avenue and East Las Palmas Corridors), shall not be approved unless first approved by the city within whose sphere of influence it lies or by the city for which areas of specific designation were agreed. Development requests within the spheres of influence or areas of specific designation of any incorporated city shall not be approved unless the development is consistent with agreements with the cities which are in effect at the time of project consideration. Such development must meet the applicable development standards of the affected city as well as any public facilities fee collection agreement in effect at the time of project consideration (Comment: This policy refers to those development standards that are transferable, such as street improvement standards, landscaping, or setbacks. It does not always apply to standards that require connection to a sanitary sewer system, for example, as that is not always feasible.
Conservation and Open Space - Policy 11	In areas designated "Agriculture" on the Land Use Element, discourage land uses which are incompatible with agriculture.
Circulation - Policy 1	Development will be permitted only when facilities for circulation exist, or will exist as part of the development, to adequately handle increased traffic.
Agriculture - Policy 1.5	Limited visitor-serving commercial uses shall be permissible in agricultural areas if they promote agriculture and are secondary and incidental to the area's agricultural production.
Agriculture - Policy 1.8	Concentrations of commercial and industrial uses, even if related to surrounding agricultural activities, are detrimental to the primary use of the land for agriculture and shall not be allowed.

Table 4.2-2
STANISLAUS COUNTY GENERAL PLAN POLICIES
RELEVANT TO SPERRY ROAD INTERCHANGE

ELEMENT & POLICY #	POLICY
Agriculture - Policy 2.7	Proposed amendments to the General Plan diagram (map) that would allow the conversion of agricultural land to non-agricultural uses shall be approved only if they are consistent with the County's conversion criteria.
Agriculture - Policy 2.12	When the County determines that the proposed conversion of agricultural land to non-agricultural uses could have a significant effect on the environment, the County shall fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects of the conversion.
Sphere of Influence - Policy	Whenever an application is to be considered which includes property within the sphere of influence of a city or special district (e.g. sewer, water, community services) or areas of specific designation created by agreement between County and City, the following procedures should be followed: 1. Development, other than agricultural uses and churches, which requires discretionary approval from incorporated cities shall be referred to that city for preliminary approval. The project shall not be approved by the county unless written communication is received from the city memorializing their approval. If approved by the city, the city should specify what conditions are necessary to ensure that development will comply with city development standards. Requested conditions for such things as sewer service in an area where none is available shall not be imposed. Approval from a city does not preclude the County decision-making body from exercising discretion, and it may either approve or deny the project. 2. Agricultural uses and churches which require discretionary approval should be referred to that city for comment. The County Planning commission and Board of Supervisors shall consider the responses of the cities in the permit process. If the county finds that a project is inconsistent with the city's general plan designation, it shall not be approved. Agricultural uses and churches shall not be considered inconsistent if the only inconsistency is with a statement that a development within the urban transition area or sphere of influence shall be discouraged (or similar sweeping statement). The city shall be asked to respond to the following questions: a) Is the proposed project inconsistent with the land use designation on the city's general plan? If so, please include a copy of the map (or that portion which includes the subject property) and the text describing uses permitted for the general plan designation. All findings of inconsistency must include supporting documentation. b) If the project is approved, specifically what type of conditions would be necessary to ensure the development will comply with city development standards such as street improvements, setbacks and landscaping? In case of a proposed project within the SOI of a sanitary sewer district, domestic water district or community services district, the proposal shall be forwarded to the district board for comment regarding the ability of the district to provide services. If the district serves an unincorporated town with a Municipal Advisory Council (MAC), the proposal shall also be referred to the MAC for comment.

Source: EDAW 1998

Development of first generation commercial uses as envisioned in the proposed development scenario has already begun to occur at the Sperry Road Interchange study area. Existing development has not affected agricultural uses to the south and east in part because the Delta-Mendota Canal forms the eastern boundary of the Villa del Lago development and serves as a barrier to separate this use from surrounding agricultural uses. Continued expansion of non-

agricultural uses within the study area to the east of the canal and south of Sperry Road would not be consistent with Land Use Policy 14 because conversion of Agricultural land would be required. Conversion of Agricultural designated land would also be counter to promoting agriculture in the County as set forth in Land Use Policy 16.

Continued development of Villa del Lago with highway commercial uses would create additional jobs in the County on both short-term and long-term time horizons consistent with Land Use Policy 17. In the short-term, some jobs would be generated in association with construction of new structures and infrastructure. Additional jobs would be created in the long-term through the establishment of commercial, industrial and eventually high-technology uses. Currently, Villa del Lago is developed with one fast-food restaurant and one gas/convenience store. A hotel has recently submitted an application for development at this location as well (Freitas, per. comm., 1998). All of these uses are consistent with first generation development envisioned in the development scenario. Second and third generation development would further diversify the County's economic base and provide more skilled labor jobs.

In addition to the requirement of a general plan amendment to change the land use designation from Agriculture, another factor which must be considered is the presence of Williamson Act Contracts. Currently, there are seven active and two non-renewal (APN 021-26-03 expires 12-31-03 and APN 021-26-06 expires 12-31-07) Williamson Act Contracts located within the Sperry Road Interchange study area. Development of parcels with active contracts would be precluded in accordance with the provisions of the Williamson Act, which prohibits conversion of contracted lands to non-agricultural uses (refer to Williamson Act Contracts in Chapter 3. Use of Williamson Act Contracts is also consistent with Land Use Policy 16, which encourages protection of agriculture in the County.

Although the Williamson Act restricts development of agricultural lands, some uses are allowed on contracted lands. Section 21.20.045 of the County Zoning Ordinance (Uses on Lands Subject to Williamson Act Contracts) sets forth principles of compatibility for proposed uses on such lands (refer to Williamson Act Contracts in Chapter 3. Development which is incompatible with the types of uses allowed under Section 21.20.045 of the County Zoning Ordinance cannot occur on Williamson Act Contract parcels. Therefore, continued development of non-agricultural commercial uses in the study area could not occur until existing contracts subsequently (i.e. 10 years or more) expire. Expansion of commercial uses could occur within the study area, but only on non-Williamson Act contracts designated parcels (i.e., APN 021-25-23 to the west, 021-26-15 to the south, and the remainder of APN 021-26-18 east of the Delta-Mendota Canal) and only to the extent that the uses are not detrimental to continued agricultural usage of the surrounding area. Commercial uses would require a general plan amendment to convert from agricultural uses.

Conversion of agricultural lands would also be inconsistent with the intent of Open Space and Conservation Policy 11 and Agricultural Element Policy 1.8. Further, Policy 2.7 of the Agriculture Element requires all agricultural land conversions to meet the County's conversion criteria (refer to Conversion of Agricultural Land in Chapter 3. According to the criteria contained in the General Plan Agricultural Element, conversion of agricultural land to urban uses shall be approved only if the Board of Supervisors makes certain findings relative to the conversion criteria.

Because Stanislaus County is primarily an agriculture based economy with policies to protect agricultural lands, making findings consistent with all 6 items would require substantive justification for the proposed conversion. Item 1 makes reference to Policy 2.4 and Policy 2.5 of the Agricultural Element, which prohibit development of the County's Most Productive Agricultural land but allow conversion of Less Productive Agricultural Areas. Due to the study area's location within Patterson's SOI, it would not be considered a Most Productive Agricultural Area. Item 2 requires a demonstrated need for the proposed project based on population data. The proposed project is substantiated based on past and projected growth in the County (refer to Population Growth discussion in Chapter 3. Given the emerging development occurring at this interchange, no feasible alternative site with existing water and sewer infrastructure is available to meet Item 3.

Item 4 addresses piecemeal conversion of agricultural lands and growth inducement. Based on existing and projected population information, the project would occur in response to population demands. Because the study area is served with water from the City of Patterson, agricultural water supplies would not be affected, and the proposed project would partially meet the criteria listed in Item 5. Conflicts and interference with agricultural operations may require substantial justification.

In terms of public services pertinent to conversion criteria item 6, the study area is served with both water and wastewater service from the City of Patterson. Finally, meeting the provisions described in item 7 would have to be demonstrated as part of the project review process. Overall, the proposed development scenario would meet the majority of findings required as part of the conversion criteria contained in Agricultural Policy 2.7.

With regard to Policy 1.5, several of the possible second generation uses (i.e. agricultural services such as heavy equipment use and repair services) may be compatible with agricultural uses if they complement existing agricultural uses. However, overall, introducing commercial and industrial uses into agricultural areas is not consistent with the intent of policies aimed at protecting agricultural lands through prohibiting conversion and limiting permitted uses.

Land Use Policy 22 addresses provision of municipal services. The Sperry Road Interchange study area, although located within the unincorporated County, receives water and wastewater service from the City of Patterson. City infrastructure was extended to the study area due to its location within Patterson's SOI and in anticipation of its future annexation into the City boundaries. Until annexation occurs, any development proposed in the unincorporated area of the County within Patterson's SOI would occur in consultation with the City.

Policy 22 is also consistent with Policy 24, which directs discretionary development occurring within a SOI or in areas of specific designation created by agreement (i.e. Sperry Road) to receive approval from the appropriate SOI City or specific designation prior to proceeding with County approval. Policy 24 deals specifically with the Villa del Lago development and all future development that may occur within the study area prior to annexation into the City.

Similar to Policy 24, the Stanislaus County General Plan also has one policy (listed in Table 4.2-2) which deals specifically with Spheres of Influence. The policy sets forth the procedures for discretionary projects, (such as the existing Villa del Lago project and the proposed development scenario), which ensures coordination between the City and County. Any future development

which may occur prior to annexation of the study area parcels into the City of Patterson must comply with this policy.

Circulation Policy 1 requires development to be adequately served with circulation infrastructure. The proposed development would overburden the existing interchange and roadways. Therefore, circulation improvements would be necessary to accommodate development proposed within the study area. In accordance with Land Use Policy 23, new development would be required to pay its fair share of the cost of cumulative impacts.

Whenever the County is confronted with converting agricultural land, it must determine whether such action will result in a significant effect on the environment. Policy 2.12 directs the County to fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects, of the conversion.

STANISLAUS COUNTY ZONING

The study area is predominantly zoned A-2 (General Agriculture District) (Exhibit 4.2-5). Numbers following the A-2 (General Agriculture District) designation (i.e. -10, 40, 160) indicate the minimum parcel size. APN 021-26-15 is zoned A-2-10, which allows for agricultural uses on parcels of 10 acres. A portion of APN 021-26-18, situated between the Delta-Mendota Canal and the California Aqueduct (i.e. the Villa del Lago Development) is zoned P-D (Planned Development). All remaining parcels in the Study Area are zoned A-2-40 (see Table 4.2-1).

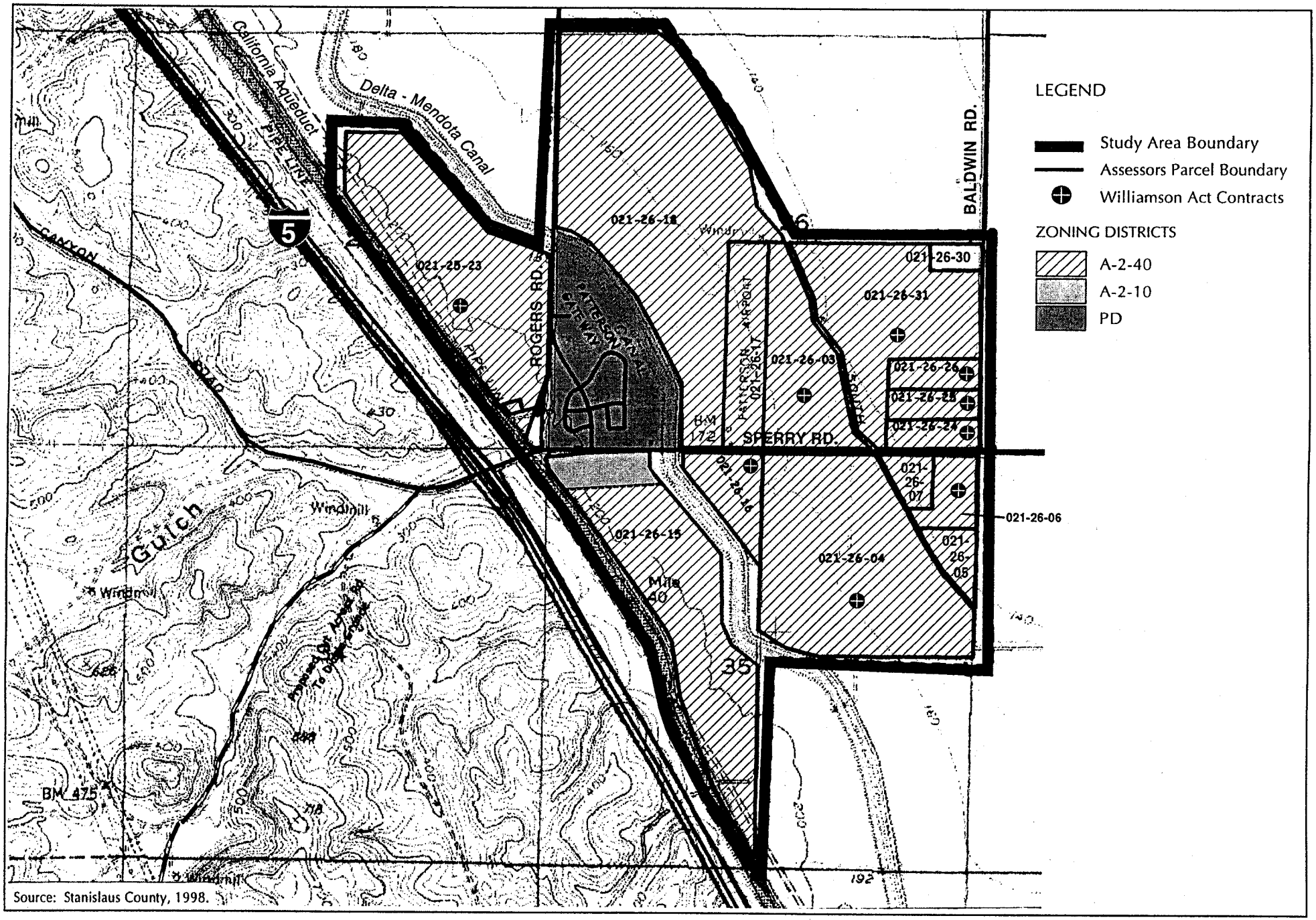
A-2 zoning is consistent with the Agriculture land use designation shown on the General Plan Land Use map. The P-D zone is also consistent with the Agriculture land use designation when it is used for agriculturally related uses or for uses of demonstrably unique character. The Villa del Lago development, due to its location within the City of Patterson's SOI, receives water and sewer service from the City, consistent with the requirements of P-D zoning. For a full description of these zoning designations, refer to Stanislaus County Zoning under Section.4.0.1.

The proposed development scenario would be consistent with the provisions of P-D zoning in the Sperry Road Interchange study area. Existing parcels within the A-2 zoning designation would require a rezone to P-D in order for development envisioned in the proposed plan to be consistent with zoning requirements.

OTHER PLANS/REGULATIONS THAT APPLY

In addition to being governed by the Stanislaus County General Plan (1994), the Stanislaus County Agricultural Element (1992), and the Stanislaus County Zoning Ordinance, the Sperry Road Interchange study area is also located within the SOI of the City of Patterson, the planning boundaries of the Patterson Airport, and in several special districts. The districts do not have any regulatory authority over projects located within their boundaries. However, they are acknowledged here as entities which should be consulted prior to proceeding with development within the Sperry Road Interchange study area.

Stanislaus County General Plan. The City of Patterson General Plan (1992) and General Plan Land Use Diagram (September 1997) direct development and land use within the City limits. These documents also direct probable future expansion and development of the City as defined by the City of Patterson's Sphere of Influence.



Sperry Road Interchange Area Zoning Districts

EXHIBIT 4.2-5

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

0 500 1000 2000 FEET

NORTH

EDAW

Airport Land Use Commission (ALUC) - The Stanislaus County ALUC is responsible for formulating land use plans that will provide for the orderly growth of each public airport and area surrounding the airport. The duties and powers of the ALUC are strictly advisory (ALUC 1978). The ALUC is concerned primarily with the incompatibility of uses surrounding air fields (Stanislaus County 1987). The ALUC has established planning area boundaries around the Patterson Airport and developed land use plans within these boundaries, including recommending compatible land uses and recommending height restrictions and building standards for soundproofing within the planning boundaries (City of Patterson, 1992). The Airport Land Use Commission Plan (1978) recommends that land surrounding the Patterson Airport remain in an agricultural General Plan land use designation and A-2 zoning to maintain the existing compatibility of surrounding uses. In addition, development within the Villa del Lago development and the surrounding area must take into consideration the height limitations imposed on uses within the ALUC plan area. A potential conflict of airspace could also arise between the Patterson Airport and former Crows Landing NALF (ALUC 1978). Therefore, all development proposals occurring within the Sperry Road Interchange study area would be subject to review by the ALUC to ensure compatibility and avoid potential airspace conflicts with future airport uses at Crows Landing.

West Stanislaus Resource Conservation District. The West Stanislaus Resource Conservation District serves as a local contact for the U.S. Department of Agriculture regarding resource conservation related to soils, air and other natural resources. The Resource Conservation District is involved primarily with aggregate mining projects. The Resource Conservation District may also review General Plan Amendments involving conversion of agricultural land, but has no approval authority (McElhiney, pers. comm. 1998).

Del Puerto Water District. The Del Puerto Water District (District) conveys water from the Delta-Mendota Canal for agricultural purposes. The District has a contract with the Bureau of Reclamation to divert 140,210 acre-feet from the canal. Although the District does not currently provide treated water for municipal and industrial uses, such as would be required by the proposed development scenario, all proposals for development should be submitted to the District for review by the District's Board of Director's (Cotter, pers. comm. 1998).

Salado Creek Storm Maintenance District No. 8. The Salado Creek Storm Maintenance District No. 8 is responsible for maintaining storm drainage facilities within its service boundaries. Storm drainage infrastructure facilitates drainage during periods of heavy precipitation which may cause Salado Creek to flood. Projects located in the Salado Creek Storm Maintenance district No. 8 should submit plans for review to the District for review prior to proceeding with development.

4.2.4 INTERCHANGE EVALUATION

Traffic generation and assignment forecasting was prepared by TJKM Transportation Consultants (1998) to identify improvements necessary at the Del Puerto Canyon Road/Sperry Road interchange. Existing conditions are described in Chapter 3. The following is a description of constraints that are anticipated to occur with implementation of the proposed development scenario.

INTERCHANGE CONSTRAINTS

The traffic analysis for the Sperry Road Interchange revealed that development of the entire study area would be possible without the need to abandon the existing tight-diamond interchange configuration. However, the volume of traffic projected in association with all three generations of development would grossly exceed the capacity of the existing lane geometry and could not be served by STOP sign control. Although the proposed development would be located on the east side of the freeway off of Sperry Road, traffic analysis assumed that the Del-Puerto interchange would receive the majority of trips to access the study area. At the southbound on- and off-ramps, conflicts occur between traffic turning left off of the freeway and left onto the freeway. The problem is more acute at the northbound on- and off-ramps, where heavy traffic to and from the southbound on- and off-ramps conflicts with traffic from the northbound on-ramp.

The northbound ramps at the Del Puerto Canyon Road Interchange are roughly 500 feet from the California Aqueduct and steep hills are located along the west side of the southbound ramps. The presence of the aqueduct and the hilly topography restrict realignment of ramps or roadways. For example, the northbound on-ramp would require a retaining structure to accommodate any modifications, due to the presence of a deep gully formed by the embankment of the northbound on-ramp and the embankment of the aqueduct. The overcrossing structure also constrains Del Puerto Canyon Road to two lanes although some roadway shoulder is available.

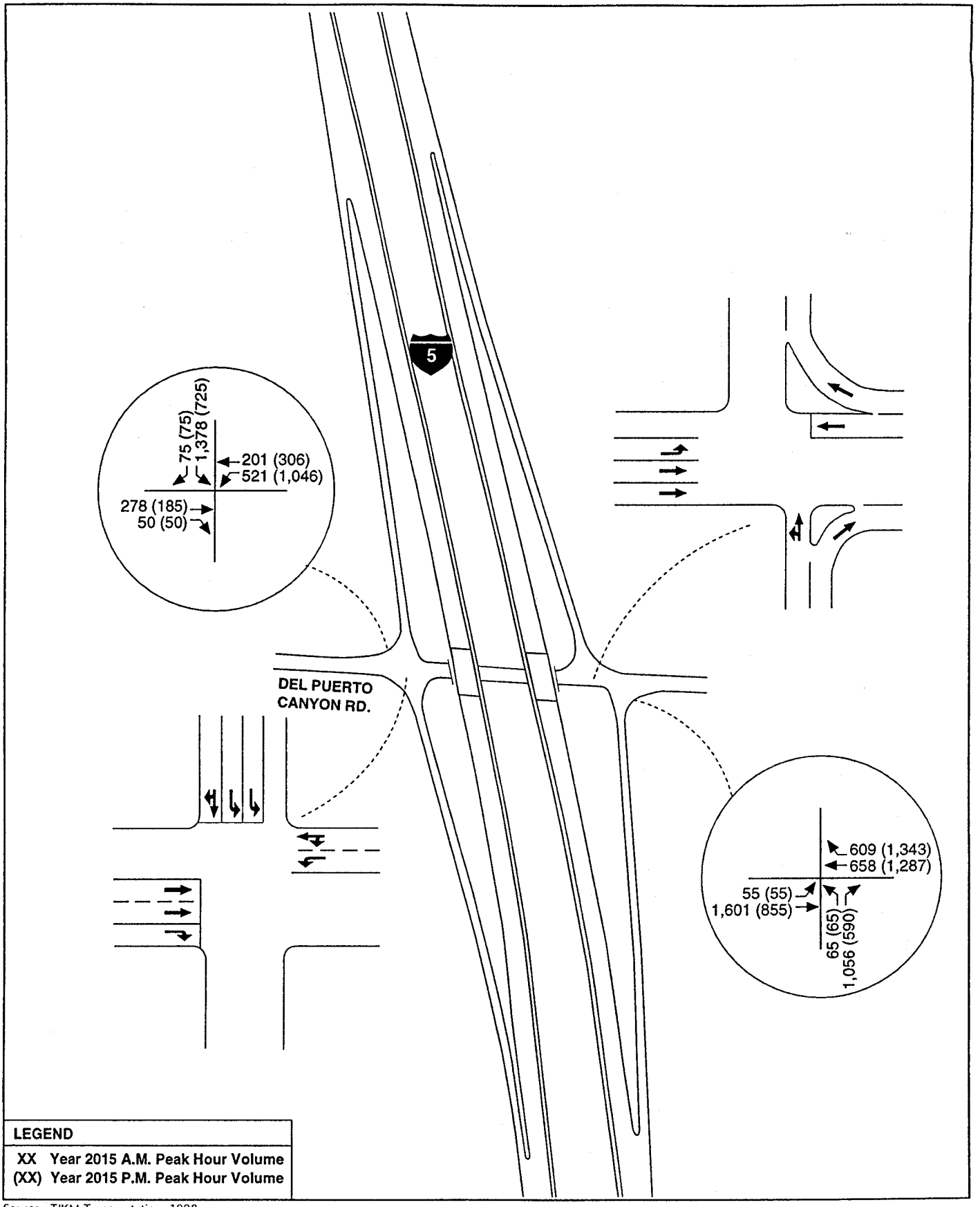
RECOMMENDED IMPROVEMENTS

To accommodate the proposed development within the Sperry Road Interchange study area, improvements are recommended at both the north and southbound on- and off-ramps. These improvements are described below and depicted in Exhibit 4.2-6. As part of the proposed roadway improvements, all ramp intersections should be signalized. All underpass and overpass structures should be widened to accommodate additional lanes and standard shoulders.

Diablo Grande is required to provide improvements to the Sperry Road-Interstate 5 intersection. CalTrans, Diablo Grande, and the County will be working together to determine the types of improvements necessary and the traffic level thresholds at which construction of the improvements would occur. A direct tie-in from Diablo Grande to the Sperry Road interchange from the west was not examined in this study. Any direct access from Diablo Grande to the freeway by way of Del Puerto Canyon Road would not change mitigations identified in the study for the Sperry Road interchange. If on the other hand traffic were to utilize the existing interchange by way of Del Puerto Canyon Road, it is likely that the underpass would have to be widened by an additional 12 to 16 feet. Other modifications would be minor.

Southbound Ramps

Full signalization of the southbound ramp intersections is recommended. Two exclusive southbound left-turn lanes should be added to the southbound off-ramp. A second through-lane and an exclusive right-turn lane should be added to the eastbound approach on Del Puerto Canyon Road. An exclusive left-turn lane should be added to the westbound approach and left turns should be permitted from both lanes (split phase). The southbound on-ramp should be widened to allow for two lanes at the intersection that merge to one lane onto the freeway.



Source: TJKM Transportation, 1998.

Proposed Tight Diamond Intersection Configuration Improvements – Sperry Road Interchange

EXHIBIT 4.2-6

Northbound Ramps

Full signalization of the northbound ramp intersections is recommended. A free right-turn lane should be added to the northbound off-ramp and the westbound approach on Del Puerto Canyon Road. The eastbound approach on Del Puerto Canyon Road should be widened to include a second through-lane and a left-turn pocket.

COSTS

Considered in the costs for improvements are expenses for roadway construction/reconstruction of retaining structures, freeway structures, signals, right-of-way, and contingencies which should include design work, minimal standard items and other miscellaneous expenses. Costs for improvements at the Sperry Road Interchange study area would be approximately $7.4 million (cost assumptions are provided in Chapter 3). Table 4.2-3 provides a breakdown of the necessary roadway construction costs at the Del Puerto Canyon Road/Sperry Road Interchange. Some of the costs associated with construction of these improvements will be partially offset by funds from Diablo Grande. Specific cost-sharing programs have not been finalized.

Table 4.2-3
SPERRY ROAD INTERCHANGE CONSTRUCTION COST SUMMARY [1]

	Cost Per Acre [2]	Cost per 1,000 square feet	Cost per Trip	Total Cost
Roadway	**$2,969.43**	**$401.00**	**$363.54**	**$2,331,000**
Pavement	$489.17	$66.06	$59.89	$384,000
Signals	$382.17	$51.61	$46.79	$300,000
Retaining Walls	$1,108.28	$149.66	$135.68	$870,000
Contingency (50%)	$989.81	$133.67	$121.18	$777,000
Structures	**$6,409.24**	**865.51**	**$784.66**	**$5,031,250**
Structures	$5,127.39	$692.41	$627.73	$4,025,000
Contingency (25%)	$1,281.85	$173.10	$156.93	$1,006,250
TOTAL	**$9,378.67**	**$1,266.51**	**$1,148.20**	**$7,362,250**

[1] Assumes 5,813 square feet of roadway improvements and 6,412 trips
[2] Assumes 785 acres

Source: TJKM 1998

4.2.5 WATER SUPPLY

The City of Patterson, in conjunction with Stanislaus County, has agreed to extend public water supply to any development in the study area. Therefore, a preliminary design for water supply is not necessary for the Sperry Road Interchange study area.

4.2.6 WASTEWATER TREATMENT AND DISPOSAL

The City of Patterson, in conjunction with Stanislaus County, has agreed to extend public sewer services to any development in the Sperry Road Interchange study area. Therefore, a preliminary design for a wastewater treatment system is not necessary.

4.2.7 SAN JOAQUIN KIT FOX MITIGATION

LOCATION OF KIT FOX

The nearest known occurrence of San Joaquin kit fox was observed in 1940 approximately 2 miles northwest of the study area (CNDDB 1998). Focused surveys for San Joaquin kit fox have been conducted for the Villa del Lago project at Stohr Road and I-5, and for a PG&E pipeline along the west side of I-5. Habitats onsite are highly disturbed by agricultural activities and emerging development. However, U.S. Fish and Wildlife Service (USFWS) has identified aqueducts and canals as San Joaquin kit fox movement corridors and have stated that kit fox occasionally den on the banks of these structures (S. Larson, pers. comm., 1998). Because the California Aqueduct forms the eastern boundary of the site, USFWS and California Department of Fish and Game (CDFG) may consider habitats within the study area appropriate for San Joaquin kit fox, and thus may require mitigation for any impacts. It is assumed that USFWS and CDFG would consider the non-native grassland, orchards, and croplands to be appropriate habitat.

PROPOSED IMPACTS AND MITIGATION MEASURES

It is anticipated that development of the Sperry Road Interchange study area would result in loss of approximately 3.5 acres of non-native grassland, 198 acres of orchard, and 374 acres of cropland that represent San Joaquin kit fox foraging or denning habitat. Impacts to non-native grassland would be mitigated at a ratio of 3:1, resulting in purchase of approximately 10.5 acres of non-native grassland. Because USFWS and CDFG are typically requiring mitigation for a 300-foot area inside the project boundary where orchards and cropland are present, mitigation would be required for approximately 40 acres of orchard and 59 acres of cropland. Replacement of this buffer area at a ratio of 1.1:1 would result in purchase of an additional 109 acres of non-native grassland. A total of approximately 119.5 acres of non-native grassland would be purchased as San Joaquin kit fox mitigation.

4.2.8 ECONOMIC CONSIDERATIONS

The Sperry Road Interchange is in the early stages of first generation development as described above. Economic analysis for the study area revealed an immediate short-term (i.e. 5 to 15 years) potential for development of upscale commercial and, to a lesser degree, industrial uses. Table 4.2-4 shows the current potential for the Sperry Road Interchange study area.

Table 4.2-4
CURRENT POTENTIAL ACRES
SPERRY ROAD INTERCHANGE STUDY AREA

SPERRY ROAD	ACRES	USED ACRES	ACRES REMAINING FOR DEVELOPMENT
Total Site	800	2	
Total Available [Short Term]	700	2	698
Commercial	40	2	38
Industrial	0	0	0
Undesignated	490	25	465
Commercial	90	0	90
Industrial	500	0	500
Total Sperry Road Study Area	700	2	700
Commercial	130	2	130
Industrial	580	25	550

Note: Numbers may not add due to independent rounding

Source: Williams-Kuebelbeck & Associates, 1998 (Site inspection, discussion with developer, local brokers, parcel and map analysis, WK&A)

As shown in Table 4.2-4, approximately 700 acres of the total would be available for development in the short-term (i.e. the next 5 - 15 years). Of this amount, approximately 40 acres have short-term potential for commercial development. The remainder of the available short-term acreage is undesignated.

Table 4.2-5 contains capital costs for offsite improvements at the Sperry Road Interchange study area. As shown in the table, capital costs (i.e. interchange only because no water and sewer construction is required) total approximately $15,000 per acre. Onsite improvements would cost approximately $40,000 per acre, bringing total costs to $55,000 per acre. Total breakeven costs per acre within the Sperry Road Interchange study area would be around $125,000 per acre, which would equate to a breakeven cost of $2.90 per square foot, based on all three generations of development.

Industrial land sales prices are assumed to range between $1.50 and $2.50 per square foot. In contrast, commercial land sales prices are three to almost four times as high ranging from $4.50 to $7.50 per square foot. Upscale commercial (e.g., hotels with amenities, sit down restaurants) ranges from $7.00 to $11.00 per square foot. Both commercial and upscale commercial sales prices exceed costs per square foot. Breakeven costs per square foot of industrial land exceed industrial sales prices by as much as $1.40 per square foot for the Sperry Road Interchange study

area. Therefore, industrial development of the Sperry Road Interchange is not economically feasible in terms of costs versus sales prices. However, commercial and upscale commercial sales prices versus costs are economically favorable.

Table 4.2-5
SPERRY ROAD INTERCHANGE STUDY AREA
TOTAL COSTS VERSUS SALES PRICES [1]

DESCRIPTION	COST
Capital Costs [2]	$9,000
Capital Carrying Costs [10 Years]	$6,000
On Site Costs [Gross Estimate]	$40,000
Land and Holding Costs [Est.]	$15,000
Subtotal	$70,000
Marketing Overhead and Developer's Profit	$23,000
Efficiency Loss	$18,000
Contingency @ 15%	$14,000
Total Breakeven	$125,000
Breakeven [Per Sq. Ft.] [3]	$2.90
Industrial Land Sales Prices	$1.50 - $2.50
Commercial Land Sales Prices	$4.50 - $7.50
Upscale Commercial Land sales Prices	$7.00 - $11.00
Short-Term Potential - Industrial	**Marginal**
Short-Term Potential - Commercial	**Very Good**
Site Rating for Upscale Commercial	**Very Good**

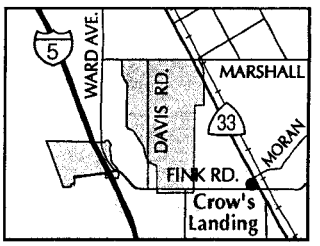
Note: By parcel cost allocation [cost spread], some cost shifts may occur among individual parcels which may make industrial development possible at the Howard Road - Westley Triangle study area. Numbers may not add due to independent rounding

1 Rounded to the nearest $1,000/acre
2 Based on costs for interchange improvements from TJKM Transportation Consultants, and water and wastewater system costs from SCS Engineers.
3 Rounded to the nearest 10 cents

Source: Williams-Kuebelbeck & Associates.

In terms of rating the prospects for each type of development at the Sperry Road Interchange, industrial development is rated as "marginal" while commercial and upscale commercial are rated as "very good." This would be expected as total breakeven costs per square foot are in the range of sales prices for industrial development while prices for commercial and upscale commercial development exceeds capital costs. This is attributable primarily to the fact that water and wastewater service are in place and are not reflected in off-site capital costs. Based on costs and sales prices, continued development at the Sperry Road Interchange is considered economically feasible.

4.3 FINK ROAD INTERCHANGE AREA



4.3.1 LOCATION

The Fink Road study area includes approximately 1,000 acres located mostly on the west side of I-5. It is bordered on the east by the California Aqueduct (located east of I-5), and generally on the west by existing Pacific Gas and Electric (PG&E) overhead transmission lines; the western boundary is not firm, and may be changed to suit potential development opportunities (Exhibit 4.3-1). The northern study area boundary is formed by the southern boundary of APN 025-12-33. The southern boundary generally follows Fink Road and section lines on the west side of I-5. Access to the study area is currently provided from the Fink Road/I-5 interchange.

The study area is located on the Patterson 7.5 Minute Quadrangle in Township 6 South, Range 7 East Sections 23, 24 and Township 6 South, Range 8 East, Section 19. This study area consists of 16 parcels. None of the parcels have active Williamson Act Contracts. The Assessors's Parcel Numbers (APNs), acreage, Williamson Act status and zoning for each parcel is shown in Table 4.3-1.

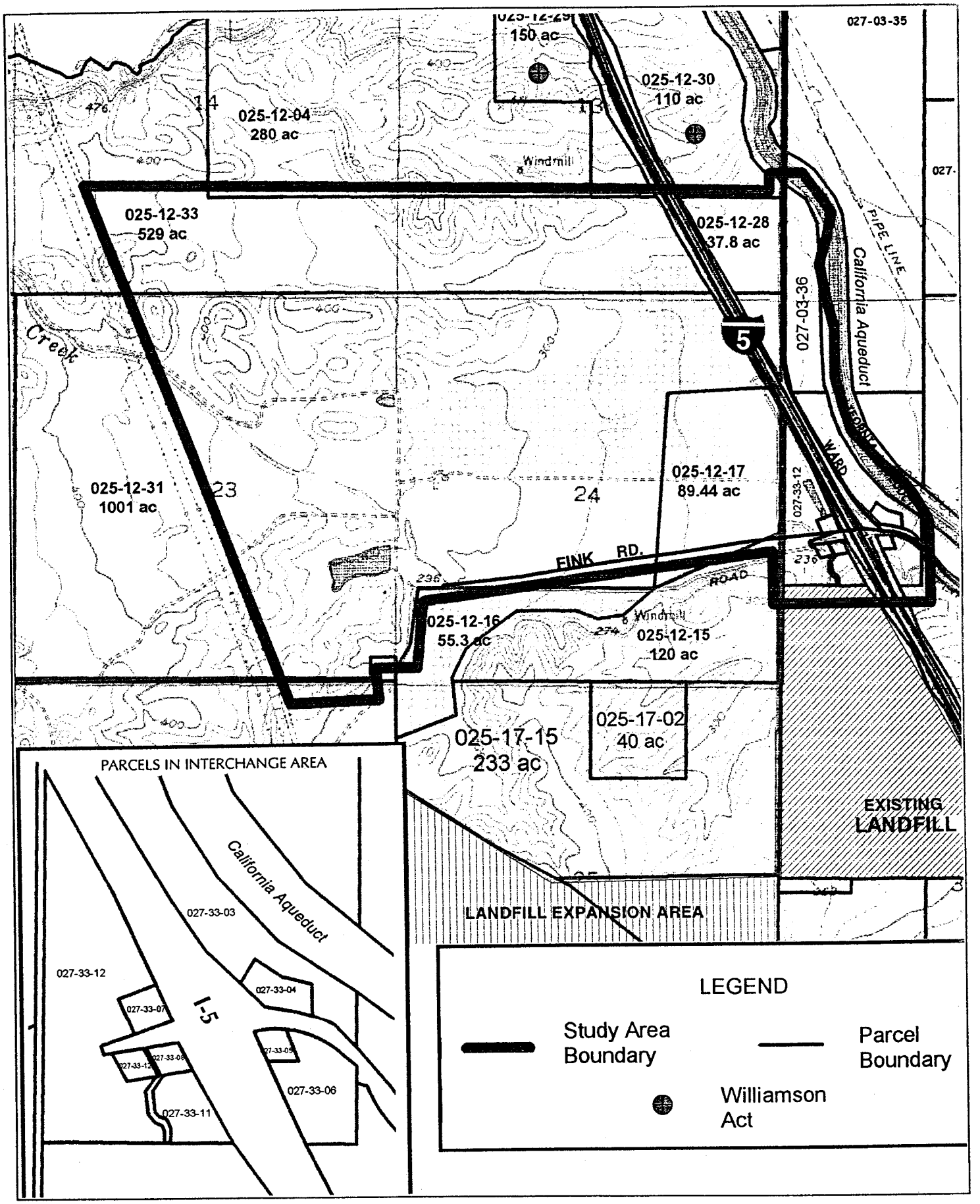
4.3.2 CHARACTERISTICS

ACCESS AND LAND USE

The only paved access to the Fink Road Area is provided from the Fink Road exit off of I-5. Several unpaved dirt roads provide access to the orchards and vacant areas to the west of the orchards (Exhibit 4.3-2, Photo 1). Further to the west beyond the orchards, the topography rises to elevations of approximately 400 feet. These hillsides are vacant and covered with native grasses. PG&E utility lines are located at the western edge of the orchards. A PG&E easement for 230 kv transmission lines is located further to the west beyond the orchards in a currently vacant area. These lines form the approximate western boundary of the study area. An underground 20' Phillips Petroleum easement is located west of the PG&E lines.

Little Salado Creek traverses the southern portion of the study area (Exhibit 4.3-2, Photo 2). The Creek originates on the west side of I-5 and flows east underneath I-5, adjacent to the north side of Fink Road within the study area, ultimately terminating at the San Joaquin River. Other creeks in the vicinity of the study area include Salado Creek to the north (forming a portion of the study area's northern boundary) and Crow Creek to the south. Two small freshwater marsh areas are located in the northeastern portion of the study area and a small pond is located in the southeastern portion.

The study area includes a small strip of land on the east side of I-5 between Ward Road and the California Aqueduct. This strip includes an orchard planted with young trees, north of Fink Road between Ward Road (which is aligned parallel to I-5 before veering east) and the California Aqueduct. PG&E overhead electric lines and buried gas pipelines are located east of the aqueduct on the flat areas north of Fink Road. Overhead lines are also located on the hillsides south of Fink Road.



Source: Stanislaus County, 1998.

Fink Road Area

EXHIBIT 4.3-1

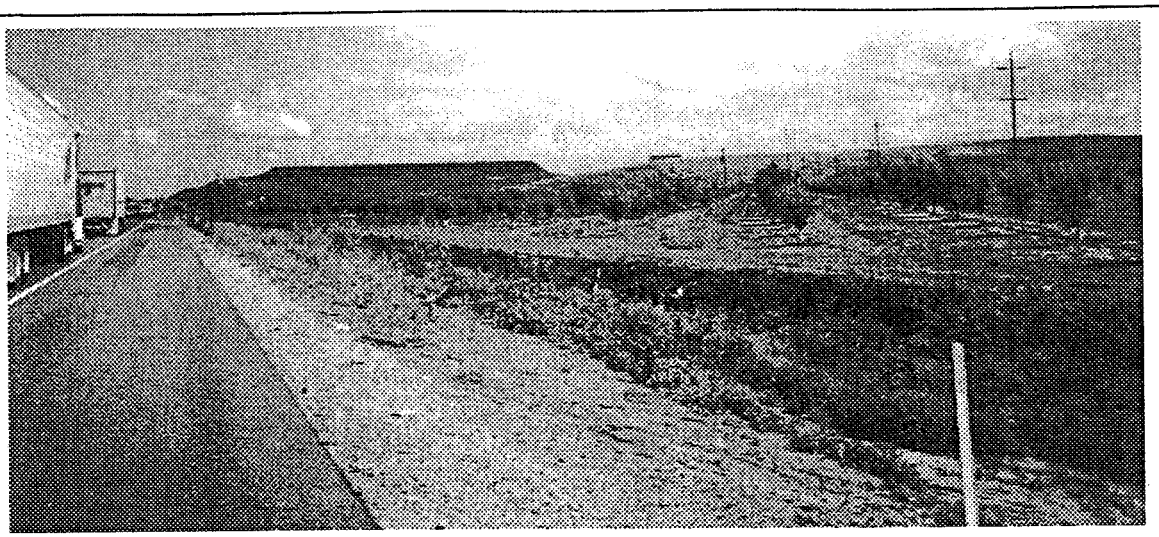
Table 4.3-1
STANISLAUS COUNTY GENERAL PLAN
POLICIES RELEVANT TO THE FINK ROAD STUDY PARCEL AREA

ASSESSOR'S PARCEL NUMBER (APN)	ACREAGE	WILLIAMSON ACT (Expiration)	ZONING
025-12-33	*215.00	(Expired 12-31-95)	A-2-40
025-12-31	*556.29	(Expired 12-31-95)	A-2-40
025-12-17	89.44	(Expired 12-31-97)	A-2-40
025-12-28	37.84	(Expired - no date)	A-2-40
025-12-23	8.97	(Expired - no date)	A-2-40
027-03-36	30.83		A-2-40
027-33-12	26.14		A-2-40
027-33-07	1.40		A-2-10
027-33-03	17.05		A-2-40
027-33-05	1.0		A-2-10
027-33-06	7.10		A-2-40
027-33-07	1.4		A-2-10
027-33-08	1.0		A-2-10
027-33-09	1.0		A-2-10
027-33-11	3.44	(Expired 12-31-95)	A-2-40
027-33-04	2.10		A-2-10
Total Acreage	1000.00		
Total Acres in Active Williamson Act		0	

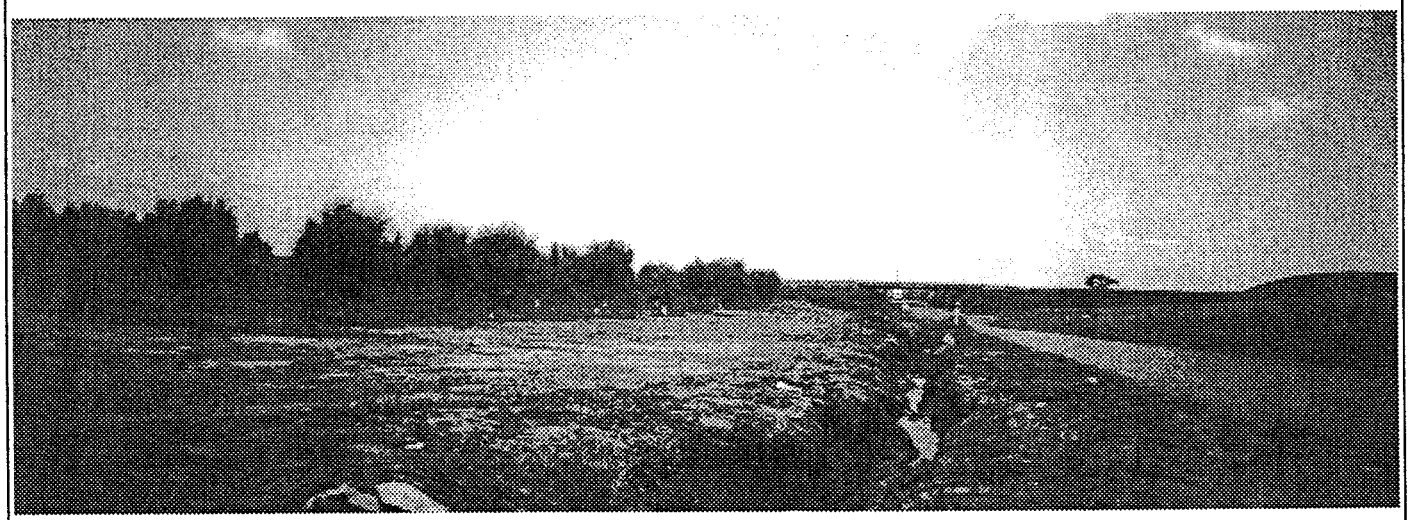
* Estimate only

Source: EDAW 1998

The Fink Road Landfill is located outside the study area, approximately one-quarter mile southeast of the Fink Road/I-5 interchange. The landfill is obstructed from view by intervening topography (Exhibit 4.3-2, Photo 3). A two lane road intersecting Fink Road provides access to the facility. The landfill accepts both commercial and public dumping. The County's waste-to-energy facility is also located near the landfill, approximately one-half mile south of the Fink Road study area.



1. View southwest along I-5 approaching Fink Road. Orchards and electrical lines currently occupy the area northwest of the interchange. The flat-top landform is at the Fink Road Landfill. The Stanislaus County Waste-to-Energy facility is at the center of the photo beyond the hills.



2. View east along Fink Road towards the Fink Road/I-5 interchange. Orchards currently occupy the area north of Fink Road, west of I-5. Little Salado Creek is at center of photo.

3. View south from Fink Road west of I-5. The flat landforms on the left are part of the Fink Road Landfill.

Source: EDAW, Inc., 1998.

Fink Road Area Photographs

EXHIBIT 4.3-2

The Fink Road study area is highly visible when approached from the exit off of southbound I-5. Flat topography adjacent to southbound I-5 allows unobstructed views of the study area on both sides of the Interstate. Hills generally obstruct views of the study area from northbound I-5. However, views of the area to the east of I-5 are possible from approximately one-half mile south of the Fink Road overpass.

VEGETATION

Aside from orchards, vegetation in the study area is found in the freshwater marshes and pond onsite. The freshwater marshes onsite are dominated by common cattail (*Typha latifolia*), umbrella sedge (*Cyperus* sp.), rabbitsfoot grass (*Polypogon monspeliensis*), and curly dock (*Rumex crispus*).

WILDLIFE

Although orchards do not represent high-quality wildlife habitat, they are frequently used by common wildlife species that are adapted to highly disturbed areas with human activity. Species typically found in these areas include house finch (*Carpodacus mexicana*), Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), and American crow (*Corvus brachyrhynchos*). Some crops support a prey base for foraging raptors, including red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), black-shouldered kite (*Elanus leucurus*), great horned owl (*Bubo virginianus*), and American kestrel (*Falco sparverius*).

Wildlife species expected to occur in freshwater and seasonal marsh habitats are those typically found in aquatic environments, including Pacific chorus frog (*Pseudacris regilla*), red-winged blackbird (*Agelaius phoeniceus*), great blue heron (*Ardea herodius*), snowy egret (*Egretta thula*), song sparrow (*Melospiza melodia*), marsh wren (*Cistothorus palustris*), and lesser goldfinch (*Carduelis psaltria*). Surface water is a likely source of drinking water for many of the birds and mammals during the summer.

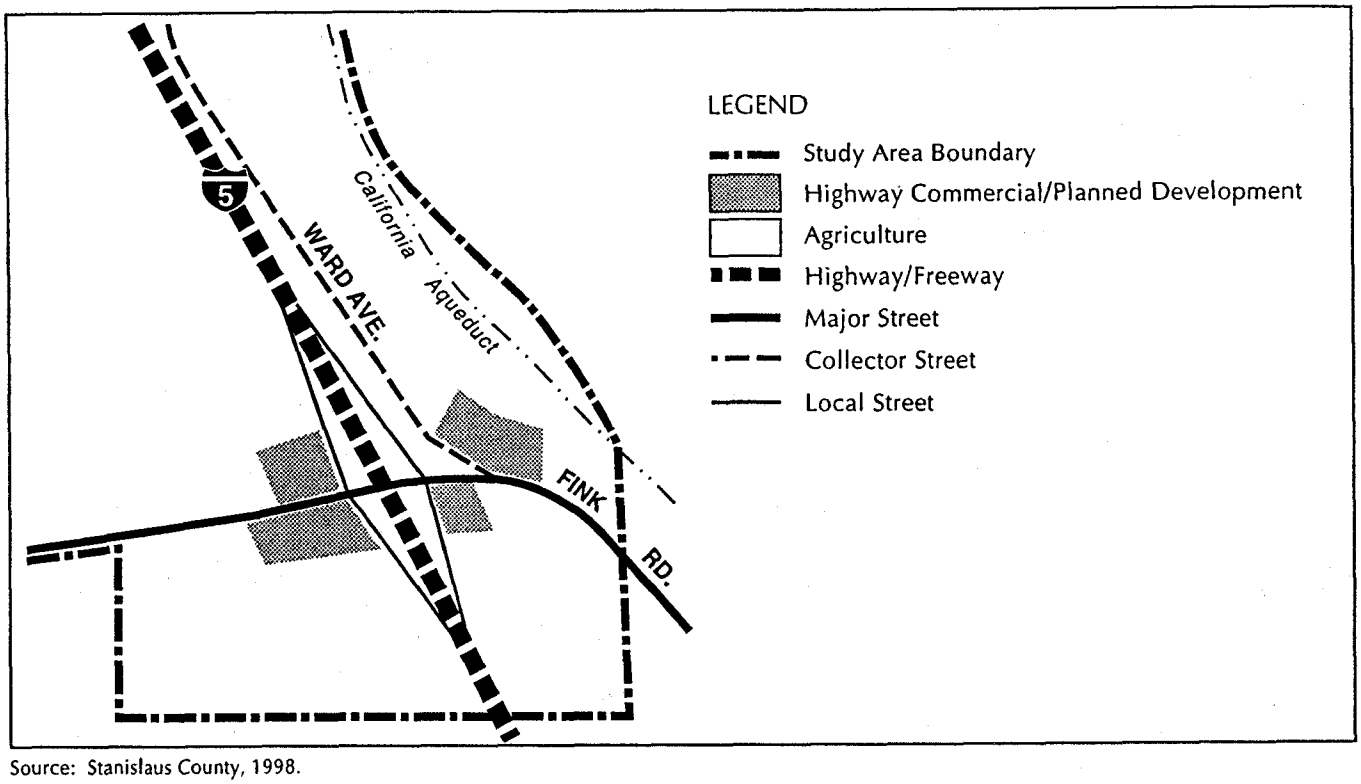
4.3.3 LAND USE PLANNING, POLICY, AND REGULATORY CONSIDERATIONS

STANISLAUS COUNTY GENERAL PLAN

This study area is designated as Highway Commercial/Planned Development on the west side of I-5, north and south of Fink Road, in the Stanislaus County General Plan. North, west and south beyond these areas, the land is designated Agriculture. The area between the east side of I-5 and Ward Avenue is also designated Agriculture (Exhibit 4.3-3). Land use designations are described in Section 4.0.1.

Relevant General Plan Policies

The Fink Road study area is undeveloped aside from agricultural uses. The Fink Road Landfill, proposed landfill expansion areas and County waste-to-energy facility are to the south of the study area. Salado Creek forms a portion of the northern boundary of the study area and Little Salado Creek meanders through the study area. At one point, Little Salado Creek flows parallel to the north side of Fink Road.



Source: Stanislaus County, 1998.

Fink Road Area County General Plan Land Use Designations

EXHIBIT 4.3-3

The Stanislaus County General Plan (Stanislaus County 1994) and Agricultural Element (Stanislaus County 1992) provide policies to direct development. Based on the general characteristics of the study area, a number of goals and policies from several different elements are applicable to possible commercial/industrial development of the Fink Road study area. Table 4.3-2 summarizes these policies.

Goal 1 of the Land Use Element of the Stanislaus County General Plan provides for diverse land use needs by designating patterns that are responsive to the physical characteristics of the land as well as to environmental, economic, and social concerns of Stanislaus County. Policy 1 encourages land use designations such as industrial and commercial when such designations are consistent with other adopted goals and policies of the general plan.

In reviewing proposed amendments to land use designations, which any development on currently designated agricultural lands at the Fink Road Study Area would require, the County must evaluate how the proposal would advance the long-term goals of the County.

Conversion of agricultural lands to agricultural or non-agricultural related industrial uses at Fink Road would be consistent with the County's long-term goal of providing for sustained economic development, but could be inconsistent with the goal of protecting agricultural lands.

Agricultural uses are currently the only uses in the study area. Land Use Policy 14 discourages uses which are detrimental to continued agricultural operations. Therefore, introduction of the uses proposed in the development scenario represent a change in land use which would be inconsistent with Policy 14. Further, the first, second and third generation uses proposed would require a change in land use. Again, this is contrary to the intent of Policy 14, as well as Policy 16, which directs the County to protect agriculture. Because development envisioned for the study area would largely be highway commercial, industrial and heavy commercial uses, potential incompatibilities could occur with surrounding agricultural uses. Land Use Policy 18, however, encourages accommodation of the siting of industries with unique requirements. Immediate Interstate 5 access is limited in Stanislaus County to the four study areas including fink Road, and this access is a unique requirement that many industries would require. Conservation and Open Space Policy 11 discourages land uses which are incompatible with agriculture. Therefore, the proposed development scenario would be inconsistent with Open Space Policy 11.

Goal 1 of the Agricultural Element encourages strengthening the Agricultural sector of our economy. Growth and expansion of existing businesses and formation of new enterprises is encouraged. Agricultural Element Policy 1.1 supports promotion of new agriculture-related business and industry, and Policy 1.9 encourages vertical integration of agriculture product related research, production, processing, distribution, marketing, and sales.

Policy 1.5 of the Agricultural Element addresses limited visitor-serving commercial uses. Although certain uses aside from growing crops are allowed on agricultural lands, the types of uses envisioned by the proposed development scenario would not be consistent with the intent of this policy. While the areas near the interchange are currently designated for non-agricultural uses on the General Plan land use map (Highway Commercial/Planned Development), the remainder of the study area is designated for Agriculture. Prior to any development in these areas, an amendment to the General Plan land use map would be necessary. Policy 2.7 of the

Table 4.3-2
STANISLAUS COUNTY GENERAL PLAN POLICIES
RELEVANT TO THE FINK ROAD STUDY AREA

ELEMENT & POLICY NO.	POLICY
Land Use - Policy 7	Riparian habitat along the rivers and natural waterways of Stanislaus County shall to the extent possible be protected.
Land Use - Policy 14	Uses shall not be permitted to intrude into or be located adjacent to an agricultural area if they are detrimental to continued agricultural usage of the surrounding area.
Land Use - Policy 15	Uses should not be permitted to intrude into or be located adjacent to areas that are identified as existing and/or potential sites for solid waste facilities if such uses would not be compatible.
Land Use - Policy 16	Agriculture, as the primary industry of the county, shall be promoted and protected.
Land Use - Policy 17	Promote diversification and growth of the local economy.
Land Use - Policy 23	New development shall pay its fair share of the cost of cumulative impacts on circulation and transit systems.
Conservation and Open Space - Policy 16	Discourage development on lands that are subject to flooding, landslide, faulting or any natural disaster to minimize loss of life and property.
Conservation and Open Space - Policy 23	The County will protect existing solid waste management facilities, including the waste-to-energy plant and the Fink road landfill, against encroachment by land uses that would adversely affect their operation or their ability to expand.
Conservation and Open Space - Policy 11	In areas designated "Agriculture" on the Land Use Element, discourage land uses which are incompatible with agriculture.
Circulation - Policy 1	Development will be permitted only when facilities for circulation exist, or will exist as part of the development, to adequately handle increased traffic.
Agriculture - Policy 1.5	Limited visitor-serving commercial uses shall be permissible in agricultural areas if they promote agriculture and are secondary and incidental to the area's agricultural production.
Agriculture - Policy 1.8	Concentrations of commercial and industrial uses, even if related to surrounding agricultural activities, are detrimental to the primary use of the land for agriculture and shall not be allowed.
Agriculture - Policy 2.7	Proposed amendments to the General Plan diagram (map) that would allow the conversion of agricultural land to non-agricultural uses shall be approved only if they are consistent with the County's conversion criteria.
Agriculture - Policy 2.12	When the County determines that the proposed conversion of agricultural land to non-agricultural uses could have a significant effect on the environment, the County shall fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects of the conversion.
Safety Element - Policy 2	Development should not be allowed in areas that are within the designated floodway.

Source: EDAW 1998

Agriculture Element requires all agricultural land conversions to meet the County's conversion criteria prior to receiving approval. According to the criteria contained in the General Plan Agricultural Element, conversion of agricultural land to urban uses shall be approved only if the Board of Supervisors makes certain findings (Conversion of Agricultural Land in Chapter 3).

Satisfying all of the criteria could be problematic, particularly with regard to items 1 and 6. Because Stanislaus County has primarily an agriculture based economy with policies to protect agricultural lands, making a finding consistent with item 1 could be problematic. According to the General Plan, "Most Productive Agricultural Areas" are currently determined on a case-by-case basis when a proposal is made for the conversion of agricultural land. Factors considered in making a determination are provided in Chapter 3, Conversion of Agricultural Lands. Based on these factors, the areas within the study area currently in production as orchard could potentially be considered as one of the County's Most Productive Agricultural Areas.

In terms of public services pertinent to conversion criteria item 6, the study area is not served by public water (even though it is located in the Del Puerto Water District) or wastewater service. Existing uses are agricultural and receive water from the Delta-Mendota Canal. Because the study area is removed from any major urban area, extension of services to meet demands of new development would not be feasible in the near future.

Whenever the County is confronted with converting agricultural land, it must determine whether such action will result in a significant effect on the environment. Policy 2.12 directs the County to fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects of the conversion.

Policy 7 addresses protection of riparian habitat along rivers and natural waterways. Salado Creek defines a portion of the northern boundary of the study area, while Little Salado Creek traverses the southern portion of the study area. In addition, an unnamed watercourse flows through the site, adjacent to the north side of Fink Road. The presence of these waterways presents some constraints to development which must be addressed in accordance with Policy 7. Similarly, Safety Policy 2 discourages development within designated floodways and Conservation and Open Space Policy 16 also discourages development on lands subject to flooding (Stanislaus County 1987). Historically, Salado Creek has been subject to flooding. Therefore, potential for flooding would be a possible constraint to development in the Fink Road study area. Existing Agricultural uses are not incompatible with the possible threat of flooding. However, the uses proposed in the development scenario would be subject to damage if exposed to flooding.

The Stanislaus General Plan Support Documentation (1987, page 255) indicates that there is some discussion of forming a flood control district for Salado Creek. However, to date a district has not been formed. Consistent with Safety Policy 2, development in the study area would have to avoid encroaching into the designated floodway of Salado and Little Salado Creeks.

The study area is located approximately 1,300 feet north the of the existing Fink Road landfill property. Expansions of the landfill are currently proposed on lands to the southwest of the existing facility. The proposed expansion areas are located more than 2,500 feet south of the study area and separated from the study area by intervening topography. As such, the study area does not encroach into the existing landfill area or proposed expansion areas, and proposed

development of the study area would not adversely affect the ability of the landfill to operate or expand. Further, setbacks and intervening topography would serve to separate the existing landfill uses from proposed commercial/industrial uses. Therefore, siting proposed uses in the vicinity of the Fink Road Landfill would be consistent with Land Use Policy 15 and Conservation and Open Space Policy 23.

Circulation Policy 1 requires development to be adequately served with circulation infrastructure. The proposed development would overburden the existing interchange and roadways. Therefore, circulation improvements would be necessary to accommodate development proposed in within the study area. In accordance with Land Use Policy 23, new development would be required to pay its fair share of the coss of cumulative impacts.

Whenever the County is confronted with converting agricultural land, it must determine whether such action will result in a significant effect on the environment. Policy 2.12 directs the County to fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects, of the conversion.

STANISLAUS COUNTY ZONING

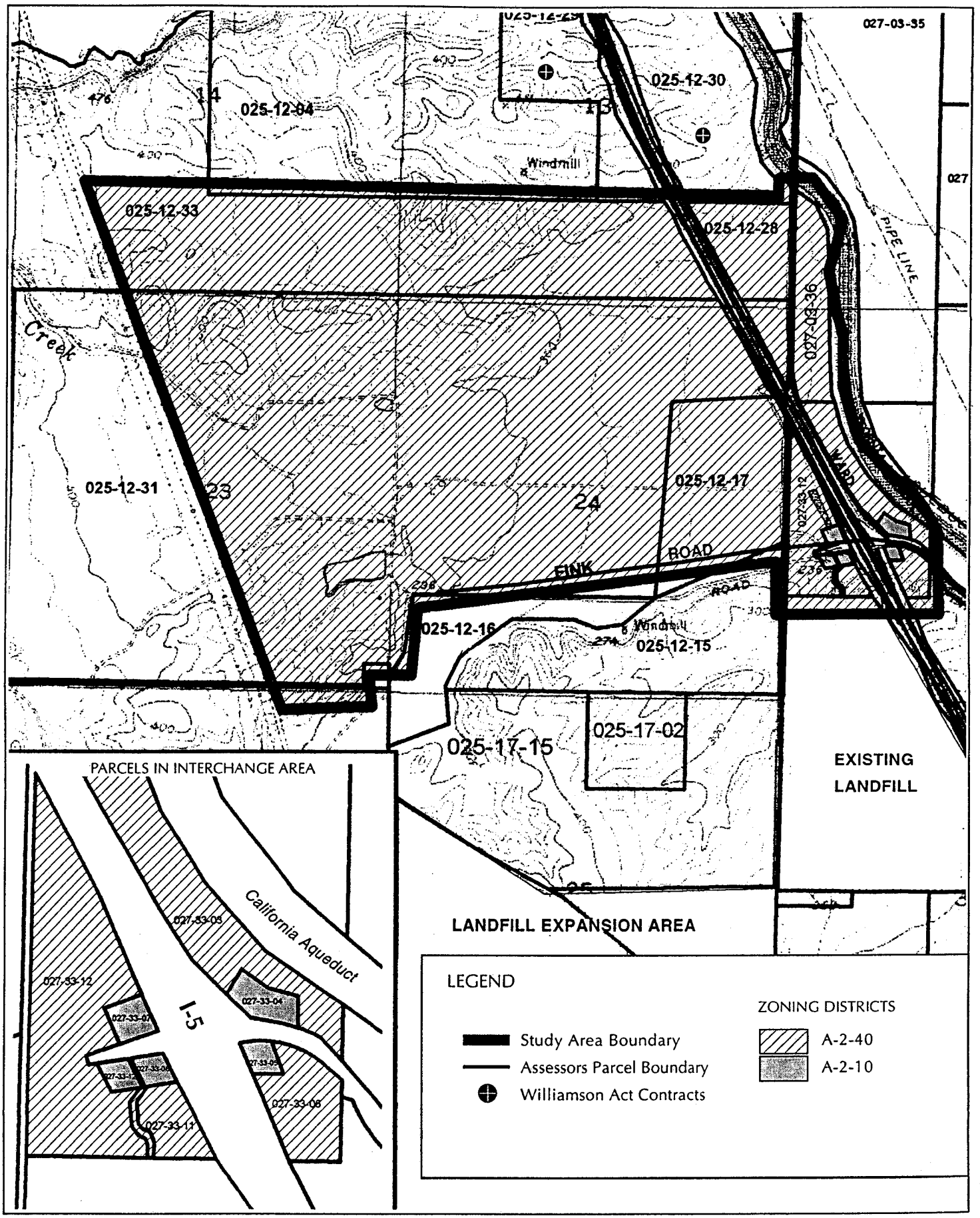
The Fink Road study area is zoned A-2 (General Agriculture District) with 10 and 40 acre parcels (A-2-10 and A-2-40) (Exhibit 4.3-4). The A-2 zoning designation is consistent with the provisions of the General Plan, which directs land within the Highway Commercial/Planned Development designation to be zoned A-2 until rezoned to P-D (Refer to Stanislaus County Zoning in Chapter 3). In order to proceed with the type of development envisioned in the proposed development scenario, parcels would have to be re-zoned to P-D. However, before rezoning can occur, findings must be made to demonstrate that the change will not be detrimental to the agricultural productivity of the surrounding property and that the subject property is not considered to be one of the County's Most Productive Agricultural Areas.

ANY OTHER PLANS/REGULATIONS THAT APPLY

In addition to being governed by the Stanislaus County General Plan (1994), the Stanislaus County Agricultural Element (1992), and the Stanislaus County Zoning Ordinance, the Fink Road study area is located within the jurisdiction of several districts. The districts do not have any regulatory authority over projects located within their boundaries. However, they are acknowledged as entities which should be consulted prior to proceeding with development within the Fink Road study area.

West Stanislaus Resource Conservation District The West Stanislaus Resource Conservation District serves as a local contact for the U.S. Department of Agriculture regarding resource conservation related to soils, air and other natural resources. The Resource Conservation District is involved primarily with aggregate mining projects. The Resource Conservation District may also review General Plan Amendments involving conversion of agricultural land, but has no approval authority (McElhiney, pers. comm. 1998).

Del Puerto Water District. The Del Puerto Water District conveys water from the Delta-Mendota Canal for agricultural purposes. The District has a contract with the Bureau of Reclamation to divert 140,210 acre-feet from the canal. Although the District does not currently provide treated



Source: Stanislaus County, 1998.

Fink Road Area Zoning Districts

EXHIBIT 4.3-4

0 500 1000 2000 FEET

NORTH

EDAW

water for municipal and industrial uses, such as would be required by the proposed development scenario, all proposals for development should be submitted to the District for review by the District's Board of Director's (Cotter, pers. comm. 1998).

4.3.4 INTERCHANGE EVALUATION

Traffic generation and assignment forecasting was prepared by TJKM Transportation Consultants (1998) to identify improvements necessary at the Fink Road interchange. Existing conditions are described in Chapter 3. The following is a description of constraints that are anticipated to occur with implementation of the proposed development scenario.

INTERCHANGE CONSTRAINTS

Traffic generation and assignment forecasting was prepared to identify improvements necessary at the Fink Road interchange. The analysis revealed that development of the entire acreage of the study area would be possible without the need to abandon the existing tight-diamond interchange configuration. However, the volume of traffic projected by the proposed development scenario would overburden the existing interchange and could not be served by STOP sign control. Development would occur to the west of I-5, resulting in conflicts between left-turns and through movements.

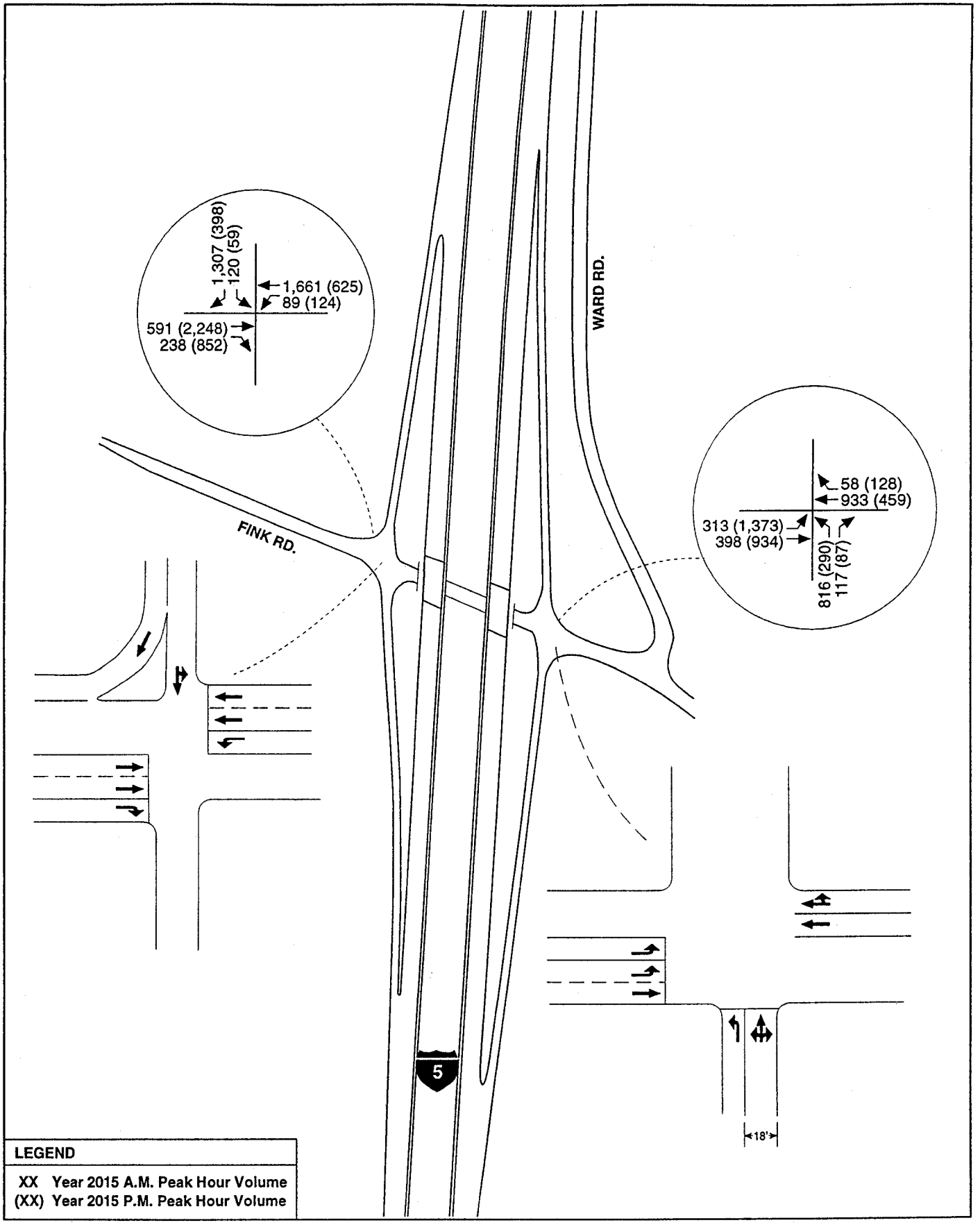
Ward Road is aligned adjacent to the northbound on-ramp. No changes in alignment would be necessary to accommodate widening of the northbound on-ramp. The location of Ward Road would allow for a hook ramp, but would possibly need to be realigned to allow for a loop ramp. Further to the east, the California Aqueduct limits any realignment of Ward Road. A shallow gully separates Ward Road and the northbound on-ramp. Little Salado Creek is located to the west of the southbound off-ramp. The presence of the Creek generally restricts improvements to the off-ramp, although with retaining structures the embankment could be narrowed or eliminated. Sloping topography to the west of the southbound on-ramp would also require retaining structures to widen the on-ramp. The freeway overcrossing structure does not allow for more than two lanes on Fink Road.

RECOMMENDED IMPROVEMENTS

To accommodate the proposed development within the Fink Road study area, improvements are recommended at both the north and southbound on- and off-ramps. These improvements are described below and depicted in Exhibit 4.3-5. As part of the proposed roadway improvements, all ramp intersections should be signalized. All underpass and overpass structures should be widened to accommodate additional lanes and standard shoulders.

Southbound Ramps

Full signalization of the southbound ramp intersections is recommended. A free right-turn lane should be added to the southbound off-ramp. A second through-lane and an exclusive right-turn lane should be added to the eastbound approach on Fink Road. A second through-lane and an exclusive left-turn lane should be added to the westbound approach.



Source: TJKM Transportation, 1998.

Proposed Tight Diamond Intersection Configuration Improvements – Fink Road Area

EXHIBIT 4.3-5

Northbound Ramps

Full signalization of the northbound ramp intersections is recommended. An exclusive left-turn lane should be added to the northbound off-ramp. The eastbound approach on Fink Road should be widened to include two left-turn pockets. The westbound approach should be widened to include a new exclusive through-lane. The northbound on-ramp should be widened to allow for two lanes at the intersection that merge to one onto the freeway.

Combined Development

If development occurred at the Crows Landing site in addition to development at Fink Road, at a minimum a partial cloverleaf design would need to be considered to avoid excessive left-turn delays at both off-ramp intersection. Furthermore, both off-ramps would likely require free right-turn lanes. It is not likely that a full cloverleaf design would be required anytime before the horizon year.

COSTS

Costs for roadway improvements at the Fink Road study area would be approximately $5.3 million. Considered in the costs are expenses for roadway construction/reconstruction retaining structures, freeway structures, signals, right-of-way, and contingencies which should include design work, minimal standard items and other miscellaneous expenses (cost assumptions are provided in Chapter 3. Table 4.3-3 provides a breakdown of the costs for improvements at the Fink Road interchange to serve the Fink Road study area.

4.3.5 WATER SUPPLY

A public water system is not available to serve the Fink Road study area. The Waste-to-Energy plant, located south of the study area, obtains its water from a groundwater well located east of I-5; however, this system cannot handle the demand required for additional development in this area.

The water demand for the Fink Road study area is estimated at 1,404 ac-ft/year, or 1,250,000 gpd. This number equates to an average demand of 1,740 gpm, based on a 12-hour pumping schedule. A water supply system was sized to accommodate this flow with the basic components of a groundwater well, pumping stations, water treatment facility, storage tank, and conveyance system.

Water storage must account for daily use as wells provide for emergency needs such as fire flow. The Fink Road study area would require three 2 million gallon and one 1 million gallon capacity storage tanks, based on 12-hour operating average daily flows, fire demand (since Fink Road has such a large area, three typical hotels with varying levels and floor areas were used to calculate maximum fire flow), and emergency reserves.

Table 4.3-3
FINK ROAD ROADWAY CONSTRUCTION COST SUMMARY [1]

	COST PER ACRE [2]	COST PER 1,000 SQUARE FOOT	COST PER TRIP	TOTAL COST
Roadway	**$1,737.00**	**$234.57**	**$218.99**	**$1,737,000**
Pavement	$520.00	$70.22	$65.56	$520,000
Signals	$300.00	$40.51	$37.82	$300,000
Retaining Walls	$298.00	$40.24	$37.57	$298,000
Right-of-Way	$60.00	$8.10	$7.56	$60,000
Contingency (50%)	$559.00	$75.49	$70.47	$559,000
Structures	**$3,610.00**	**$487.51**	**$455.12**	**$3,610,000**
Structures	$2,888.00	$390.01	$364.09	$2,888,000
Contingency (25%)	$722.00	$97.50	$91.02	$722,000
TOTAL	**$5,347.00**	**$722.08**	**$674.10**	**$5,347,000**

[1] Assumes 7,405 square feet of roadway improvements and 7,932 trips
[2] Assumes 1,000 acres.

Source: TJKM 1998

Table 4.3-4
WATER SYSTEM COMPONENT COSTS

SYSTEM COMPONENTS	COSTS
Groundwater Well	$93,000
Water Treatment System	$1,430,000
Pumping Stations	$18,000
Storage Tanks	$1,505,000
Conveyance System	$700,000
Total Costs	**$3,746,000**

Source: SCS Engineers 1998.

The water is then conveyed to the users through a network of distribution pipes. For purposes of this study, it was assumed that one main water supply pipe runs along the longest path of the area (10,000 feet). All developments connecting to the system must provide their own access to the main water line. From these assumptions, hypothetical pumping requirements and pump sizes were calculated. Table 4.3-4 summarizes the costs for the system components to provide water supply, treatment, storage and conveyance for the Fink Road study area. Background and assumptions are provided in Chapter 3.

After sizing the system to accommodate all three generations of development, the first development scenario was applied to the overall system to determine its capability of handling a low flow situation. This resulted in an alternative storage tank configuration which will suit first generation development flows. Since the first development scenario requires two 2-million-gallon capacity storage tanks, and ultimately three are required, the system can be upgraded to accommodate the third generation development scenario.

4.3.6 WASTEWATER TREATMENT AND DISPOSAL

TABLE 4.3-5
WASTEWATER SYSTEM COMPONENT COSTS

System Components	Costs
Conveyance System	$14,000,000
Wastewater Treatment System	$10,275,000
Total Costs:	**$24,275,000**
Source: SCS Engineers, 1998	

The wastewater that would be produced in the Fink Road Area is estimated at 2,720 ac-ft/year or 2,425,000 gpd. This number equates to 1,680 gpm of wastewater (including infiltration from outside sources) which must be treated,. Based on this value, a wastewater treatment system was developed with the basic component of a wastewater treatment facility and a conveyance system. Background assumptions and general cost information are provided in Chapter 3. The costs to construct a wastewater treatment and conveyance system capable of handling the development scenarios through the third generation are shown in Table 4.3-5.

To determine if the system would be capable of handling a low flow situation, the first generation of development was applied to the overall system. As preliminarily designed, the conveyance system would be able to maintain constant flow to the treatment system with only first generation flows. Because the system could accommodate a low flow threshold, the system would be able to service the study area through all three stages of development

4.3.7 SAN JOAQUIN KIT FOX MITIGATION

LOCATION OF SAN JOAQUIN KIT FOX

San Joaquin Kit fox surveys were completed within the Fink Road study area for the Lakeborough Specific Plan Area in 1989 (WESCO 1990). During these surveys, a San Joaquin kit fox was observed in a walnut orchard in the northern portion of the study area (April 11). A potentially active den was also identified along Little Salado Creek in the northwestern arm of the study area. During subsequent site visits (January 24-26, 1990) possible kit fox scat was identified in the vicinity of Little Salado Creek and Crows Creek (west of I-5).

Proposed Impacts and Mitigation Measures

Because there are known San Joaquin kit fox sightings and USFWS and CDFG are strictly opposed to any development west of I-5, development of the Fink Road study area may result in a higher mitigation ratio (S. Larson, pers. comm., 1998) than sites where the occurrence of kit fox

is less likely. Although the study area consists almost entirely of orchards, USFWS is considering all habitat west of I-5 as higher quality kit fox habitat. Because of this, 1.1:1 mitigation for the entire acreage of the study area rather than just a 300-foot buffer would likely be required. It is anticipated that approximately 1,000 acres of orchard habitat would be removed during development of this study area. Mitigation for these impacts is estimated to be purchase of approximately 1,100 acres of San Joaquin kit fox habitat.

4.3.8 ECONOMIC CONSIDERATIONS

The Fink Road study area is currently isolated from any types of commercial or industrial development. The nearest developed land use is the former NASA Crows Landing Flight Facility approximately a mile and a half east of I-5. Table 4.3-6 shows the current development potential for the Fink Road study area. Approximately 700 acres could be developed in the study area, out of a maximum of 1,000. The economic analysis did not identify any developable acreage in the short-term (i.e. the next 5 - 15 years) because the study area did not appear to be economically feasible in the absence of other nearby development (i.e. Crows Landing). In the long-term, there is potential for 130 acres of commercial and 570 acres of industrial development to occur. However, long-term potential development may be contingent on development of Crows Landing and expansion of the Fink Road/I-5 interchange.

Table 4.3-7 contains capital costs for offsite improvements at the Fink Road study area. As shown in the table, capital costs (i.e. interchange, water, wastewater) would cost approximately $56,000 per acre. Onsite improvements would cost approximately $40,000 per acre bringing total onsite and offsite capital costs to $96,000 per acre. In total, breakeven costs per acre within the Fink Road study area would be around $196,000 per acre, which would equate to approximately $4.50 per square foot, based on all three generations of development.

Table 4.3-6
POTENTIAL DEVELOPABLE ACRES

STUDY AREA	ACRES	USED ACRES	ACRES REMAINING FOR DEVELOPMENT
Total Site	500 - 1,000	-	
Total Available Short Term	-	-	-
Commercial	-	-	-
Industrial	-	-	-
Undesignated	-	-	-
Commercial	-	-	-
Industrial	-	-	-
Total Available - Long-Term	700	-	700
Commercial	130	-	130
Industrial	570	-	570

Source: Williams-Kuebelbeck & Associates, 1998 (based on site inspection, discussion with developer, local brokers, parcel and map analysis)

Table 4.3-7
TOTAL COSTS VERSUS SALES PRICES [1]

DESCRIPTION	COST
Capital Costs [2]	$33,000
Capital Carrying Costs [10 Years]	$23,000
On Site Costs [Gross Estimate]	$40,000
Land and Holding Costs [Est.]	$15,000
Subtotal	$111,000
Marketing Overhead and Developer's Profit	$37,000
Efficiency Loss	$28,000
Contingency @ 15%	$20,000
Total Breakeven	$196,000
Breakeven [Per Sq. Ft.] [3]	$4.50
Industrial Land Sales Prices	$.75 - $1.25
Commercial Land Sales Prices	$4.00 - $5.00
Upscale Commercial Land sales Prices	N/A
Short-Term Potential - Industrial	**Very Poor**
Short-Term Potential - Commercial	**Marginal**
Site Rating for Upscale Commercial	**N/A**

Note: By parcel cost allocation [cost spread], some cost shifts may occur among individual parcels which may make industrial development possible at the Howard Road - Westley Triangle study area. Numbers may not add due to independent rounding

1 Rounded to the nearest $1,000/acre
2 Based on costs for interchange improvements from TJKM Transportation Consultants, and water and wastewater system costs from SCS Engineers.
3 Rounded to the nearest 10 cents

Source: Williams-Kuebelbeck & Associates.

Industrial land sales prices are assumed to range between $.75 and $1.25 per square foot. In contrast, commercial land sales prices range from $4.00 to $5.00 per square foot. Upscale commercial was not applied to the Fink Road study area because demand for this type of land use would not be anticipated due to the study area's location. Breakeven costs per square foot for industrial land exceed sales prices in the Fink Road study area by as much as $3.75. However, breakeven costs per acre were within the commercial sales price range. Therefore, development of commercial uses at the Fink Road study area is economically possible, but not highly favorable due to the minor difference ($.50 per square foot) between cost and price.

In terms of rating the prospects for each type of development at the Fink Road study area, industrial development was rated as "very poor" while commercial was rated as "marginal" This would be expected as total costs per square foot were in the range of sales prices for commercial development while costs exceeded sales prices for industrial land. The study area received overall low ratings due to its distance from other developed areas, lack of existing development and high offsite improvement costs per acre relative to sales prices.

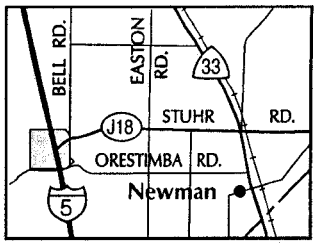
4.3.9 OTHER FACTORS/CONSIDERATIONS

BIOLOGICAL ISSUES

In addition to impacts to the San Joaquin kit fox, development of the Fink Road study area could also result in impacts to jurisdictional waters of the U.S., including wetlands that are regulated under Section 404 of the Clean Water Act. A wetland delineation was conducted by WESCO in 1989, but was not verified by the U.S. Army Corps of Engineers (USACE) (WESCO 1990). If the proposed development would result in direct or indirect impacts to either the freshwater marsh, pond, or associated riparian vegetation, a review of the existing delineation to verify that wetland areas are accurately mapped would likely be required. The revised delineation would then be resubmitted to USACE for verification. A USACE Nationwide 26 permit would likely be required prior to any construction within the study area.

The freshwater marshes and pond identified within the study area are known to support nesting tricolored blackbirds, a California Species of Special concern. Therefore, removal or disturbance to these areas would also result in impacts to this species.

4.4 STUHR ROAD-NEWMAN INTERCHANGE AREA



4.4.1 LOCATION

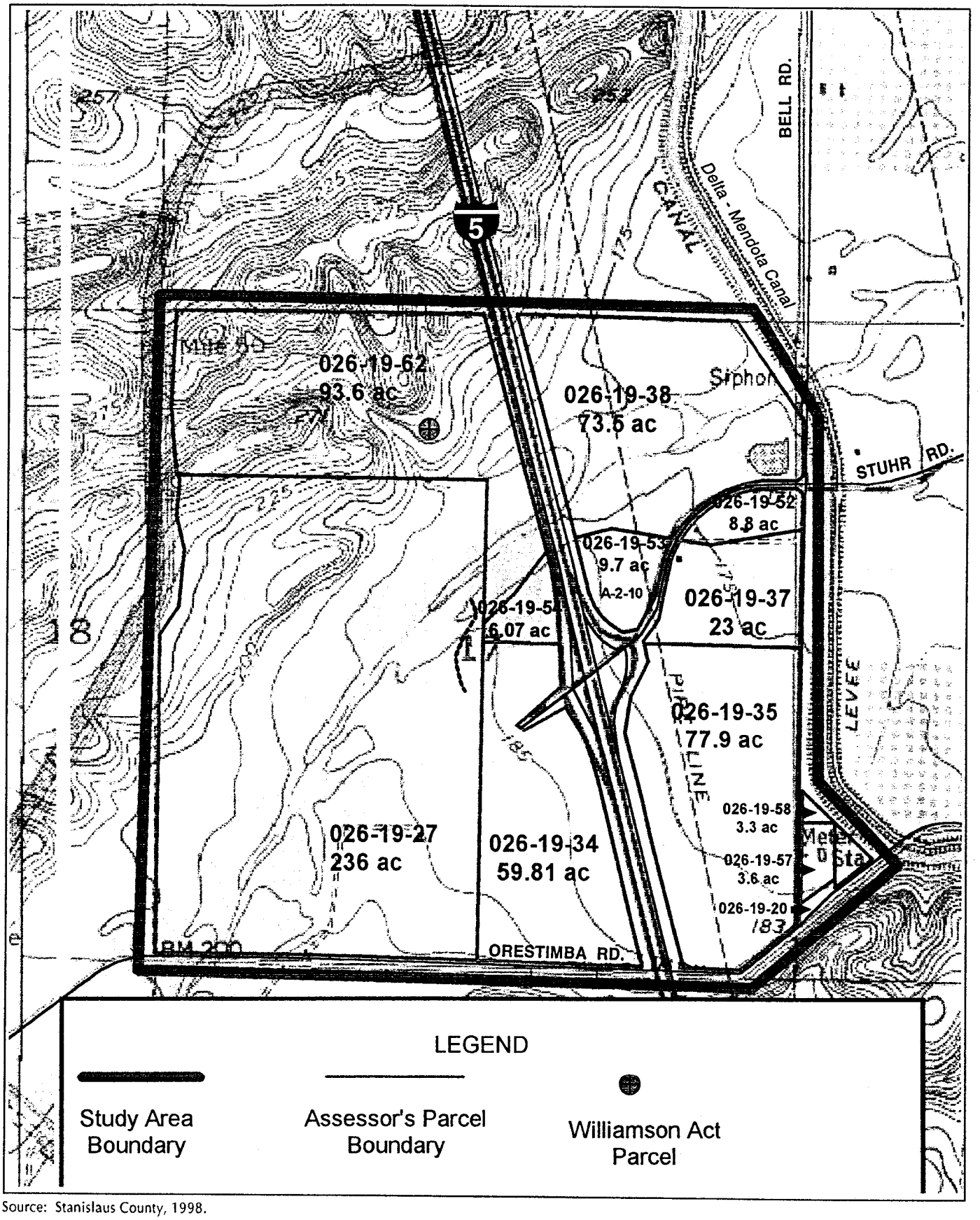
The Stuhr Road—Newman Area is approximately 600 acres situated along both sides of I-5. This study area is bordered on the south by Orestimba Road, on the east by the Delta-Mendota Canal, and on the west by the California Aqueduct (Exhibit 4.4-1). I-5 bisects the study area in a north/south direction. Stuhr Road provides regional access to the study area eastward from I-5.

The Stuhr Road—Newman study area is located on the Newman 7.5 Minute Quadrangle, Township 7 South, Range 8 East, Sections 17 and 18. This study area consists of 12 parcels, including one active Williamson Act Contract. The Assessor's Parcel Numbers (APNs), acreage, Williamson Act status and zoning for each parcel is shown in Table 4.4-1.

Table 4.4-1
STUHR ROAD—NEWMAN STUDY AREA

ASSESSOR'S PARCEL NUMBER (APN)	ACREAGE	WILLIAMSON ACT STATUS (Expired)	ZONING
026-19-62	93.60	Active	A-2-40
026-19-27	236.36		A-2-40
026-19-34	59.81		A-2-40
026-19-35	77.90		A-2-40
026-19-38	73.50		A-2-40
026-19-52	8.83		A-2-40
026-19-54	6.07		A-2-40
026-19-20			A-2-40
026-19-37	23.06		P-D
026-19-53	9.71		A-2-10
026-19-57	3.61		A-2-40
026-19-58	3.32		A-2-40
Total Acreage	595.77		
Total Acres in Active Williamson Act		93.60	

Source: EDAW 1998



Source: Stanislaus County, 1998.

Stuhr Road - Newman Area

EXHIBIT 4.4-1

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

0 500 1000 FEET

NORTH

EDAW

4.4.2 CHARACTERISTICS

ACCESS AND LAND USE

Stuhr Road currently dead ends at the overpass in the western direction. Therefore, the area west of I-5 within the study area is currently unaccessible from Stuhr Road.

The Stuhr Road—Newman study area is dominated by vacant agricultural land. Views of the study area from the southbound lanes of I-5 are for the most part open and unobstructed with the exception of some screening by existing trees. I-5 is nearly at grade approaching the study area from the south. From northbound I-5, views look down on the study area from the overpass approach. Overhead lights are currently in place near the southbound exit.

The northeast corner of the interchange (east of I-5 and north of Stuhr Road) is currently undeveloped land (Exhibit 4.4-2, Photo 1). This area is dominated by riparian vegetation associated with Orestimba Creek. Several large trees are scattered throughout this portion of the study area.

The remainder of the study area consists of approximately 55 acres of orchards, 60 acres of cropland, and 238 acres of non-native grassland. Orchards within the study area are fairly mature; however, a fallow orchard is present east of I-5 and south of Stuhr Road. Other orchards are present both north and south of Orestimba Creek, with some row crops west of I-5. Non-native grassland is present primarily west of I-5, at the base of the coast ranges and in the southeastern corner of the study area.

Electric and gas infrastructure is located within the study area along Stuhr Road. Overhead electrical lines are located in the southwest portion of the study area at the base of the hillsides as well as west of the orchards. Petroleum pipelines are located along Stuhr Road as well as north/south across the study area parallel to I-5. The pipelines are identified with by above-ground markers and warnings. No public water or sewer infrastructure serves the area.

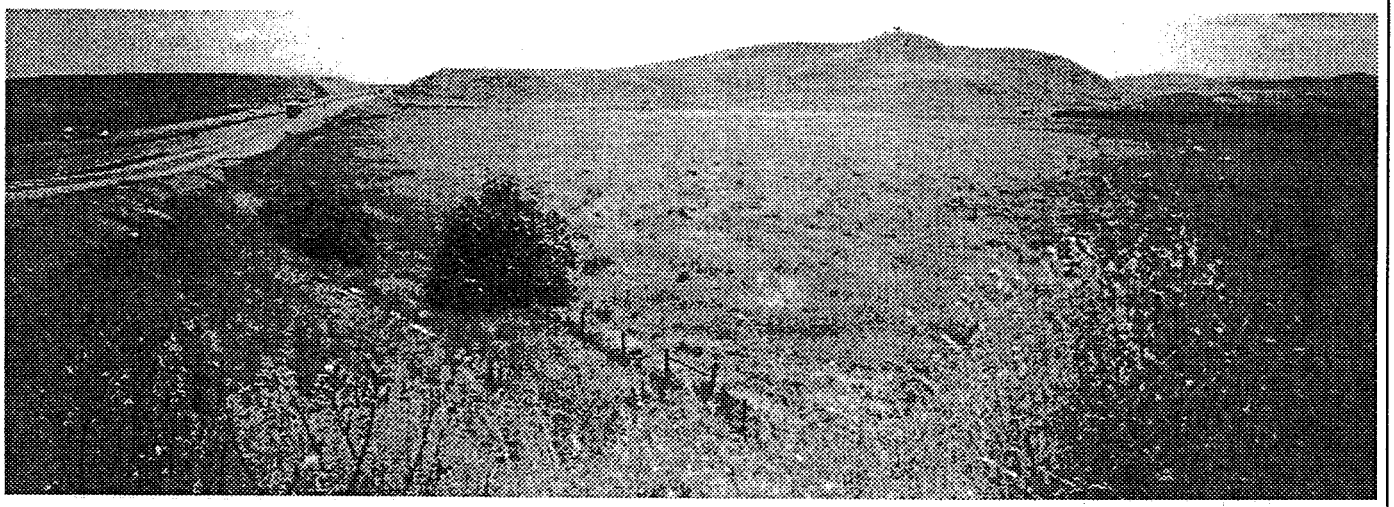
The area to the southeast of the interchange (bounded by Bell Road and the Delta-Mendota Canal on the east, Orestimba Road on the south, I-5 on the west and Stuhr Road on the north) is approximately half vacant grass lands and half commercial hay production. Several residential structures are located near the intersection of Bell Road and Orestimba Road. A PG&E meter station is located on a triangular parcel bounded by Bell Road, the Delta-Mendota Canal and Orestimba Road.

This western portion of the study area is located in a valley between hilly areas. Orestimba Creek, and its surrounding riparian corridor, bisects this western portion of the study area. Agricultural land and orchards infill the area southeast to I-5 and Orestimba Road (Exhibit 4.4-2, Photos 2 and 3).

VEGETATION

The study area is dominated by riparian vegetation associated with Orestimba Creek. A unique stand of California sycamores (*Plantanus racemosa*) is located within and adjacent to Orestimba Creek. This is the only location on the valley side of the Coast Ranges where California

1. View of northeast corner of Stuhr Road interchange (at left) and southeast corner (at right). The northeast corner is undeveloped and is traversed by Orestimba Creek. The southeast corner is a combination of vacant grassland and agricultural land.



2. View south from the of Stuhr Road overpass. The area is currently used for agriculture, including orchards at far right.

3. View north from the western terminus of Stuhr Road. Trees at center of photo are California sycamores which line Orestimba Creek. Vacant agricultural land and orchards are located south of the creek.

Source: EDAW, Inc., 1998.

Stuhr Road - Newman Area Photographs

EXHIBIT 4.4-2

sycamore occurs on the valley floor (Stanislaus County 1987). Other overstory species include arroyo willow (*Salix lasiolepsis*) and Fremont's cottonwood (*Populus fremontii*). The thick understory is composed of button bush (*Cephalanthus occidentalis* var. *californicus*), honeysuckle (*Lonicera* sp.), elderberry (*Sambucus mexicana*), and gooseberry (*Ribes* sp.). Poison oak (*Toxicodendron diversilobum*), mule fat (*Baccharis salicifolia*), and wild grape (*Vitis californicus*) are also present. Low-lying areas adjacent to Orestimba Creek are dominated by tules (*Scirpus acutus*), cattails (*Typha latifolia*), and curly dock (*Rumex crispus*).

The remainder of the property consists of approximately 55 acres of orchards, 60 acres of cropland, and 238 acres of non-native grassland. Orchards on the study are fairly mature; however, a fallow orchard is present east of I-5 and south of Stuhr Road. Other orchards are present both north and south of Orestimba Creek, with some row crops west of I-5.

Non-native grassland onsite is present primarily west of I-5 at the base of the Coast Ranges and in the southeastern corner of the property.

WILDLIFE

The majority of the study area consist of cropland and orchard. Although these areas do not represent high-quality wildlife habitat, they are frequently used by common wildlife species that are adapted to highly disturbed areas with human activity. Species typically found in these areas include house finch (*Carpodacus mexicana*), Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), and American crow (*Corvus brachyrhynchos*). Some crops support a prey base for foraging raptors, including red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), black-shouldered kite (*Elanus leucurus*), great horned owl (*Bubo virginianus*), and American kestrel (*Falco sparverius*).

Non-native grassland represents habitat for a variety of rodents, which in turn serve as a prey base for raptors and carnivores such as hawks and owls, coyote (*Canis latrans*), and grey fox (*Urocyon cinereoargenteus*). Although few birds nest in grassland areas, a number of species forage in this habitat, including mourning dove (*Zenaida macroura*), white-crowned sparrow (*Zonotrichia leucophrys*), lesser goldfinch (*Carduelis psaltria*), song sparrow (*Melospiza melodia*), western bluebird (*Sialia mexicana*), western meadowlark (*Sturnella neglecta*), and several raptor species. Other species expected to occur include California vole (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), black-tailed jackrabbit (*Lepus californicus*), western fence lizard (*Sceloporus occidentalis*), northern alligator lizard (*Gerrhonotus coeruleus*), and gopher snake (*Pituophis melanoleucus*).

The Stuhr Road—Newman Area supports mature riparian habitat. This habitat is well developed and represents appropriate nesting and/or foraging habitat for many migratory and resident bird species including spotted towhee (*Pipilo erythropthalmus*), song sparrow, and black phoebe (*Sayornis nigricans*), yellow warbler (*Dendroica petechia*), Wilson's warbler (*Wilsonia pusilla*), yellow-rumped warbler (*Dendroica coronata*), northern oriole (*Icterus galbula*), and red-winged blackbird (*Agelaius phoeniceus*). Mammals such as Audubon's cottontail (*Sylvilagus audubonii*), raccoon (*Procyon lotor*), opposum (*Didelphis marsupialis*), and striped skunk (*Mephitis mephitis*) are also expected to occur. The most common reptiles and amphibians that occur in riparian habitats include western toad (*Bufo boreas*), Pacific tree frog (*Hyla regilla*), bullfrog (*Rana catesbeiana*), western fence lizard, common garter snake (*Thamnophis sirtalis*), and gopher snake.

Wildlife species expected to occur in freshwater habitats are those typically found in aquatic environments, including Pacific chorus frog (*Pseudacris regilla*), red-winged blackbird, great blue heron (*Ardea herodius*), snowy egret (*Egretta thula*), song sparrow, marsh wren (*Cistothorus palustris*), and lesser goldfinch. Pools and other surface water along the Orestimba Creek are a likely source of drinking water for many of the birds and mammals during the summer.

4.4.3 LAND USE PLANNING, POLICY, AND REGULATORY CONSIDERATIONS

STANISLAUS COUNTY GENERAL PLAN

The Stuhr Road—Newman study area on the west side of I-5 is designated as Agriculture in the Stanislaus County General Plan. Agriculture is also designated between the east side of I-5 and Bell Road north of Stuhr Road.

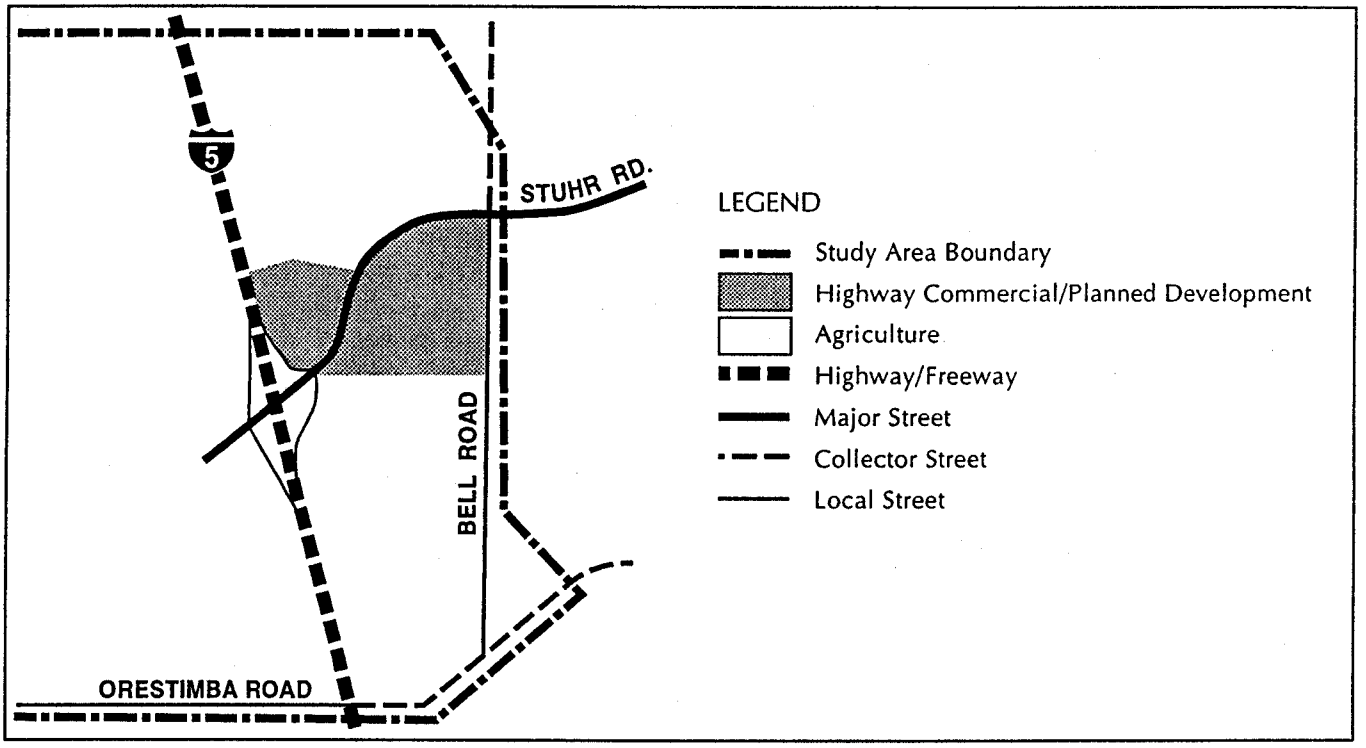
A small triangular area on the east side of I-5 north of Stuhr Road is designated Highway Commercial/Planned Development. South of Stuhr Road between Bell Road and I-5 is also designated Highway Commercial/Planned Development (Exhibit 4.4-3). Agricultural uses surround the study area. (Refer to Chapter 3 for a descriptions of General Plan land use designations).

Relevant General Plan Policies

The Stuhr Road—Newman study area consists of undeveloped and agricultural land. Orestimba Creek traverses the study area , presenting possible flooding. Access to the study area is also limited due to Stuhr Road's termination west of I-5.

The Stanislaus County General Plan (Stanislaus County 1994) and Agricultural Element (Stanislaus County 1992) provide policies to direct development. Based on the general characteristics of the study area, a number of policies from several different elements are applicable to possible commercial/industrial development of the Stuhr Road—Newman Area. Table 4.4-2 summarizes these policies.

Because there are agricultural lands as well as one Williamson Act Contract within the Stuhr Road—Newman area, policies from the Land Use Element, Conservation and Open Space Element and the Agricultural Element apply to the study area. Land Use Element Policies 14 and 16, Conservation and Open Space Policy 11, and Agriculture Element Policies 1.5 and 1.8 all support the preservation of agricultural lands in the County. Because the study area is primarily designated Agriculture, introducing non-agricultural uses into agricultural areas is inconsistent with Agricultural Policy 11 and Land Use Policies 14 and 16. Policy 1.8 of the Agriculture Element also discourages non-agricultural uses, even if related to surrounding agricultural activities.



Source: Stanislaus County, 1998.

Stuhr Road - Newman Area County General Plan Land Use Designations EXHIBIT 4.4-3

Table 4.4-2
STANISLAUS COUNTY GENERAL PLAN POLICIES
RELEVANT TO THE STUHR ROAD—NEWMAN AREA

ELEMENT & POLICY NO.	POLICY
Land Use - Policy 7	Riparian habitat along the rivers and natural waterways of Stanislaus County shall to the extent possible be protected.
Land Use - Policy 14	Uses shall not be permitted to intrude into or be located adjacent to an agricultural area if they are detrimental to continued agricultural usage of the surrounding area.
Land Use - Policy 16	Agriculture, as the primary industry of the county, shall be promoted and protected.
Land Use - Policy 17	Promote diversification and growth of the local economy.
Land Use - Policy 23	New development shall pay its fair share of the cost of cumulative impacts on circulation and transit systems.
Conservation and Open Space - Policy 3	Areas of sensitive wildlife habitat and plant life (e.g. vernal pools, riparian habitats, flyways and other waterfowl habitats, etc.) including those habitats and plant species listed in the General Plan Support document or by state or federal agencies shall be protected from development.
Conservation and Open Space - Policy 11	In areas designated "Agriculture" on the Land Use Element, discourage land uses which are incompatible with agriculture.
Conservation and Open Space - Policy 16	Discourage development on lands that are subject to flooding, landslide, faulting or any natural disaster to minimize loss of life and property.
Circulation - Policy 1	Development will be permitted only when facilities for circulation exist, or will exist as part of the development, to adequately handle increased traffic.
Agriculture - Policy 1.5	Limited visitor-serving commercial uses shall be permissible in agricultural areas if they promote agriculture and are secondary and incidental to the area's agricultural production.
Agriculture - Policy 1.8	Concentrations of commercial and industrial uses, even if related to surrounding agricultural activities, are detrimental to the primary use of the land for agriculture and shall not be allowed.
Agriculture - Policy 2.7	Proposed amendments to the General Plan diagram (map) that would allow the conversion of agricultural land to non-agricultural uses shall be approved only if they are consistent with the County's conversion criteria.
Agriculture - Policy 2.12	When the County determines that the proposed conversion of agricultural land to non-agricultural uses could have a significant effect on the environment, the County shall fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects of the conversion.
Safety Element - Policy 2	Development should not be allowed in areas that are within the designated floodway.

Source: EDAW 1998

Policy 1.5 of the Agricultural Element addresses limited visitor-serving commercial uses. Although certain uses aside from growing crops are allowed on agricultural lands, the types of uses envisioned by the proposed development scenario would not be consistent with the intent of this policy. While areas adjacent to the interchange are currently designated for non-agricultural uses on the General Plan land use map (Highway Commercial/Planned Development), the remainder of the study area is designated for Agriculture. Prior to any development in these areas, an amendment to the General Plan land use map would be necessary. Policy 2.7 of the Agriculture Element requires all agricultural land conversions to meet the County's conversion criteria prior to receiving approval for a change in land use. According to the criteria contained in the General Plan Agricultural Element, conversion of agricultural land to urban uses shall be approved only if the Board of Supervisors makes certain findings (see Conversion of Agricultural Land in Chapter 3.

Satisfying all of the criteria could be problematic, particularly with regard to items 1 and 6. Because Stanislaus County has primarily an agriculture based economy with policies to protect agricultural lands, making a finding consistent with item 1 could be problematic. According to the General Plan, "Most Productive Agricultural Areas" are currently determined on a case-by-case basis when a proposal is made for the conversion of agricultural land. Factors considered in making a determination are provided in Chapter 3, Conversion of Agricultural Land. Based on these factors, the areas within the Stuhr Road—Newman area which are currently in production with orchards or which are fallow but irrigated could potentially be considered among the County's Most Productive Agricultural Areas.

In terms of public services pertinent to conversion criteria item 6, the Stuhr Road—Newman study area is not served by public water (even though it is located in the Del Puerto Water District) or wastewater service. Existing agricultural uses receive water for irrigation from the Delta-Mendota Canal. Because the study area is removed from any major urban area, extension of services to meet demands of new development would not be feasible in the near future.

Orestimba Creek traverses the Stuhr—Road Newman area, flowing northeast towards the San Joaquin River. Historically Orestimba Creek has been subject to flooding. The study area is located in the Orestimba Flood Control District. Safety Policy 2 discourages development in designated floodways. Similarly, Conservation and Open Space Policy 16 also discourages development on lands subject to flooding. Therefore, Orestimba Creek would present some constraints to development in the Stuhr Road—Newman study area.

Orestimba Creek also contains riparian woodlands, including a unique stand of California sycamores and associated habitat. In accordance with Land Use Policy 7 and Conservation and Open Space Policy 3, development occurring in the study area would have to avoid and protect the sycamores and any associated sensitive wildlife and plant life.

Access to the Stuhr Road—Newman study area is limited as Stuhr Road currently provides access only east of I-5. Stuhr Road in the western direction ends at the overpass, limiting direct access to the study area west of I-5. Circulation Policy 1 requires development to be adequately served with circulation infrastructure. The proposed development would overburden the existing interchange and roadways. Therefore, circulation improvements would be necessary to accommodate development proposed in within the study area. In accordance with Land Use Policy 23, new development would be required to pay its fair share of the cost of cumulative impacts to the Stuhr Road interchange.

Development of commercial/industrial businesses in the Stuhr Road—Newman area would create jobs and promote diversification of the County economy. Jobs would be generated in the short-term in association with construction of buildings and infrastructure in the study area. Some long-term, low-skilled employment would be created through the proliferation of motels, restaurants and other visitor-serving/highway commercial establishments which would occur during first generation development. Second generation uses, including distribution centers, warehouses, agricultural services, etc., would complement the existing agricultural economic base while providing additional jobs and economic diversification for the County. Third generation uses, such as high-technology industries, would serve to further expand and diversify the County's economy by providing skilled labor jobs. Each generation of development would be consistent with the intent of Land Use Policy 17.

Whenever the County is confronted with converting agricultural land, it must determine whether such action will result in a significant effect on the environment. Policy 2.12 directs the County to fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects of the conversion.

STANISLAUS COUNTY ZONING

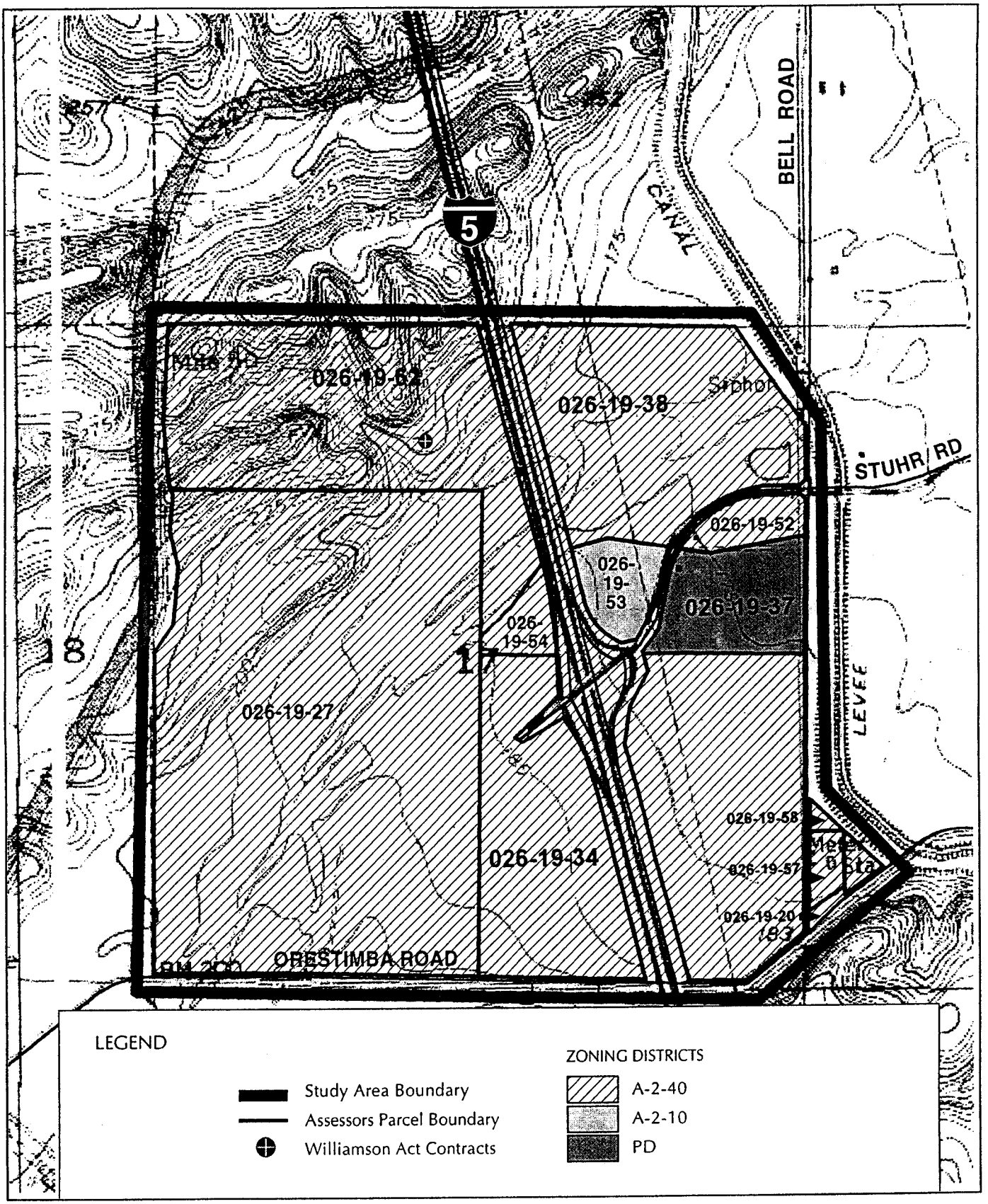
The Stuhr Road—Newman study area is zoned entirely A-2 (General Agriculture District) with 10 and 40 acre parcels (A-2-10 and A-2-40) (Exhibit 4.4-4). Refer to Chapter 3 for a description of County zoning.

ANY OTHER PLANS/REGULATIONS THAT APPLY

In addition to being governed by the Stanislaus County General Plan (1994), the Stanislaus County Agricultural Element (1992), and the Stanislaus County Zoning Ordinance, the Stuhr Road—Newman study area is also located within the jurisdiction of several districts. The districts do not have any regulatory authority over projects located within their boundaries. However, they are acknowledged as entities which should be consulted prior to proceeding with development within the Stuhr Road— Newman study area.

West Stanislaus Resource Conservation District. The West Stanislaus Resource Conservation District serves as a local contact for the U.S. Department of Agriculture regarding resource conservation related to soils, air and other natural resources. The Resource Conservation District is involved primarily with aggregate mining projects. The Resource Conservation District may also review General Plan Amendments involving conversion of agricultural land, but has no approval authority (McElhiney, pers. comm. 1998)

Del Puerto Water District. The Del Puerto Water District conveys water from the Delta-Mendota Canal for agricultural purposes. The District has a contract with the Bureau of Reclamation to divert 140,210 acre-feet from the canal. Although the District does not currently provide treated water for municipal and industrial uses, such as would be required by the proposed development scenario, all proposals for development should be submitted to the District for review by the District's Board of Director's (Cotter, pers. comm. 1998).



Source: Stanislaus County, 1998.

Stuhr Road - Newman Area Zoning Districts

EXHIBIT 4.4-4

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

0 500 1000 FEET

NORTH

EDAW

Orestimba Flood Control District. The Orestimba Flood Control District is the only flood control district in the county. The District generally includes the area between I-5 on the west and State Route (SR) 33 on the east, Fink Road on the north and Stuhr Road on the south. The District also includes areas adjacent to Orestimba Creek to the southwest of I-5 and northeast of SR 33. Projects within the District boundaries should submit project plans to the district for review.

4.4.4 INTERCHANGE EVALUATION

Traffic generation and assignment forecasting was prepared by TJKM Transportation Consultants (1998) to identify improvements necessary at the Stuhr Road interchange. Existing conditions are described in Chapter 3. The following is a description of constraints that are anticipated to occur with implementation of the proposed development scenario.

INTERCHANGE CONSTRAINTS

The analysis of traffic generation revealed that development of the entire acreage of the Stuhr Road—Newman Study area would be possible with the existing tight-diamond interchange. However, the volume of traffic projected by the proposed development at the Stuhr Road—Newman area would overburden the existing interchange and cannot be served by STOP sign control. Development is proposed on both sides of the interchange. Therefore, traffic making left-turns onto and off of the freeway ramps could conflict with through-traffic on Stuhr Road. These conflicts could result in congestion at the interchange.

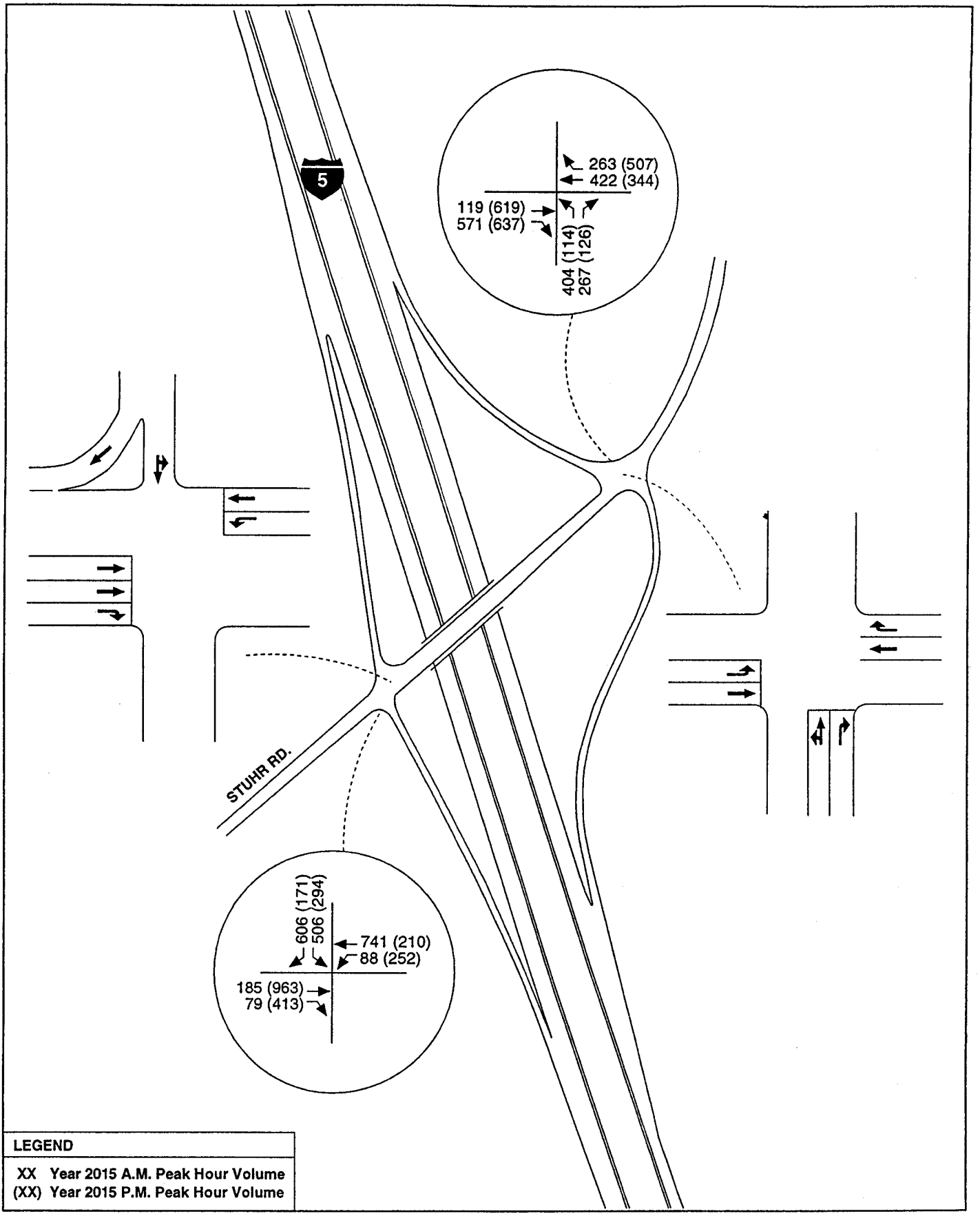
Few physical constraints limit improvements to the Stuhr Road interchange. Land on either side of the interchange is flat with few distinguishing characteristics. The Stuhr Road overpass structure is wide enough to accommodate three lanes. However, due to the existing shoulder, there would need to be some widening to accommodate three lanes with shoulders.

RECOMMENDED IMPROVEMENTS

To accommodate the proposed development within the Stuhr Road—Newman study area, improvements are recommended at both the north and southbound on- and off-ramps. These improvements are described below and depicted in Exhibit 4.4-5. As part of the proposed roadway improvements, all ramp intersections should be signalized. The overpass structure should be widened to accommodate additional lanes and standard shoulders.

Southbound Ramps

Full signalization of the southbound ramp intersections is recommended. A free right-turn lane should be added to the southbound off-ramp. The eastbound leg of this ramp intersection should be constructed to coincide with development on the west side of the freeway. An eastbound approach should be constructed on the new portion of Stuhr Road. The approach should consist of two through-lanes and an exclusive-right turn lane. In addition, a new through-lane should be added to the westbound approach.



Source: TJKM Transportation, 1998.

Proposed Tight Diamond Intersection Configuration Improvements – Stuhr Road - Newman Area

EXHIBIT 4.4-5

Northbound Ramps

To reduce traffic congestion at the interchange, full signalization of the northbound ramp intersections is recommended. An exclusive right-turn lane should be added to the northbound off-ramp. The eastbound approach on Stuhr Road should be widened to include a left-turn pocket. The westbound approach should be widened to include a new exclusive right-turn lane.

COST

Costs for the necessary improvements at the Stuhr Road interchange would be approximately $1.1 million. This includes expenses for roadway construction/reconstruction retaining structures, freeway structures, signals, right-of-way, and contingencies which should include design work, minimal standard items and other miscellaneous expenses (cost assumptions are provided in Section 4.0.2). Table 4.4-3 provides a breakdown of the costs for roadway improvements in the Stuhr Road—Newman Area.

Table 4.4-3
STUHR ROAD ROADWAY CONSTRUCTION COST SUMMARY [1]

	COST PER ACRE [2]	Cost per 1,000 sq ft	COST PER TRIP	TOTAL COST
Roadway	**$265.80**	**$89.74**	**$104.81**	**$664,500**
Pavement	$97.20	$32.82	$36.33	$243,000
Signals	$80.00	$27.01	$31.55	$200,000
Contingency (50%)	$88.60	$29.91	$34.94	$221,500
Structures	**$195.00**	**$65.84**	**$76.89**	**$487,500**
Structures	$156.00	$52.67	$61.51	$390,000
Contingency (25%)	$39.00	$13.17	$15.38	$97,500
TOTAL	**$460.80**	**$155.58**	**$181.70**	**$1,152,000**

[1] Assumes 4,362 square feet of roadway improvements and 5,011 trips
[2] Assumes 589 acres

Source: TJKM 1998

4.4.5 WATER SUPPLY

A public water system is not available in the Stuhr Road—Newman study area. Existing uses in the area are vacant and agricultural lands which do not require potable water. Background and assumptions for this water supply analysis are provided in Section 4.0.3. For the purpose of this analysis, fire flow and emergency requirements were assumed to be potable (i.e. treated) water.

The water demand for the Stuhr Road—Newman Area is estimated at 850 ac-ft/year or 750,000 gpd. This number equates to an average demand of 1,060 gpm, based on a 12-hour pumping schedule. A water supply system was sized to accommodate this flow with the basic components of a groundwater well, pumping stations, water treatment facility, storage tank, and conveyance system.

Water storage must account for daily use as well as provide for emergency needs such as fire flow. Because the Stuhr Road—Newman area is so large, three typical hotels with varying levels and floor areas were used to calculate maximum fire flow. Based on these calculations with the assumption of a 12-hour operating average daily flow, the Stuhr Road—Newman area would require three 2 million gallon capacity storage tanks.

Table 4.4-4
WATER SYSTEM COMPONENT COSTS

System Components	Capital Costs
Groundwater Well	$80,000
Water Treatment System	$942,500
Pumping Stations	$13,000
Storage Tanks	$1,275,000
Conveyance System	$304,000
Total Costs:	**$2,614,500**

Source: SCS Engineers, 1998

From storage, water is conveyed to users through a network of distribution pipes. For purposes of this study, it was assumed that one main water supply pipe runs along the longest path of the area (7,000 feet). All developments connecting to the system must provide their own access to the main water line. From these assumptions, hypothetical pumping requirements were calculated and necessary pumps were sized. Table 4.4-4 summarizes the costs for the necessary water components to serve the Stuhr Road—Newman study area through the third generation development scenario. Background and assumptions are provided in Chapter 3.

The first development scenario was then applied to the overall system to determine if the system would be capable of handling a low flow situation. This resulted in an alternative storage tank configuration which may incur additional costs by occupying more space. Based on a review of the first generation development scenario, at least three 1.2 million gallon storage tanks are required to treat the demand. In order to accommodate the third stage, an additional 2 million gallon storage tank must be installed, thereby utilizing 6,400 cubic feet of additional space.

4.4.6 WASTEWATER TREATMENT AND DISPOSAL

The wastewater produced in the Stuhr Road—Newman Area is estimated at 1,630 ac-ft/year, or 1,450,000 gpd. This number equates to 1,010 gpm of wastewater (including occurrence of infiltration from outside sources) which must be treated.. Based on this value, a wastewater treatment system was developed with the basic components of a wastewater treatment facility and a conveyance system. Background assumptions and general cost information are provided in Chapter 3. Table 4.4-5 summarizes costs for the system components to provide wastewater conveyance and treatment, for the Stuhr Road—Newman Area.

Table 4.4-5 WASTEWATER SYSTEM COMPONENT COSTS	
System Components	**Capital Costs**
Conveyance System	$4,200,000
Wastewater Treatment System	$6,525,000
Total Costs	**$10,725,000**
Source: SCS Engineers 1998	

To determine if the system would be capable of handling a low flow situation, the first generation of development was applied to the overall system. As preliminarily designed, the conveyance system would be able to maintain constant flow to the treatment system with only first generation flows. Because the system could accommodate a low flow threshold, the system would be able to service the study area through all three stages of development.

4.4.7 SAN JOAQUIN KIT FOX MITIGATION

LOCATION OF SAN JOAQUIN KIT FOX

San Joaquin kit fox could potentially den and/or forage in the non-native grassland and forage in the adjacent orchards and cropland within the study area. Based on a review of the CNDDB, a San Joaquin kit fox was observed approximately 1.25 miles southwest of the Stuhr Road—Newman study area, along Orestimba Creek, in 1992 (CNDDB 1998). Because there is currently little human activity on the majority of the study area, and because this species was previously sighted within the Orestimba Creek riparian corridor, San Joaquin kit fox are expected to occur onsite.

IMPACTS AND PROPOSED MITIGATIONS

Development of the Stuhr Road—Newman Area would result in removal of approximately 238 acres of non-native grassland, 55 acres of orchards, and 60 acres of cropland. Impacts to non-native grassland would be mitigated at a ratio of 3:1, resulting in purchase of approximately 714 acres of non-native grassland. Approximately 8 acres of orchard and 7 acres of cropland fall within the 300-foot buffer area and would require mitigation at a ratio of 1.1:1. Purchase of a total of approximately 730.5 acres of non-native grassland would likely be required to mitigate impacts to San Joaquin kit fox.

4.4.8 ECONOMIC CONSIDERATIONS

The Stuhr Road—Newman Area has potential to develop over the long-term (i.e., 20 years). It may have potential to develop in the short-term as well if capital costs for water and sewer can somehow be offset. Table 4.4-6 shows the current potential for the Stuhr Road study area. The total 600 acres of the study area could be developed, ignoring Orestimba creek and adjacent sensitive areas. The economic analysis did not identify any developable acreage in the short-term (i.e. the next 5 - 15 years) because development of the study area did not appear to be economically feasible due to capital costs for water and wastewater. In the long-term, there is potential for 90 acres of commercial and 510 acres of industrial development to occur.

Table 4.4-6
CURRENT POTENTIAL ACREAGE

STUDY AREA	ACRES	USED ACRES	ACRES REMAINING FOR DEVELOPMENT
Total Site	600	-	
Total Available [Short Term]	600	-	600
Commercial	-	-	-
Industrial	-	-	-
Undesignated[1]	600	-	600
Commercial	90	-	90
Industrial	510	-	510
Total Stuhr Road	600	-	600
Commercial	N/A	-	N/A
Industrial	N/A	-	N/A

[1] Excellent potential due to location and topography - appears too costly to develop in the short-term.

Source: Williams-Kuebelbeck & Associates, 1998 (Acreage and building area for transfer unknowns - developable for special purpose commercial, general purpose commercial and industrial use. Source: site inspection, discussion with developer, local brokers, parcel and map analysis)

Table 4.4-7 contains capital costs for offsite improvements at the Stuhr Road—Newman area. As shown in the table, capital costs (i.e. interchange, water, wastewater) would cost approximately $41,000 per acre. Onsite improvements would cost approximately $40,000 per acre, bringing total capital costs to $81,000 per acre. Total breakeven costs would be approximately $170,000, or $3.90 per square foot, based on all three generations of development.

Industrial land sales prices are assumed to range between $.75 and $1.25 per square foot. In contrast, commercial land sales prices range from $4.00 to $5.00 per square foot. Upscale commercial was not applied to the Stuhr Road—Newman Area because demand for this type of land use would be virtually non-existent, based on its isolated location. Breakeven costs per square foot for industrial land exceed sales prices in the Stuhr Road—Newman Area by as much as $3.15 per square foot. However, commercial sales prices were greater than breakeven costs per square foot, although only by $.10 - $1.10. Therefore, development of commercial uses at the Stuhr Road—Newman Area study area is considered economically feasible although prices would not substantially exceed costs. Breakeven costs are such that industrial development would not be economically feasible, based on current industrial sales prices.

In terms of the potential for each type of development at the Stuhr Road—Newman area, industrial development is rated as "very poor" while commercial is rated as "marginal" This would be expected as total costs per square foot were in the range of sales prices for commercial development while costs exceeded sales prices for industrial land. The study area received

overall low ratings due to its distance from other developed areas, lack of existing development and high breakeven costs per acre relative to sales prices.

Table 4.4-7
TOTAL COSTS VERSUS SALES PRICES [1]

DESCRIPTION	COST
Capital Costs [2]	$24,000
Capital Carrying Costs [10 Years]	$17,000
On Site Costs [Gross Estimate]	$40,000
Land and Holding Costs [Est.]	$15,000
Subtotal	$96,000
Marketing Overhead and Developer's Profit	$32,000
Efficiency Loss	$24,000
Contingency @ 15%	$18,000
Total Breakeven	$170,000
Breakeven [Per Sq. Ft.] [3]	$3.90
Industrial Land Sales Prices	$.75 - $1.25
Commercial Land Sales Prices	$4.00 - $5.00
Upscale Commercial Land sales Prices	N/A
Short-Term Potential - Industrial	**Very Poor**
Short-Term Potential - Commercial	**Marginal**
Site Rating for Upscale Commercial	**N/A**

Note: By parcel cost allocation [cost spread], some cost shifts may occur among individual parcels which may make industrial development possible at the Stuhr Road-Newman study area. Numbers may not add due to independent rounding.

[1] Rounded to the nearest $1,000/acre
[3] Rounded to the nearest 10 cents
[2] Based on costs for interchange improvements from TJKM Transportation Consultants, and water and wastewater system costs from SCS Engineers.

Source: Williams-Kuebelbeck & Associates.

4.4.9 OTHER FACTORS/CONSIDERATIONS

TOWN OF NEWMAN

A discussion was held with the Town of Newman Planning Director (Borchard, pers. comm., 1998) to communicate the purpose of the feasibility study, and to describe the development scenario being considered for the Stuhr Road/Newman and other I-5 study interchanges. The Town expressed concern for any proposed interchange uses that would compete economically with existing or proposed downtown Newman uses. The Town indicated, however, that given an appropriate development scenario, they could be interested in joint-venture partnering with the County for development of uses at the interchange. A joint-venture opportunity would require active dialogue and joint planning efforts between the jurisdictions. Uses suggested for the immediate interchange area included a rest stop, non-competitive commercial, or high technology. West of the interchange could be considered for higher-end golf and/or restaurant uses.

WETLAND AND RIPARIAN AREAS

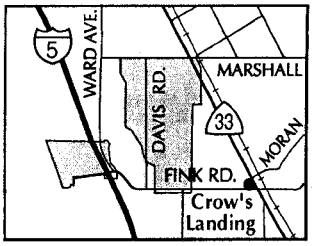
The Stuhr Road-Newman Area includes Orestimba Creek and adjacent freshwater marsh and associated mature riparian vegetation, including California sycamores. Development of the Stuhr Road—Newman area would require that a formal wetland delineation be conducted to determine the extent of jurisdictional waters of the U.S., including onsite wetlands. If the proposed development would result in impacts to Orestimba Creek or associated wetland and riparian vegetation, a USACE and CDFG Streambed Alternation Agreement would be required.

Riparian habitat is known to be of high value to migratory birds and nesting raptors. A Swainson's hawk (State Threatened) is known to nest in a sycamore west of I-5 at the Stuhr Road exit (CNDDB 1998). Development of the Stuhr Road—Newman study area would result in loss of foraging habitat and potential disturbance to nesting Swainson's hawks.

OTHER FACTORS

The Stuhr Road intersection study area may be the least developable of the interchanges. The presence of Orestimba Creek, the sycamore grove, and the current pattern of land ownership by the State of California, could preclude most development scenarios. This site may be more suited to remain in current land uses or to be used as a possible wetland or kit fox mitigation bank for other development proposals.

4.5 CROWS LANDING



HISTORY/BACKGROUND

The Naval Auxiliary Landing Field (NALF) Crows Landing was commissioned in May 1943. The facility originally served as a training field during World War II. The facility was largely inactive following World War II until the early 1950s, when it was used for fleet carrier landing practice during the Korean War. Also during this period, NALF Crows Landing was evaluated for upgrading to a full Naval Air Station (NAS). Instead, a site in Lemoore was selected (Tetra Tech 1994).

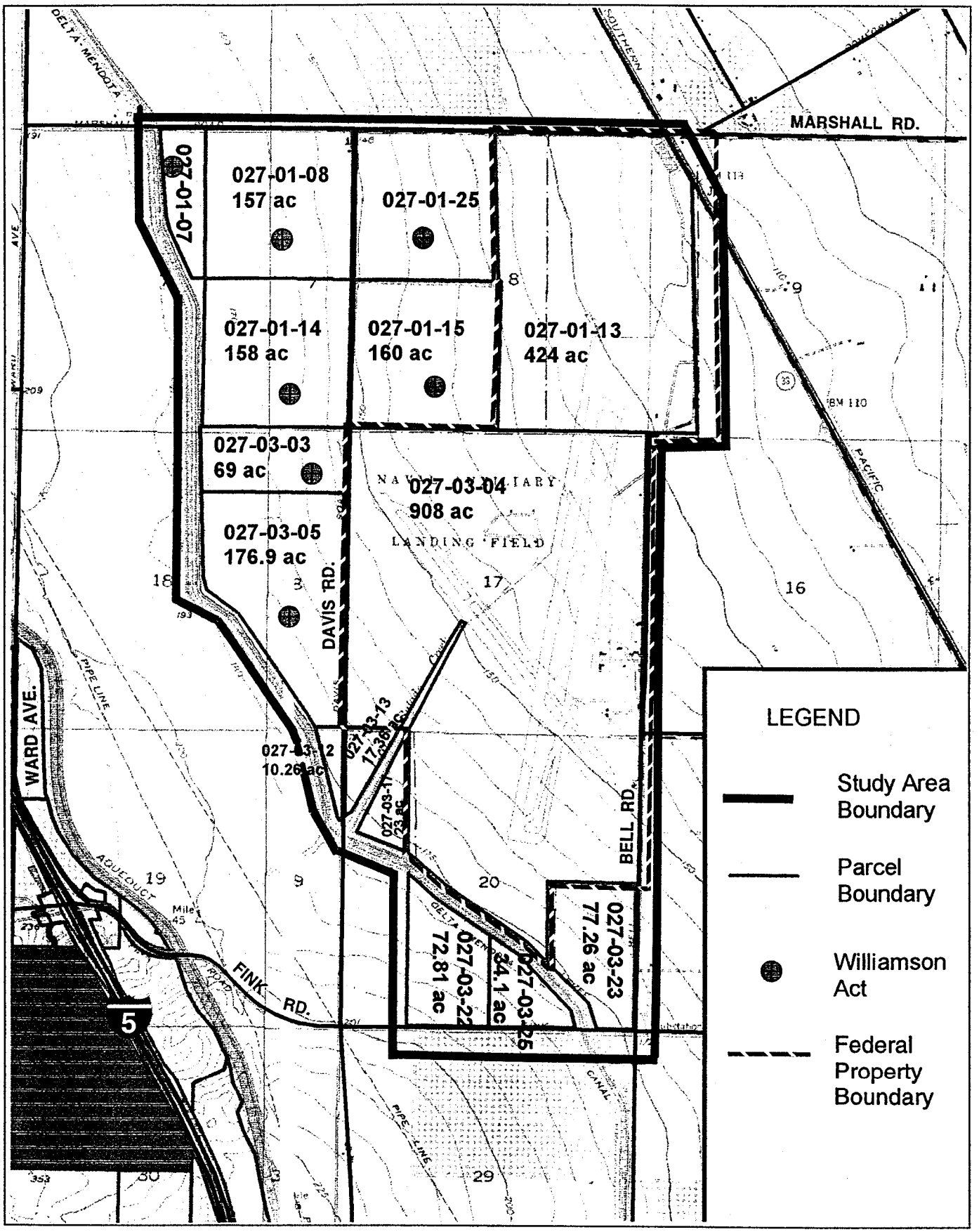
Touch-and-go operations began in the early 1970s when the majority of P-3 Orion aircraft practice missions were shifted to NALF Crows Landing from NAS Moffett Field (now known as Moffett Federal Airfield). Throughout the 1970s and 1980s, NALF Crows Landing was used for practice operations by the Navy, Air Force, Army, and Coast Guard. The facility was also used for paradrop practice by the Air Guard Rescue and as a research and development site by National Aeronautics and Space Administration (NASA) (Tetra Tech 1994).

In response to the recommendation of the 1991 Defense Base Closure and Realignment Commission (BRAC), it was determined that both NAS Moffett Field and NALF Crows Landing would no longer be operated by the active duty Navy. Because NASA depended on both facilities to carry out it's research and development mission, it was decided that custodial responsibility would be transferred to NASA (NASA Ames Research Center 1996).

In 1994, NASA took over operation of NALF Crows Landing from the U.S. Navy. Since then, the facility has been known as the NASA Crows Landing Flight Facility. During the following two years of NASA's operation of the facility, use continued to decline without a sufficiently commensurate decline in the cost of operation. To offset these costs, NASA attempted to find additional government users of the facility. By 1996, when no additional users were identified to share the facility, NASA decided to divest itself of the facility. In March 1997, NASA notified the United States Congress of the Administration's intention to declare the NASA Crows Landing Flight Facility property as "excess." In the summer of 1997, NASA ceased operations at Crows Landing (Hanaker, pers. Comm., 1998) and has virtually vacated the facility. Most of the property on the base, however, continues to be used for agricultural production. Pursuant to the BRAC Act of 1994, the U.S. Navy continues environmental restoration and remediation activities at Crows Landing.

4.5.1 LOCATION

The Crows Landing study area consists of approximately 2,500 acres, including approximately 1,500 acres within the former NALF Crows Landing and surrounding acreage (Exhibit 4.5-1). The study area is located one mile west of State Route 33 and one mile east of I-5, approximately 80 miles southeast of the San Francisco Bay Area. The Crows Landing study area is bounded by the Delta-Mendota Canal on the west, Bell Road on the east, Fink Road on the south, and Marshall Road on the north.



Source: Stanislaus County, 1998.

Crows Landing Area

EXHIBIT 4.5-1

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

0 1000 2000 4000 FEET

NORTH

EDAW

The study area is located on the Patterson 7.5 Minute Quadrangle, Township 6 South, Range 8 East, Sections 7 and 18 and the Crows Landing 7.5 Minute Quadrangle, Township 6 South, Range 8 East, Sections 7, 8, 9, 17, 18, 19 and 20. This study area consists of 15 parcels. Seven parcels are in active Williamson Act Contracts. The Assessors's Parcel Numbers (APNs), acreage, Williamson Act status and zoning for each parcel is shown in Table 4.5-1.

Table 4.5-1
CROWS LANDING STUDY AREA PARCEL SUMMARY

ASSESSOR'S PARCEL NUMBER (APN)	ACREAGE	WILLIAMSON ACT STATUS	ZONING
027-01-07	38.72	Active	A-2-40
027-01-08	157.60	Active	A-2-40
027-01-13	*424.07		A-2-40
027-01-14	158.80	Active	A-2-40
027-01-15	160.00	Active	A-2-40
027-01-25	153.33	Active	A-2-40
027-03-03	69.50	Active	A-2-40
027-03-04	*908.03		A-2-40
027-03-05	176.90	Active	A-2-40
027-03-12	10.26		A-2-40
027-03-13	17.36		A-2-40
027-03-17	23.68		A-2-40
027-03-22	* 72.81		A-2-40
027-03-23	* 77.26		A-2-40
027-03-25	* 34.06		A-2-40
Total Acreage	2,482.38		
Total Acreage in Active Williamson Act		914.85	

* Federally owned parcels (1,516 acres)

Source: EDAW 1998

4.5.2 CHARACTERISTICS

ACCESS AND LAND USES

Access to the study area is available from Fink Road on the south (which connects the study area with I-5), Bell Road on the east, and Marshall Road on the north (Exhibit 4.5-2, Photo 1). Davis Road also provides access to the western portion of the study area.

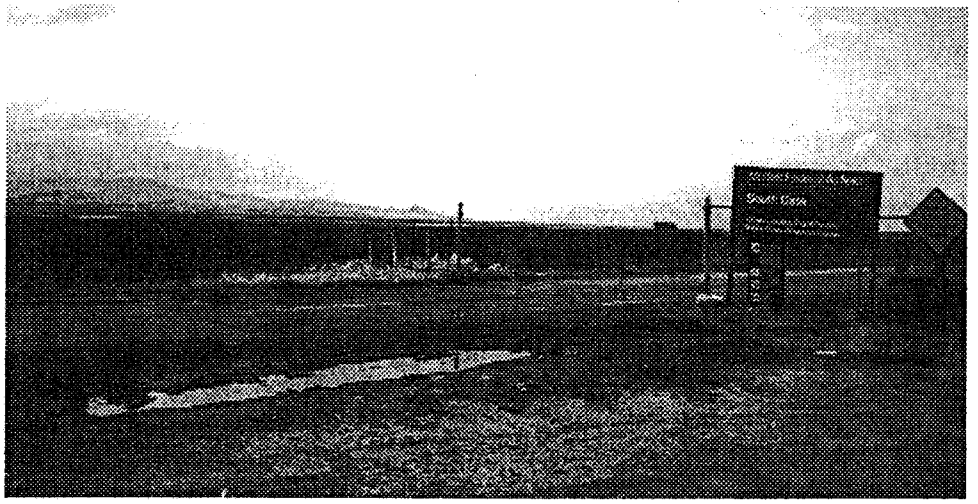
The facility includes an airfield consisting of two concrete runways and related taxiways which roughly form an "X" shape. Facilities located on the east side of the runway include a control tower, administrative offices, maintenance areas, and fire/rescue facilities. The north end of the facility includes a NASA satellite flight research site and test area. The remaining land is outleased to a private tenant for agricultural uses. Support facilities include storage areas, buildings, equipment, and roads (NASA Ames Research Center 1996).

The study area's terrain is flat, providing good visibility from all adjacent roadways (Exhibit 4.5-2, Photo 2). The existing landing field is surrounded by agricultural outleases used for row crops and commercial hay production (Exhibit 4.5-2, Photos 2 and 3). Most development on the base is located along Bell Road. Little Salado Creek crosses the central portion of the study area, flowing from the southwest to the northeast. West of the study area beyond I-5, a range of hills rises to elevations of approximately 1,200 feet.

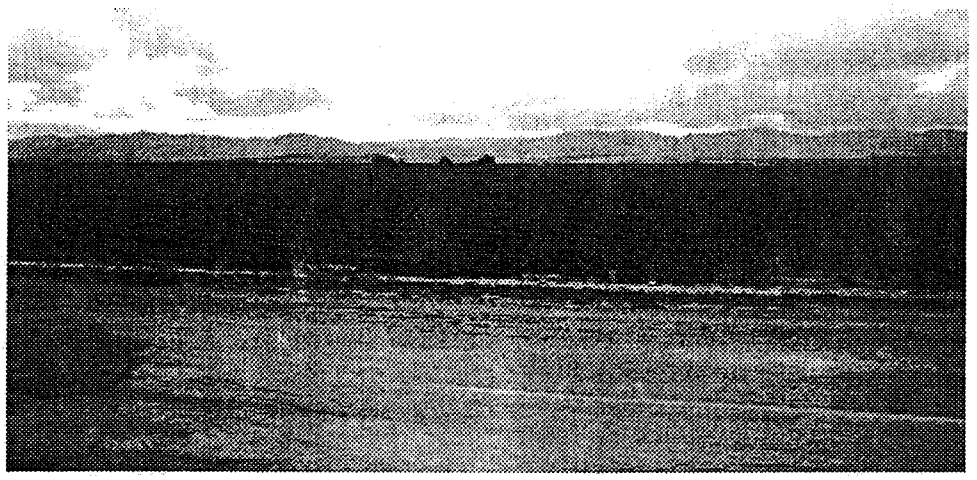
The study area is serviced with water, wastewater, and electricity. Drinking water is supplied by two on-base wells, and water for irrigation is provided by the Delta-Mendota Canal, the California Aqueduct and the San Joaquin River, supplemented by pumped ground water (Tetra Tech 1994). An onsite sewage collection system includes a trunk line, a processing tank for primary settling and a holding pond. Due to the low usage, the system is no longer in working order. New water and wastewater infrastructure would be required prior to reuse (refer to Sections 4.5.5 and 4.5.6). Electrical energy is supplied to NASA Crows Landing via 12-kv PG&E transmission lines. Four 160-volt transformers, located outside the facility, reduce the voltage for distribution. The existing electrical distribution system is maintained by NASA. Production of steam-powered electricity from co-generation facilities could be used to augment existing electricity sources at Crows Landing.

VEGETATION

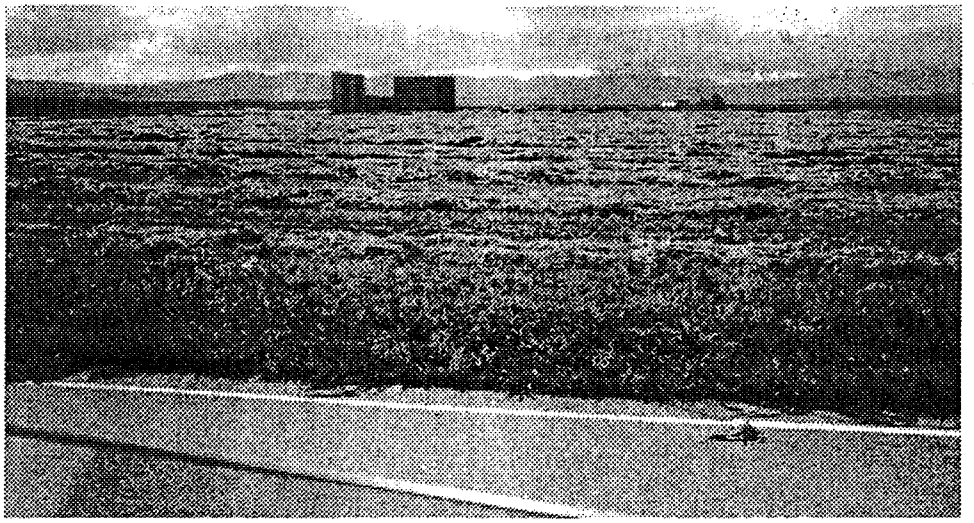
The Crows Landing study area is approximately 2,500 acres, with approximately 1,500 acres of the site consisting of the NASA Crows Landing Flight Facility. The facility includes landing strips, administration buildings, roads, parking lots, landscaping and maintenance areas. The grassland species in this area are primarily perennial ryegrass (*Lolium perenne*), alta fescue (*Festuca megalora*), Kentucky bluegrass (*Poa pratensis*), and Bermuda grass (*Cynodon dactylon*). Groundcover species are English ivy (*Hedera helix*) and shore juniper (*Juniperus* sp.), while shrub and tree species include star acacia (*Acacia verticillata*), Sydney golden wattle (*Acacia longifolia*), elm (*Ulmus* sp.), ash (*Fraxinus* sp.), birch (*Betula* sp.), and buckeye (*Aesculus* sp.). The remaining area is croplands and non-native grasslands with scattered wetland habitats. Irrigated crops are grown on the agricultural lease areas surrounding the NASA Crows Landing Flight Facility infrastructure, including the area surrounding the runway. Crops grown on the site include alfalfa, oat hay, sugar beets, tomatoes, beans, peas, lima beans, spinach, grain crops, and melons.



1. View west of Crows Landing study area from South Gate entrance on Bell Road. The area is primarily used for row crops.



2. View west from Bell Road of NASA Crows Landing Flight Facility. The topography of the project area is flat with unobstructed views of hillsides to the east. Agricultural uses on site include row crops as shown in photo.



3. View southwest from Bell Road towards NASA Crows Landing Flight Facility. The area is primarily used for commercial hay production.

Source: EDAW, Inc., 1998.

Crows Landing Photographs

EXHIBIT 4.5-2

Non-native grassland habitat, as with other grassland within the area, is dominated by non-native grasses and forbs. Some of the grassland areas near the landing field were once maintained but now consist of yellow star thistle and several other weed species. A 14-acre fenced site between the two runways was formerly an ammunition dump but now supports ruderal vegetation.

Wetland habitats found onsite consist of a former sewer pond that has been converted into freshwater marsh, Little Salado Creek, and the Delta-Mendota Irrigation Canal. This habitat is present near the landing field and in open areas within the NASA Crows Landing facility. In 1982, Boy Scouts of America converted an existing sewer pond into freshwater marsh habitat. Several marsh and riparian species were planted including willow (*Salix* sp.), cattails (*Typha* sp.), and blackberries (*Rubus* sp.). Little Salado Creek runs through the western portion of NASA Crows Landing Flight Facility. Most of the original creek which traverses the study area has been channelized and is being used as an agricultural drainage canal, which is cleared annually by the Bureau of Reclamation to maximize flow (U.S. Department of Agriculture 1987).

The Stuhr Road - Newman Area supports mature riparian habitat. This habitat is well developed and represents appropriate nesting and/or foraging habitat for many migratory and resident bird species including spotted towhee (*Pipilo erythropthalmus*), song sparrow(*Melospiza melodia*), black phoebe (*Sayornis nigricans*), yellow warbler (*Dendroica petechia*), Wilson's warbler (*Wilsonia pusilla*), yellow-rumped warbler (*Dendroica coronata*), northern oriole (*Icterus galbula*), and red-winged blackbird (*Agelaius phoeniceus*). Mammals such as Audubon's cottontail (*Sylvilagus auduboni*), raccoon (*Procyon lotor*), opposum (*Didelphis marsupialis*), and striped skunk (*Mephitis mephitis*) are also expected to occur. The most common reptiles and amphibians that occur in riparian habitats include western toad (*Bufo boreas*), Pacific tree frog (*Hyla regilla*), bullfrog (*Rana catesbeiana*), western fence lizard (*Sceloporus occidentalis*), common garter snake (*Thamnophis sirtalis*), and gopher snake (*Pituophis melanoleucus*).

Wildlife species expected to occur in freshwater and seasonal marsh habitats are those typically found in aquatic environments, including Pacific chorus frog (*Pseudacris regilla*), red-winged blackbird, great blue heron (*Ardea herodius*), snowy egret (*Egretta thula*), song sparrow, marsh wren (*Cistothorus palustris*), and lesser goldfinch (*Carduelis psaltria*). Pools and other surface water along the main tributaries to creeks are a likely source of drinking water for many of the birds and mammals during the summer.

4.5.3 LAND USE PLANNING, POLICY, AND REGULATORY CONSIDERATIONS

STANISLAUS COUNTY GENERAL PLAN

As previously stated, the NASA Crows Landing Flight Facility is located on federal property within Stanislaus County. As such, the facility does not have to conform to the Stanislaus County General Plan. If the facility is transferred to the County, it would receive a General Plan land use designation. Lands surrounding the facility are currently designated A-2 (General Agricultural District) Agriculture.

Existing Uses

Land uses occurring on the Crows Landing Flight Facility fall into four categories: airfield operations, support facilities, tenant activities, and agricultural outleases (Tetra Tech 1994). The

airfield consists of two concrete runways in an "X" configuration. Both runways are designed to accommodate single tire aircraft of up to 59,000 pounds wheel loading (Exhibit 4.5-3).

Support facilities include buildings, roads, and storage areas. Agricultural outleases compose 1,200 acres of irrigated cropland on areas surrounding the runway. Surrounding land uses, within Stanislaus County's jurisdiction, include agriculture to the north, south, east and west of the facility. Seven active Williamson Act contract parcels are located adjacent to and west of the study area.

STANISLAUS COUNTY ZONING

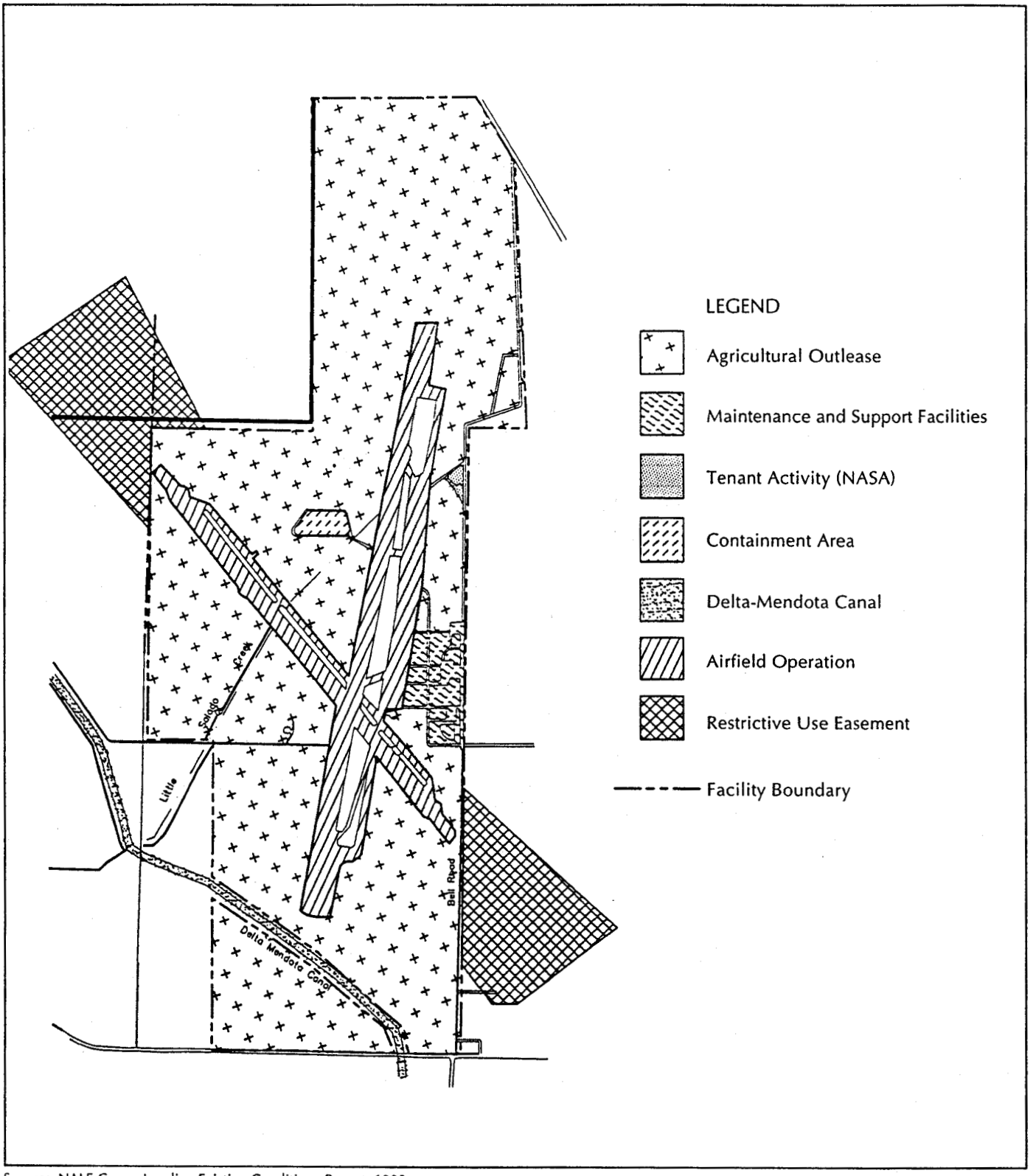
Although the facility is located on federal land not subject to Stanislaus County regulations, county parcel maps reflect A-2 zoning (General Agriculture District) on the parcels included in the study area (Exhibit 4.5-4). The parcels within the study area are all zoned A-2-40 on Stanislaus County Assessor's Parcel maps (refer to Chapter 3, Stanislaus County Zoning for a description of A-2 zoning).

In order to proceed with the type of development envisioned in the proposed development scenario, parcels would have to be re-zoned to P-D. However, before rezoning could occur, findings must be made to demonstrate that the change will not be detrimental to the agricultural productivity of the surrounding property and that the subject property is not considered to be one of the County's Most Productive Agricultural Areas (refer to Conversion of Agricultural Land in Chapter 3).

OTHER PLANS/REGULATIONS THAT APPLY

Airport Land Use Commission (ALUC) - The Stanislaus County ALUC is responsible for formulating land use plans that will provide for the orderly growth of each public airport and area surrounding the airport. The ALUC is concerned primarily with the incompatibility of uses surrounding air fields (Stanislaus County 1987). The ALUC has established planning area boundaries around the NASA Crows Landing Flight Facility and developed land use plans within these boundaries, including recommending compatible land uses and recommending height restrictions and standards for building soundproofing within the planning boundaries (City of Patterson 1992). Development proposals for occurring on the NASA Crows Landing Flight Facility would be subject to review by the ALUC to ensure any proposed uses or changes in land use or zoning are compatible with the airport. Further, the potential for air space conflicts between the Patterson airport and the future uses at the NASA Crows Landing Flight Facility could occur (ALUC 1978). Therefore, cooperation and coordination between the two airports will be necessary to avoid airspace conflicts.

The Federal Aviation Administration (FAA) has specific standards for commercial runway and airport construction and operation. Improvements to the runways, lighting, navigation, and traffic control facilities may be required at the Crows Landing site to make it suitable for use as a commercial air-distribution center. A list of specific FAA-required improvements or their associated costs have not been included in this report.



Source: NALF Crows Landing Existing Conditions Report, 1993.

Existing Land Uses and Easements NALF Crows Landing

EXHIBIT 4.5-3

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

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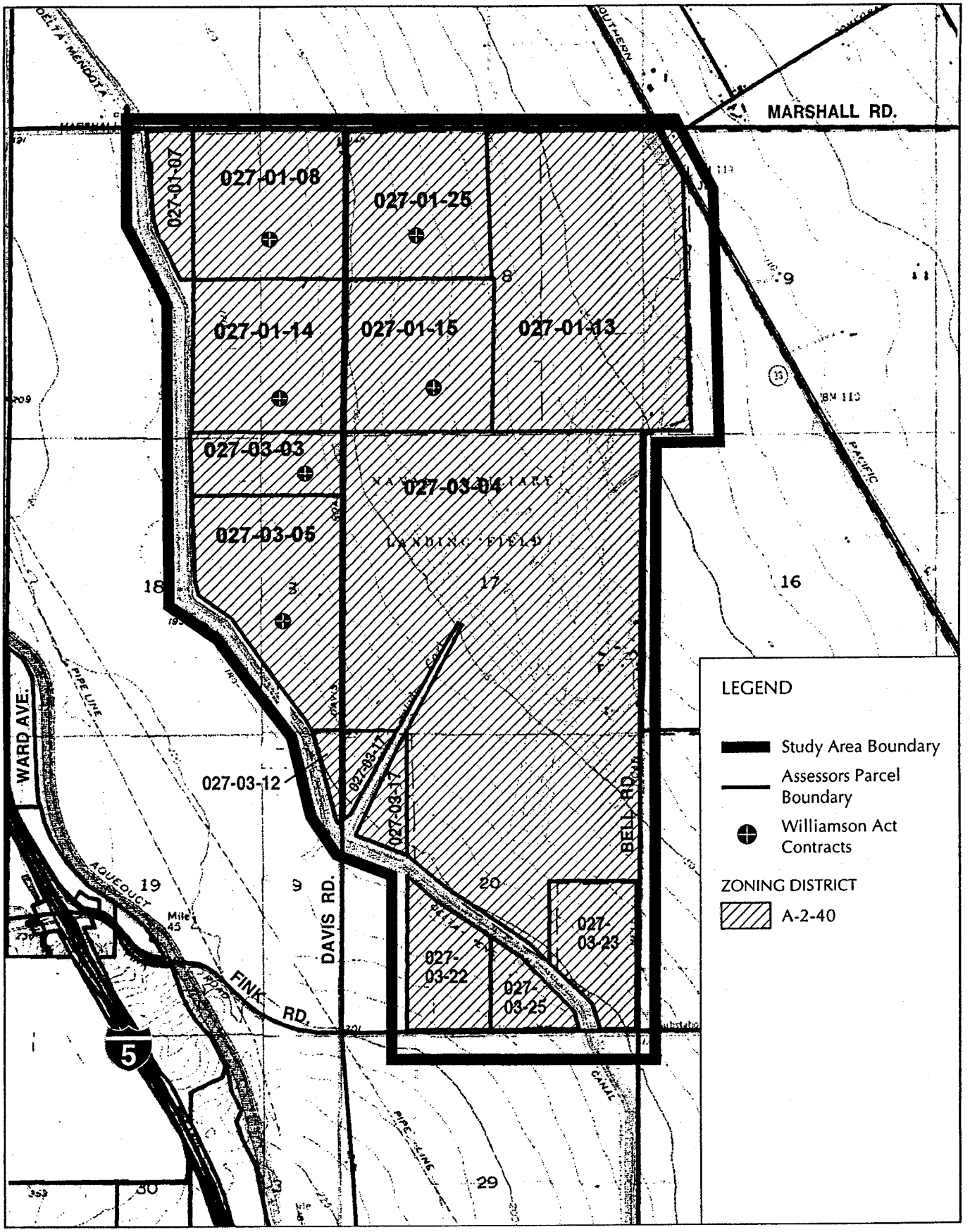


Source: Stanislaus County, 1998.

Crows Landing Zoning Districts

EXHIBIT 4.5-4

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

0 1000 2000 4000 FEET

NORTH

EDAW

4.5.4 INTERCHANGE EVALUATION

Traffic generation and assignment forecasting was prepared by TJKM Transportation Consultants (1998) to identify improvements necessary at the Fink Road interchange to serve the Crows Landing study area (Exhibit 4.5-5). Existing conditions are described under Chapter 3. The following is a description of constraints that are anticipated to occur with implementation of the proposed development scenario.

INTERCHANGE CONSTRAINTS

Traffic generation and assignment forecasting was prepared to identify improvements necessary at the Fink Road interchange to serve the Crows Landing study area. The analysis revealed that development of the entire acreage of the study area would be possible without the need to abandon the existing tight-diamond interchange configuration. However, the volume of traffic projected by the proposed development scenario would overburden the existing interchange and could not be served by STOP sign control. Development would occur to the east of I-5, resulting in conflicts between left-turns and through movements.

Ward Road is aligned adjacent to the northbound on-ramp. No changes in alignment would be necessary to accommodate widening of the northbound on-ramp. The location of Ward Road would allow for a hook ramp or would possibly need to be realigned to allow for a loop ramp. Further to the east, the California Aqueduct limits any realignment of Ward Road. A shallow gully separates Ward Road and the northbound on-ramp. Little Salado Creek is located to the west of the southbound off-ramp. The presence of the Creek generally restricts improvements to the off-ramp, although with retaining structures the embankment could be narrowed or eliminated. Sloping topography to the west of the southbound on-ramp would also require retaining structures to widen the on-ramp. The freeway overcrossing structure does not allow for more than two lanes on Fink Road.

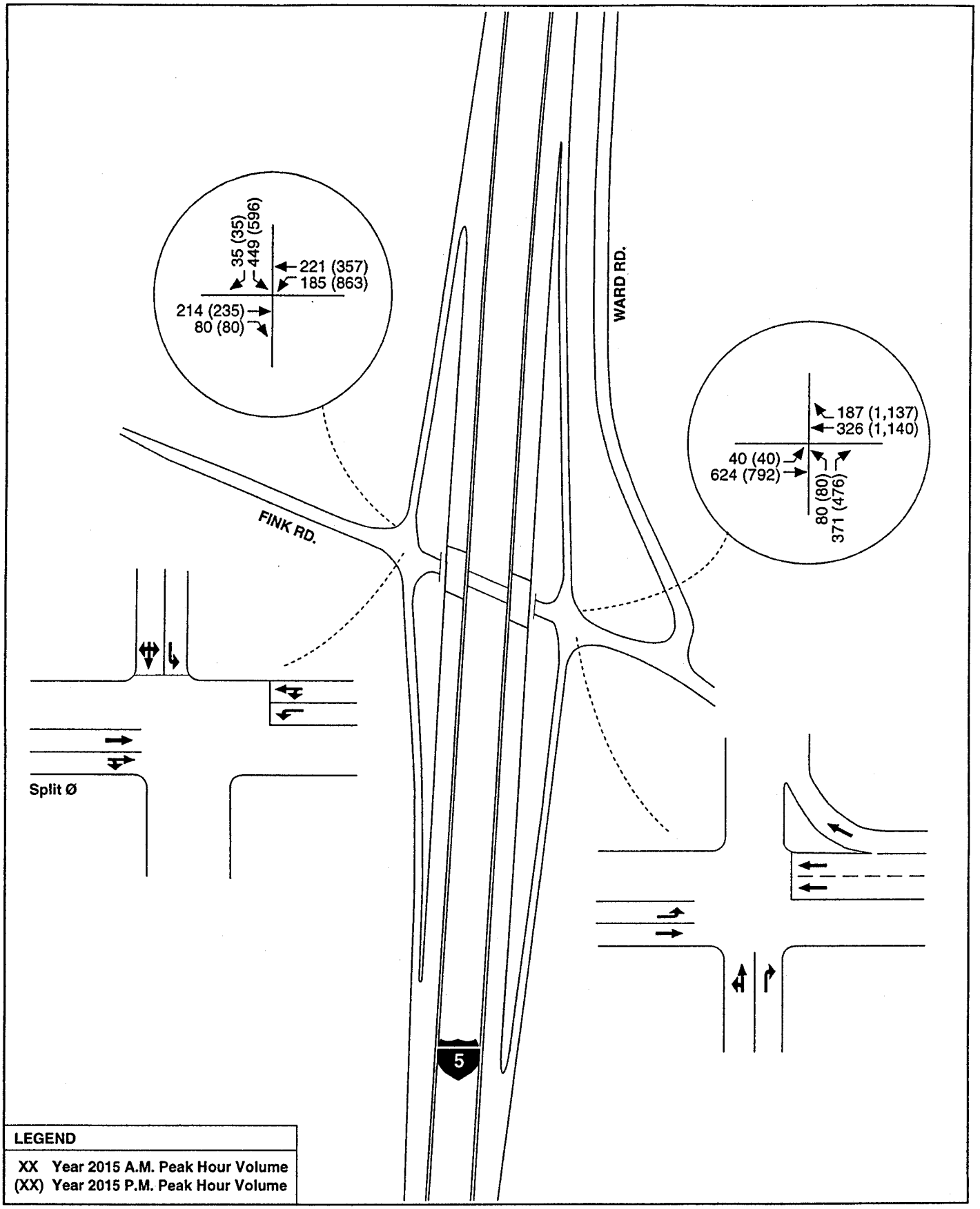
RECOMMENDED IMPROVEMENTS

Southbound Ramps

Full signalization of the southbound ramp intersections is recommended. A second exclusive left-turn lane should be added to the southbound off-ramp. A second through-lane should be added to the eastbound approach on Fink Road. An exclusive left turn lane should be added to the westbound approach and left turns should be permitted from both lanes (split phase). The southbound on-ramp should be widened to allow for two lanes at the intersection that merge to one lane onto the freeway.

Northbound Ramps

Full signalization of the northbound ramp intersections is recommended. An exclusive right-turn lane should be added to the northbound off-ramp and a free right-turn lane should be added to the westbound approach on Fink Road. The eastbound approach should be widened to include a left-turn pocket.



Source: TJKM Transportation, 1998.

Proposed Tight Diamond Intersection Configuration Improvements – Crows Landing

EXHIBIT 4.5-5

Industrial and Combined Development

In this study, traffic generation was calculated and interchange needs evaluated for short-term commercial uses at the Crows Landing site, rather than more extensive industrial development that may be able to occur in the longer term future, if development costs are mitigated (as discussed in the economic evaluation of the site). Given the site's size and typical development density, additional interchange improvements would likely be needed with extensive industrial development. For instance, if a substantial portion of the Crows Landing site developed in industrial uses, it is likely that at the least, a southbound loop exit ramp would be needed at the Fink Road interchange.

If development occurred at the Fink Road Landfill site in addition to development at Crows Landing, at a minimum a partial cloverleaf design would need to be considered to avoid excessive left-turn delays at both off-ramp intersections. Furthermore, both off-ramps would likely require free right-turn lanes. It is not likely that a full cloverleaf design would be required any time before the horizon year.

COSTS

Costs for improvements at the Crows Landing study area would be approximately $7.4 million. This includes expenses for roadway construction/reconstruction retaining structures, freeway structures, signals, right-of-way, and contingencies which should include design work, minimal standard items and other miscellaneous expenses (cost assumptions are provided in Chapter 3. Table 4.5-2 provides a breakdown of the Fink Road/Crows Landing roadway construction costs.

Table 4.5-2
CROWS LANDING ROADWAY CONSTRUCTION COST SUMMARY [1]

	COST PER ACRE [2]	COST PER 1,000 SQ FT	COST PER TRIP	TOTAL COST
Roadway	**$312.00**	**n/a**	**$123.03**	**$780,000**
Pavement	$76.00	n/a	$29.97	$190,000
Signals	$120.00	n/a	$47.32	$300,000
Retaining Walls	$12.00	n/a	$4.73	$30,000
Contingency (50%)	$104.00	n/a	$41.01	$260,000
Structures	**$1,444.00**	**n/a**	**$569.40**	**$3,610,000**
Structures	$1,155.20	n/a	$455.52	$2,888,000
Contingency (25%)	$288.80	n/a	$113.88	$722,000
TOTAL	**$1,756.00**	**n/a**	**$692.43**	**$4,390,000**

[1] *Assumes 6,340 trips*
[2] *Assumes 2,500 acres*

Source: TJKM 1998

4.5.5 WATER SUPPLY

Stanislaus County does not provide public water to the Crows Landing study area; however, several groundwater wells were installed at the facility. Coliform bacteria was discovered in the water system in August 1993. As a result, the Department of Health Services banned the use of the water for human consumption, hand washing, etc. Although NASA inundated the system with chlorine to destroy the bacteria, the system can never be used to supply potable water. Therefore, a new water supply system is necessary.

The water demand for the Crows Landing study area is estimated at 4,200 ac-ft/year, or 3,750,000 gpd. This number equates to an average demand of 5,200 gpm, based on a 12-hour pumping schedule. A water supply system was sized to accommodate this flow with the basic components of a groundwater well, pumping stations, water treatment facility, storage tanks, and conveyance system.

Water storage must account for daily use as well as provide for emergency needs such as fire flow. Because the Crows Landing area is so large, three typical hotels with varying levels and floor areas were used to calculate maximum fire flow. Based on these calculations, with the assumption of a 12-hour operating average daily flow, the Crows Landing area would require three 4 million gallon and one 1 million gallon capacity storage tanks.

The water is then conveyed to the users through a network of distribution pipes. For purposes of this study, it was assumed that one main water supply pipe runs along the longest path of the area (20,000 feet). All developments connecting to the system must provide their own access to the main water line. From these assumptions, hypothetical pumping requirements were calculated and necessary pumps were sized.

Should the County, for whatever reason, be unable to meet the entire demand of 4,200 acre-feet per year from an upgraded on-site groundwater well system, other supply options should be considered. These could include purchase or transfer of water rights from either the California Aqueduct or the Delta Mendota Canal.

COSTS

Table 4.5-3
WATER SYSTEM COMPONENT COSTS

SYSTEM COMPONENTS	COSTS
Groundwater Well	$93,000
Water Treatment System	$2,500,000
Pumping Stations	$36,000
Storage Tanks	$2,780,000
Conveyance System	$4,384,000
Total Costs	**$9,793,000**

Source: SCS Engineers 1998

Table 4.5-3 summarizes the costs for the system components to provide water supply, treatment, storage and conveyance for the Crows Landing study area. Background and assumptions are provided in Chapter 3.

To determine if the system as designed would be capable of handling a low flow situation, the first generation development scenario was applied to the overall system. This resulted in an alternative storage tank configuration which would suit the flows.

The first generation development scenario required one 4 million gallon capacity storage tank. At completion of all three generations of development, three tanks are required. The system could operate with one tank and subsequently be upgraded to accommodate the third development stage.

4.5.6 WASTEWATER TREATMENT AND DISPOSAL

BACKGROUND

Stanislaus County currently does not provide wastewater services to the Crows Landing area. The NASA Crows Landing Flight Facility currently has an on-site sewage collection system composed of a trunk line parallel to Bell Road and a sewer lateral line running westward to Building 40. The main line is a double eight-inch terra cotta tile line. The system was designed to handle up to 750 gallons a day. It drains northward to a processing tank (Imhoff tank) where primary settling occurs, and then to a holding pond at the north end of the facility's property.

In 1996, the Imhoff tank was reported to be only half full and no primary treated effluent was being discharged into the adjacent percolation pond due to insufficient waste flows. Such flows do not lend themselves to efficient and proper operation of the plant, so are not in compliance with the Clean Water Act. In 1996, the facility was found to be in poor condition due to lack of maintenance (Crows Landing Naval Air Landing Field Report, August 1996).

Stanislaus County Department of Environmental Resources has developed new regulations and guidelines on the disposal of wastewater. Those who choose to develop their business in this area are solely responsible for primary and secondary treatment of their wastewater, which must meet the U.S. EPA's Secondary Treatment Guidelines. Because the NASA Crows Landing Flight Facility wastewater treatment system is designed for low flows and only accommodates primary treatment, a new system must be constructed to handle new development in the area.

The wastewater produced in the Crows Landing Area is estimated at 5,870 ac-ft/year, or 5,250,000 gpd. This number equates to 3,640 gpm of wastewater (including infiltration from outside sources) which must be treated. Based on this value, a wastewater treatment system was developed with the basic components of a wastewater treatment and a conveyance system.

COSTS

Table 4.5-4
WASTEWATER SYSTEM COMPONENT COSTS

System Components	Capital Costs
Conveyance System	$12,000,000
Wastewater Treatment System	$13,239,000
Total Costs	**$25,239,000**

Source: SCS Engineers 1998

The costs to construct a wastewater treatment and conveyance system capable of handling the development scenarios through the third generation are shown in Table 4.5-4. Background assumptions and general cost information are provided in Chapter 3.

The costs are summarized in Table 4.5-4.

To determine if the system would be capable of handling a low flow situation, the first generation of development scenarios was applied to the overall system. As preliminarily designed, the conveyance system would be able to maintain constant flow to the treatment system with only first generation flows. Because the system could accommodate a low flow threshold, the system would be able to service the study area through all three stages of development.

4.5.7 SAN JOAQUIN KIT FOX MITIGATION

LOCATION OF SAN JOAQUIN KIT FOX

The Crows Landing study area consists almost entirely of the NASA Crows Landing Flight Facility and cropland (oat hay, row crops, alfalfa). As a result of development and agricultural use, the study area is considered to have minimal value to San Joaquin kit fox; however, they may forage onsite. The nearest sightings of San Joaquin kit fox were recorded in 1949 and 1957, approximately 6 miles southwest of the study area (CNDDB 1998). Although the study area only represents low quality foraging habitat, USFWS has identified aqueducts and canals (Delta-Mendota Canal) as San Joaquin kit fox movement corridors and have stated that kit fox occasionally den on the banks of these structures (S. Larson, pers. comm., 1998). Because the Delta-Mendota Canal traverses the southern portion of the site, USFWS would likely identify all croplands as foraging habitat and the canal as a movement corridor with potential denning sites.

IMPACTS AND PROPOSED MITIGATIONS

Proposed uses on the Crows Landing study area are expected to be aviation, specialized air freight distribution, and specialty recreation. This impact analysis assumes that no new buildings would be constructed and that only upgrades to the existing sewer and water supply would occur. Therefore, no removal of San Joaquin kit fox foraging or denning habitat is expected.

Any recreational activity including gliding, sky diving, and hot air ballooning would likely occur on the existing runway, and all associated activities (training centers, rental shops, and equipment storage facilities) would occur within the existing NASA Crows Landing Flight Facility. Although the facility is not currently in use, activity within the existing infrastructure is not expected to significantly affect San Joaquin kit fox.

Regional and State competitions or events that may be planned at the facility would likely consist of one or two days of extensive human activity in the study area. Because these events are expected to occur only once or twice a year, they are not anticipated to result in significant disturbance or impacts to San Joaquin kit fox.

Full or partial development of an air distribution center at Crows Landing could result in increased noise levels on some adjacent lands. Mitigation measures would need to be developed to offset these impacts. Measures could include restrictions on times of operation, or other noise abatement procedures. Additional parcels may also need to be purchased, if possible, by the County to control clear zones at the approaches to and flight paths from the runways.

4.5.8 ECONOMIC CONSIDERATIONS

The Crows Landing study area has potential primarily because it has a history of "industrial" use and can be planned, developed and marketed by a public entity. Timing for planning, development and marketing for the NASA Crows Landing Flight Facility is currently unknown due in part to uncertainties surrounding potential transfer of the property to Stanislaus County. NASA recently vacated Crows Landing. However, given its existing features (i.e. landing field, existing infrastructure), the facility appears to be capable of development into a viable industrial and commercial property. Formal plans would be formulated based on the terms of its potential transfer from NASA to the County, taking into consideration retaining the air facility for public benefit use. Table 4.5-5 shows the current potential for the Crows Landing study area.

Table 4.5-5
CURRENT POTENTIAL ACREAGE
CROWS LANDING

CROWS LANDING	ACRES	USED ACRES	ACRES REMAINING FOR DEVELOPMENT
Total Site	2,500	-	
Total Available [Short Term]	1,750	-	1,750
Commercial	-	-	-
Industrial	-	-	-
Undesignated*	1,750	-	1,750
Commercial	320	-	320
Industrial	1,430	-	1,750
Total Crows Landing Study Area	1,750	-	1,750
Commercial	N/A	-	N/A
Industrial	N/A	-	N/A

* Acreage and building areas for transfer unknown - developable for special purpose commercial, general purpose commercial and industrial use.

Note: Numbers may not add due to independent rounding.

Source: Williams-Kuebelbeck & Associates, 1998 (based on site inspection, discussion with developer, local brokers, parcel and map analysis).

As shown, 1,750 acres (of the total 2,500) are available for development in the short-term. This acreage is currently undesignated but may be spilt between 320 commercial acres and 1,430 industrial acres.

Table 4.5-6 contains capital costs for improvements at the Crows Landing study area. As shown in the table, capital costs (i.e., interchange, water, wastewater) would be approximately $27,000 per acre. Onsite improvements would cost approximately $40,000 per acre, bringing total onsite and offsite capital costs to $67,000 per acre. In total, breakeven costs per acre within the Crows Landing study area would be approximately $83,000. This equates to a breakeven cost of approximately $1.90 per square foot, based on all three generations of development. Additional costs may be associated with County purchase of "clear zone" parcels adjacent to the runways, and construction of FAA-required improvements to runways, navigation, lighting, or traffic control facilities.

In the existing Stanislaus County market, industrial land sales prices are assumed to range between $.75 and $1.25 per square foot. In contrast, commercial land sales prices range from $3.50 to $4.00 per square foot. Upscale commercial was not applied to the Crows Landing study area because demand for this type of land use would not be appropriate to the types of uses envisioned in the development scenario for the air field. Breakeven costs per square foot for industrial land exceed sales prices in the Crows Landing study area by as much as $1.15 per square foot. However, commercial sales prices are greater than total costs per square foot, although only by $1.60 - $2.10. Therefore, development of commercial uses at the Crows Landing study area is considered economically feasible.

In terms of rating the potential for each type of development at the Crows Landing study area, industrial development was rated as "marginal" while commercial was rated as "good." This would be expected as total costs per square foot were in the range of sales prices for commercial development while costs exceeded sales prices for industrial land.

Although shown as marginal for industrial development, the Crows Landing site should nonetheless continue to be pursued vigorously for longer term potential. The total cost is sufficiently close to market rates that public assistance could reduce costs to make the site's potential industrial development attractive. Also, a smaller first phase could perhaps be developed at lesser cost making some development land available sooner. Development of about 1,500 acres could be considered likely to be available at the site.

The market for Crows Landing is broader and not dependent just on the highway-oriented market; it should share in the general demand for land countywide. (The estimate of 50 acres of annual demand for commercial/industrial land in the I-5 corridor study area over the next 10 years excludes demand for Crows Landing). The reason it is listed as marginal is that other first priority project areas are available at costs closer to industrial land market rates and issues of infrastructure cost need to be addressed at Crows Landing to bring it more in line with the market.

As a specific approach, a detailed special area plan for Crows Landing and a site-specific economic/marketing study should be undertaken as a next step to ultimate utilization of the land, including targeting sources of development funding and investigating marketing approaches. More detailed information about how to most cost-effectively resolve infrastructure constraints is also needed. For instance, current constraints on use of facility for air freight distribution include competition with other air fields (including other closed military bases) and runway load capacity (the runway is rated for planes that are lighter and smaller than air freight carriers' aircraft). However, there is definite potential for general industrial and commercial use of the site, if development and infrastructure cost constraints are mitigated.

Table 4.5-6
CROWS LANDING AREA
TOTAL COSTS VERSUS SALES PRICES [1]

DESCRIPTION	COST
Capital Costs [2]	$16,000
Possible Land Costs ("clear zones")	$3,500/acre for croplands
Capital Carrying Costs [10 Years]	$11,000
On Site Costs [Gross Estimate]	$40,000
Land and Holding Costs [Est.]	-
Subtotal	$70,500
Marketing Overhead and Developer's Profit	-
Efficiency Loss	-
Contingency @ 15%	$16,000
Total Breakeven	$86,500
Breakeven [Per Sq. Ft.]	$2.00 [3]
Industrial Land Sales Prices	$.75 - $1.25
Commercial Land Sales Prices	$3.50 - $4.00
Upscale Commercial Land sales Prices	N/A
Short-Term Potential - Industrial	**Marginal**
Short-Term Potential - Commercial	**Good**
Site Rating for Upscale Commercial	**N/A**

Notes:

- By parcel cost allocation [cost spread], some cost shifts may occur among individual parcels which may make industrial development possible at the Crows Landing study area.
- Numbers may not add due to independent rounding.
- Unknown costs are associated with possible FAA-required improvements for commercial air-freight distribution center use.
- Extra and, possibly, substantial costs could occur with other water supply options.

[1] Rounded to the nearest $1,000/acre
[2] Based on costs for interchange improvements from TJKM Transportation Consultants, and water and wastewater system costs from SCS Engineers.
[3] Rounded to the nearest 10 cents

Source: Williams-Kuebelbeck & Associates 1998.

It appears that short-term commercial recreation uses, such as hot air ballooning and skydiving, may be appropriate. These types of uses have been found to be compatible with industrial development and agricultural development, and they could take advantage of the existing air field. For the longer term, the county should consider aggressive pursuit of economic development funding and federal funding, especially for infrastructure investment at Crows Landing to help reduce the overall development costs. Some form of external grant funding would assist in bridging the gap between market prices and development costs.

4.5.9 OTHER FACTORS/CONSIDERATIONS

As described in the History/Background section above, it is apparent that NASA will be divesting itself of the Crows Landing Flight Facility due to its decreased operations at the facility. Stanislaus County's interest in the NASA Crows Landing Flight Facility is well documented. In 1991, the County had an *Air Cargo Airport Feasibility Study* prepared (Kreines & Kreines) to investigate the potential for an air cargo airport on the NASA Crows Landing Flight Facility. The report examined the reuse of the facility for air shipment of agricultural products to international markets and the possibility of locating Just-In-Time (JIT) high tech processing facilities adjacent to the airport.

Stanislaus County became aware of NASA's intentions to dispose of the facility. On April 3, 1996, the County submitted a formal letter of interest to NASA regarding the potential transfer of the facility to its jurisdiction. It is assumed in this report that the base has been transferred to the County (based on continuous progress and imminent transfer of the base). Based on conversations with NASA, GSA and the County, disposal of the Crows Landing Flight Facility may occur in one of two possible ways: by special legislation or through the General Services Administration (GSA). Each of these avenues is described in detail below.

In anticipation of its eventual transfer, NASA, in cooperation with the Navy, conducted the environmental baseline survey (EBS) process at the NASA Crows Landing Flight Facility to assess environmental concerns and summarize current conditions. Through the EBS process, NASA will determine which parcels of real property may be transferred as clean, in accordance with Section 120(h) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Tetra Tech 1998).

Several sites were identified in the EBS as potential hazardous waste disposal or spill locations. According to a *Draft Environmental Baseline Survey* (Tetra Tech 1998), several areas, referred to as Installation Restoration Program (IRP) sites, are identified as potentially containing hazardous materials:

IRP Site 10, Rubble Disposal Area - Parcel 12
IRP Site 11, Disposal Pits Area - Parcel 13
IRP Site 12, Auto Maintenance Shop Area - Parcel 9
IRP Site 13, TACAN Transformer Oil Spill Area - Parcel 15
IRP Site 14, Fire Training Area - Parcel 11
IRP Site 16, Pesticide Rinse Area - Parcel 10
IRP Site 17, Demolished Hangars Area - Parcel 7
IRP Site 18, Firing Range Area - Parcel 14

Prior to the EBS, NASA prepared an Environmental Assessment in accordance with the National Environmental Policy Act (NEPA) (NASA Ames Research Center 1996). A Baseline Environmental Report was also prepared by the Navy in 1994 in compliance with NEPA as part of the transfer of the property to NASA (Tetra Tech 1994).

TRANSFER VIA SPECIAL LEGISLATION

Special legislation (U.S House of Representatives 112) has been introduced to Congress in a bill to provide for the conveyance of the facility to Stanislaus County. The bill directs NASA to convey the Crows Landing Flight Facility to Stanislaus County. Other provisions of the bill include prohibiting conveyance from relieving the Federal agencies of environmental remediation responsibilities (i.e., the Navy), retaining NASA's right to use the property for aviation activities without consideration and on mutually acceptable terms with Stanislaus County, and requiring NASA to relinquish legislative jurisdiction over the conveyed property to California.

The bill has been introduced twice and passed the House of Representatives. As of November 1997, the bill had not passed the Senate. As of February 1999, the bill is before the House for a third time. According to the County, this method of transfer is still being pursued (Freitas, pers. comm., 1998).

TRANSFER VIA GENERAL SERVICES ADMINISTRATION

As previously stated, NASA has determined the Crows Landing Flight Facility to be "excess" due to decreasing use of the facility and continued operational costs. Based on NASA's determination that the facility is "excess" to their needs, the property would be "reported" (i.e. turned over) to the General Services Administration(GSA). However, any residual hazardous materials would have to be fully remediated to the satisfaction of responsible agencies (e.g. the Regional Water Quality Control Board, Department of Toxic Substances, etc.) prior to reporting the property to GSA. NASA has indicated that it is preparing to report approximately 60 - 75% of the property to GSA (Staab, pers. comm., 1998). The remainder would be transferred to the subsequent property owner following completion of remediation activities.

Once reported, GSA serves as NASA's real estate broker to dispose of the property. Before offering the property to public entities, GSA goes through a screening process whereby Federal agencies are given first priority to bid for the property. If no Federal agency wants the property, it is declared "surplus" and notices for public benefit use are sent to public agencies to acquire the property.

The presence of the landing field at the NASA Crows Landing Flight Facility lends itself to a special public benefit use as an airport. The Federal government makes surplus property available at no cost if a public agency wants to use it for a public benefit use. Based on conversations with NASA, GSA and Stanislaus County, it appears that NASA Crows Landing could potentially be transferred to Stanislaus County at no cost. However, this would be contingent upon NASA's intentions to use the property in some capacity. Therefore, there are three potential paths for disposal of the airfield via the GSA process:

1) Some Control and ownership by NASA after transfer - Section 47125 of Airport Development Chapter 471

If NASA decided to retain some control and ownership of the airfield, then 49 U.S.C., Section 47125 would apply. Under this section, the Secretary of Transportation would have primary control over the disposition of the property.

2) Transfer by NASA for use as an airport - Section 47151 of Airport Development Chapter 471

If NASA declared the property as excess, and it is subsequently declared surplus and the property is transferred to a public agency for use as an airport, then 40 U.S.C., Section 47151 would apply. Under this provision, the Secretary of Transportation would make the determination whether the property was desirable and necessary for use as an airport. The GSA Administrator would have to approve the gift and make a determination on the suitability of the property for industrial use. Following the transfer, the Secretary of Transportation is responsible for ensuring compliance with the transfer instrument.

3) Property not transferred to a public agency for airport use - Federal Property Administrative Services Act of 1949

If NASA declared the property surplus, but it was not transferred to a public agency for airport use, then the general provisions of the 1949 Act would apply. The process in the 1949 Act would begin with Federal screening, followed by the notice of availability to all public agencies, with no stated preference for adjacent communities. All proposals for public benefit use would be reviewed by GSA and the appropriate Federal agency that has jurisdiction over a particular use.

The Public Law and formal policies of the FAA, recodified in 1994, establishes two procedures under which NASA Crows Landing could continue as a public airport. One process is the lease or joint use of the property by the federal government and an approved local operator, and the other would surplus the property through the provisions of the Federal Property and Administrative Services Act of 1949. The Legislative History accompanying the recodification states that the purpose of Congress was not to make substantive changes to the law. If the Secretary of Transportation determines that the property is suitable, essential or for a public airport, the FAA still considers airport use the priority use for the property. Through the public benefit conveyances, airport use would receive high consideration.

ENVIRONMENTAL REVIEW FOR PROPERTY TRANSFER

Under the regulations of the National Environmental Policy Act (NEPA), the GSA is required to conduct an environmental assessment (EA) before it implements a "major federal action," including sale of surplus federal land. If the EA concludes that the sale or transfer would "significantly affect the quality of the human environment," an Environmental Impact Statement (EIS) would be required.

An additional EA may be required for the recipient unless the GSA's earlier environmental review adequately analyzed the impacts of the proposed use. If the land is sold to a California agency, the proposed reuse of the land would be subject to the California Environmental Quality Act (CEQA), which applies to all governmental agencies at all levels in California. CEQA applies generally to *"discretionary projects proposed to be carried out or approved by public agencies...'*

CEQA requires that an Environmental Impact Report (EIR) be prepared whenever the "approval" of a proposed "project" may cause "significant effects on the environment."

Where a Federal agency, such as the GSA, has analyzed a project before the CEQA lead agency has done so, the CEQA agency could, under appropriate circumstances, rely on the previously prepared NEPA environmental documentation rather than preparing separate CEQA documents. However, to do so, the NEPA documents must have adequately analyzed the impacts of the proposed action, and notice of the intent to rely on NEPA documents must be published and subjected to public review.

COMBINED DEVELOPMENT AT FINK ROAD AND CROWS LANDING

If both the Fink Road and Crows Landing experienced development, it is possible that additional improvements would be needed to the Fink Road interchange (as discussed in the traffic analysis). Therefore, the cost of infrastructure improvements could increase over the improvements identified independently for each site. The two sites are not close enough to expect that it would be advantageous to combine water or wastewater systems, therefore, the independently described water and wastewater systems needed for each site would remain the same if both sites developed.

5 FINK ROAD MITIGATION BANK STUDY AREA

This section discusses existing conditions of the Fink Road Area properties and the general costs and feasibility of setting up a mitigation bank on those properties.

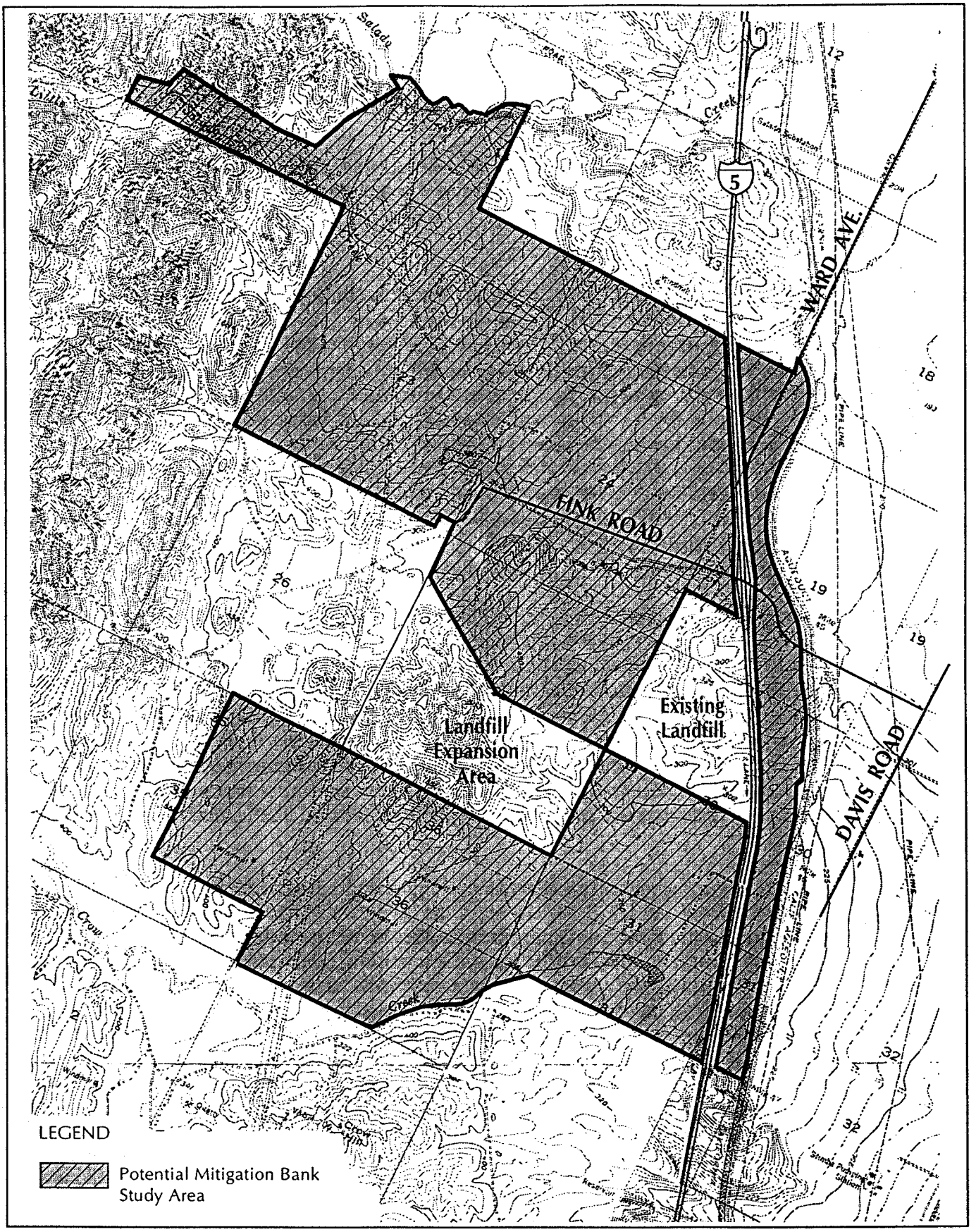
5.1 SETTING

The Fink Road Mitigation Bank Area includes two non-contiguous parcels consisting of approximately 3,871 acres (Exhibit 5-1). The site is bounded by Solada Creek on the north Crow Creek on the south, and extends east of I-5 both north and south of the intersection of Fink Road and I-5. The Fink Road Landfill and the proposed landfill expansion site are located between the two parcels. Much of the proposed mitigation area is cultivated and includes extensive almond, walnut, and citrus orchards, row crops, and minimal dryland farming (approximately 2,504 acres). A large portion of the area has been designated by the Natural Resource Conservation Service (NRCS) as prime agricultural land (Exhibit 5-2). The remaining acreage of the site supports plant communities that are characteristic of the northern San Joaquin Valley and foothills. These include annual and ruderal grassland, riparian, seasonal wetland and freshwater marsh. A small patch of sage scrub and sandy outcrop habitat are present in the northern portion of the site. A map of onsite vegetation communities is provided as Exhibit 5-3.

Non-native grassland (approximately 1,328 acres) is the most prevalent onsite plant community. It is heavily grazed by cattle, and thus the residual cover is sparse and noxious weeds are abundant. Characteristic plants include exotic and naturalized annual grasses such as wild oats (*Avena* sp.), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), Italian ryegrass (*Lolium multiflorum*), and foxtail (*Alopecurus* sp.). Common weed species include tarweed (*Hemizonia* sp.), yellow star thistle (*Centaurea solstialis*), and turkey mullein (*Eremocarpus setigerus*). In many areas the non-native grassland has been disced and invaded by mostly forbs, such as weeds, wild radish (*Raphanus sativus*), mustard (*Brassica* sp.), Russian-thistle (*Salsola tragus*), curly dock (*Rumex crispus*), storksbill (*Erodium botrys*), and common sunflower (*Helianthus* sp.).

Riparian (approximately 23 acres) vegetation occurs along Salado Creek, Little Salado Creek, and Crow Creek, which traverse the site. Riparian vegetation along these creeks share many common plant species, but generally differ in species prevalence. Dominant plant species found in the area include sandbar willow (*Salix sessilifolia*), yellow willow (*Salix lutea*), Goodding's black willow (*Salix gooddingii*), elderberry (*Sambucus mexicana*), tree tobacco (*Nicotiana glauca*), and Fremont's cottonwood (*Populus fremontii*). Freshwater marsh vegetation is also present along portions of these creeks and consists of common cattail (*Typha latifolia*), umbrella sedge (*Cyperus* sp.), Bermuda grass (*Cynodon dactylon*), curly dock, and rabbitsfoot grass (*Polypogon monspeliensis*). Freshwater marsh vegetation is also present in man-made irrigation channels and sumps that dissect the cultivated land (approximately 6.9 acres).

Three *seasonal wetlands* (approximately 6 acres) are present on the proposed mitigation bank site. Two are located near the farm buildings in the southern portion of the site. These wetlands receive rainwater runoff from the surrounding hills in winter and excess irrigation water which is pumped from adjacent fields in summer and fall. The third seasonal wetland is located in the central portion of the site near the western boundary.



Data Source: Stanislaus County, 1998.

Fink Road Mitigation Bank Study Area

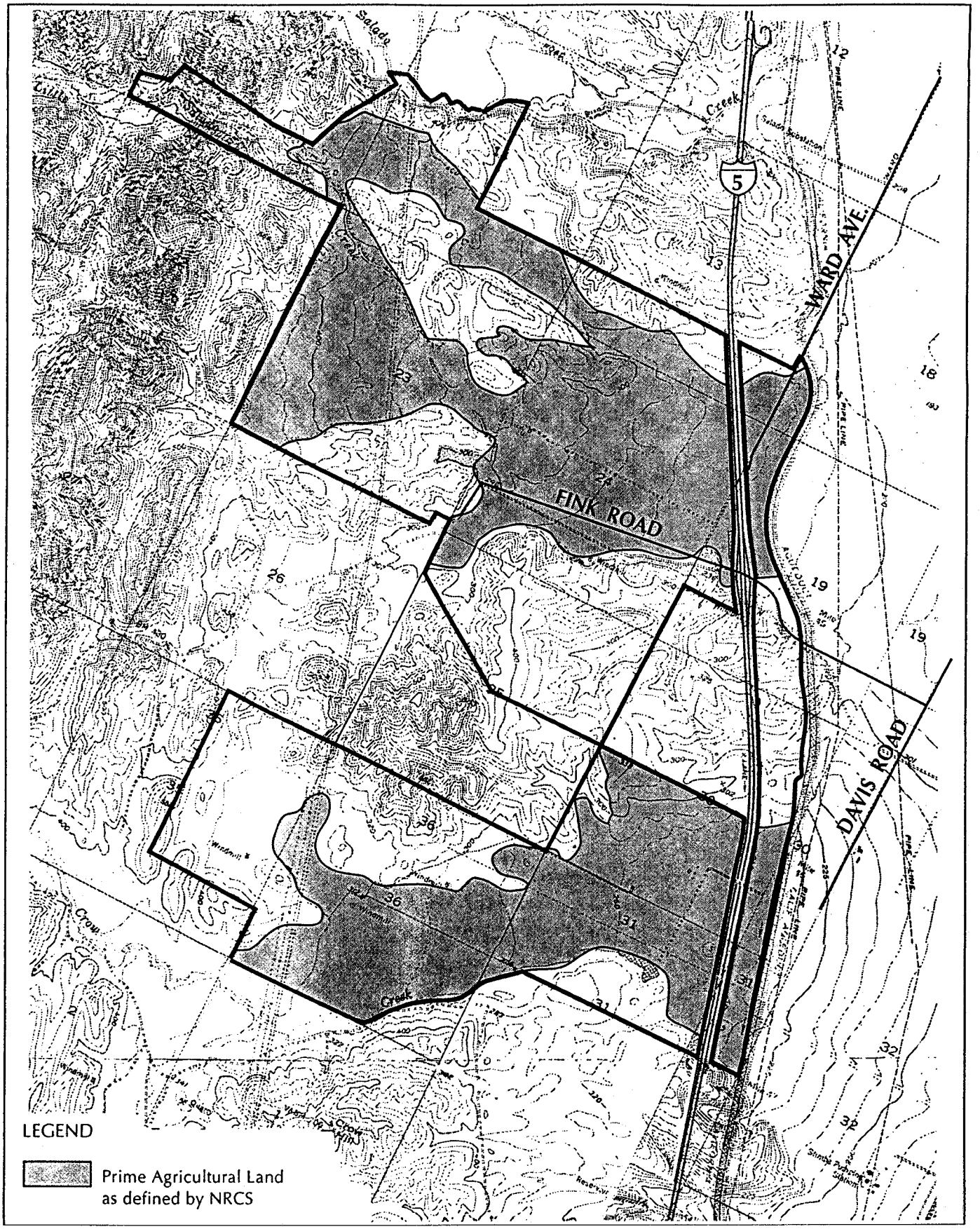
EXHIBIT 5-1

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

0 1000 2000 4000 FEET

NORTH

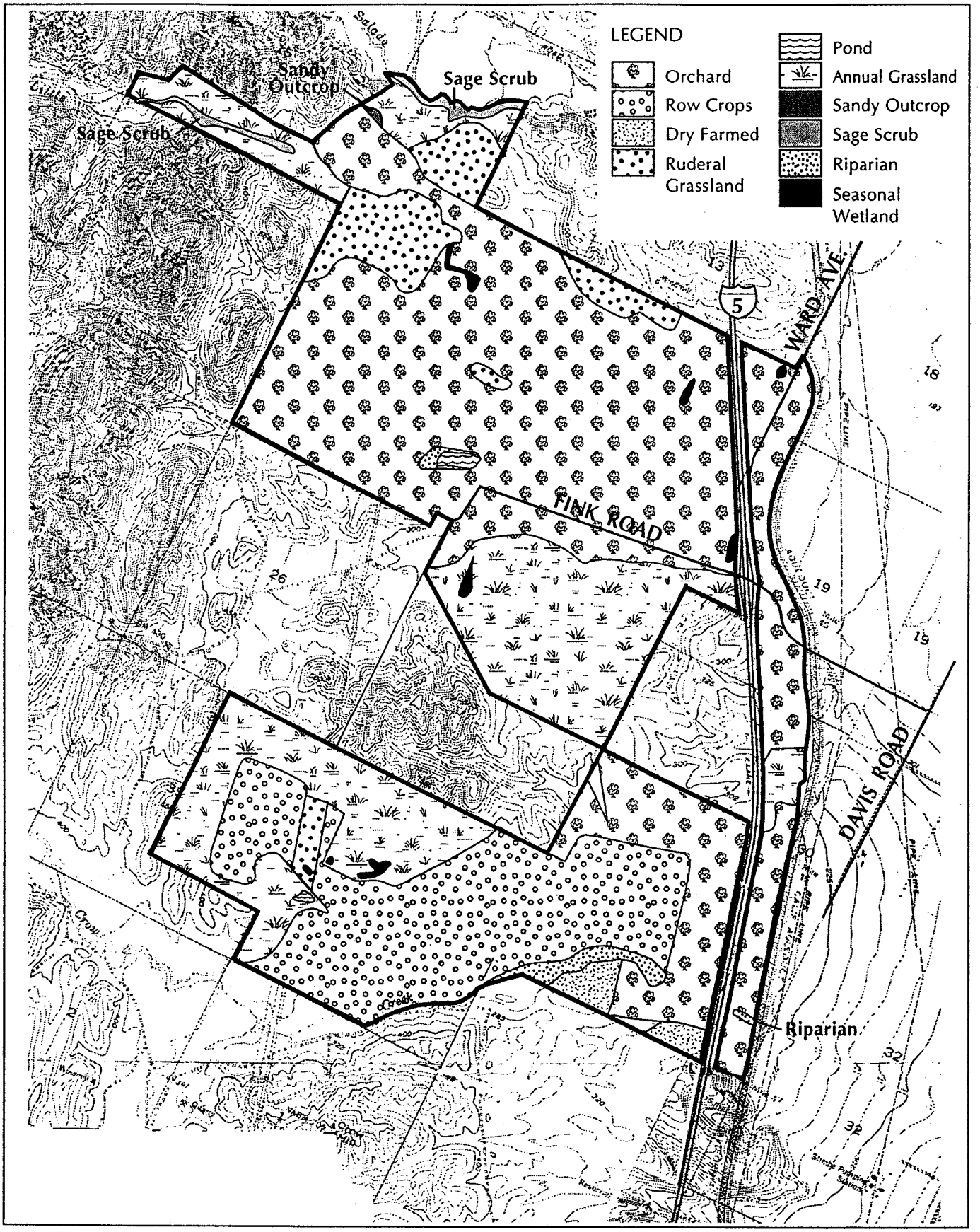
EDAW



Base Map Sources: Orestimba Creek, Patterson, Crows Landing, and Newman U.S.G.S Topographic Quadrangle Maps.

Location of Prime Agricultural Land on the Fink Road Mitigation Bank Study Area

EXHIBIT 5-2



Data Source: WESCO, 1990; Base Map Sources: Orestimba Creek, Patterson, Crows Landing, and Newman U.S.G.S Topographic Quadrangle Maps.

Vegetation on the Fink Road Mitigation Bank Study Area

EXHIBIT 5-3

I-5 Corridor Industrial/Business Park Feasibility Study
JN 8T101.01 7/98

0 1000 2000 4000 FEET

NORTH

EDAW

These areas are dominated by Bermuda grass, common cattail, Mediterranean barley (*Hordeum murinum*), rabbitsfoot grass, umbrella sedge, curly dock, and trefoil (*Lotus* sp.).

Two small patches of *sage scrub* (approximately 0.8 acre) are present in the northern portion of the site along the north-facing slope above Salado Creek and a deep gully within Little Salado Creek. These areas are characterized by widely-spaced shrubs within a non-native grassland understory. The sage scrub community is dominated by California sagebrush (*Artemisia californica*).

A *sandy outcrop* (approximately 1 acre) is present in the northern portion of the site and is covered by sparse vegetation. Dominant species include bunchgrass (*Stipa* sp.), buckwheat (*Fagopyrum esculentum*), tarweed, and telegraph weed (*Heterotheca grandiflora*).

Known Occurrences of San Joaquin Kit Fox within the Proposed Mitigation Area

San Joaquin Kit fox surveys were completed on the Fink Road Area for the Lakeborough Specific Plan Area in 1989 (WESCO 1990). During these surveys, a San Joaquin kit fox was observed in a walnut orchard in the northern portion of the site (April 11). A potentially active den was also identified along Little Salado Creek in the northwestern arm of the site. During subsequent site visits (January 24-26, 1990) possible kit fox scat was identified in the vicinity of Little Salado Creek and Crows Creek (west of I-5).

5.2 GENERAL COST ANALYSIS AND FEASIBILITY FOR A MITIGATION BANK

Given the current position of CDFG and USFWS regarding development west of I-5 in Stanislaus County, the regional approach for mitigating impacts to San Joaquin kit fox is preferred. This regional planning approach will reduce lengthy project-by-project regulatory permit processes and reduce significant costs for landowners seeking project approvals.

A mitigation bank consists of a single parcel, or a series of contiguous or non-contiguous parcels, of habitat that is managed for its natural resource values. The resource benefits derived from this management regime are sold as "credits" to project proponents who seek mitigation opportunities to compensate for resource impacts elsewhere. Credits may be generated to meet any number of resource conservation needs; however, the Fink Road Area Bank would be established to mitigate impacts to San Joaquin kit fox. Additional species that could also be benefitted include Swainson's hawk (*Buteo swainsonii*), tricolored blackbird (*Agelaius tricolor*), ferruginous hawk (*Buteo regalis*), prairie falcon (*Falco mexicanus*), northern harrier (*Circus cyaneus*), and sharp-shinned hawk (*Accipiter striatus*). The San Joaquin pocket mouse could occur within the bank habitat; however, intensive live trapping studies would be necessary to determine the presence of this species (WESCO 1990). Once a mitigation bank is established, mitigation compliance can be reduced to a single transaction.

The Nature Conservancy recently purchased approximately 95 square miles in the vicinity of the Stuhr Road interchange, and plans to manage most of these lands as conservation areas. Initiating mitigation banking programs near either the Fink Road or Stuhr Road interchanges may provide an opportunity for contiguous habitat preservation and mitigation credit acquisition for other developments along the Interstate 5 corridor.

COSTS ANALYSIS

The following section presents estimates of the cost of a mitigation bank, and presents an overview of the components of the proposed fee for purchase of one acre of mitigation credit within the mitigation bank. The costs of setting up a mitigation bank can be broken down into the following categories: start-up costs, land acquisition costs, habitat creation/enhancement/ restoration costs, long-term monitoring, and long-term land management and maintenance. Estimates and descriptions of these costs are described below. Table 5-1 provides a preliminary estimate of fee components.

Table 5-1
PRELIMINARY ESTIMATE OF FEE COMPONENTS
FINK ROAD AREA MITIGATION BANK

ITEM	FEES ARE BASED ON PER ACRE COST FOR 3,871 ACRES	
	FEE PER ACRE	TOTAL
Start-up costs	$39	$150,000
Land acquisition	$3,659	$14,163,500
Habitat creation/restoration Native grassland creation (2,505 acres) Initial restoration fee (1,328 acres)	$323	$1,252,500 $132,800
Long-term management and Maintenance Enhancement Permanent Endowment	$150 -- --	$5,806,50 $1,354,850
Total	**$4,171**	**$17,634,300**

Start-up Costs

There are several steps required to establish a mitigation bank. The first step, and one of the most important, is to include agency staff in the planning and review process. This will increase the probability of success of the bank and reduce delays from agency comment. The planning and review process is initiated by submittal of a *Prospectus* to the regulating agencies. The intent of this document is to provide practical comments to the Bank Sponsor (Stanislaus County) regarding the general need for technical feasibility of the proposed bank. Therefore, it is to the benefit of the County to include sufficient information in the *Prospectus* concerning the objectives of the bank and how it will be established and operated, to allow the agencies to provide appropriate feedback. Information provided in this document will serve as the basis for establishing the *Mitigation Banking Instrument.*

All mitigation banks must develop a formal, written agreement that includes all involved parties as signatories. The purpose of the agreement is to establish clear guidelines for bank use and

define required, permitted and prohibited actions, and obligations for each participating entity. The banking instrument includes a complete description of the following items:

- Bank goals and objectives
- Ownership of bank lands
- Bank size and resources proposed for inclusion in the bank
- Description of baseline conditions
- Geographic service area
- Biological resource impacts suitable for compensation
- Methods for determining credits
- Accounting procedures
- Performance standards for determination of credit availability and bank success
- Reporting protocols and monitoring plans
- Contingency and remedial actions and responsibilities
- Financial assurances
- Compensation ratios and provisions for long-term management and maintenance

The terms and conditions of the banking instrument are subject to agreement by all signatories. Collectively the signatory agencies of the banking instrument will comprise the Mitigation Bank Review Team (MBRT). The primary role of this team is to facilitate the establishment of the mitigation bank through the development of the mitigation bank instrument. The MBRT and County would be responsible for preparation of the banking instrument.

Because it is difficult to estimate the number of agency meetings and the time required to reach consensus with USFWS and CDFG on the banking instrument, a range of costs is provided for this task. Start-up costs are estimated to be between $100,000 and $150,000.

Land Acquisition Costs

Land acquisition costs include the direct cost of the land, transaction costs associated with purchasing the land, preparation of an appraisal, buying title insurance, paying escrow, title fees, and other closing costs. The cost per acre of land in Stanislaus County west of I-5 varies, depending on current land use. Based on recent land sales within the vicinity of the proposed mitigation area, costs for non-native grassland are approximately $1,000 per acre, croplands are $3,500 per acre, and orchards are approximately $5,500 per acre, depending on the maturity of the trees (J. Kuebelbeck, pers. comm., 1998). Transaction costs are estimated at $100/acre. It is assumed that all other habitats (e.g., sage scrub, sandy outcrop riparian, seasonal wetland, and man-made irrigation) would be approximately $1,000 per acre. Therefore the cost for purchase of 1,328 acres of grassland ($1,328,000), 490 acres of cropland ($1,715,000) and 2,015 acres of orchard ($11,082,500), and 38 acres of "other habitats" ($38,000), is estimated to be $14,163,500. Kit fox land acquisition costs could be substantially reduced by focusing purchases on the less expensive annual grassland properties and not on high-cost orchard or row-crop lands.

Habitat Creation/Restoration Costs

Although project development within orchards and cropland would likely require mitigation, USFWS has stated that if a mitigation bank was developed, credit for San Joaquin kit fox mitigation would not be given for orchards and cropland at the mitigation site (S. Larson, pers.

comm., 1998). Therefore, approximately 2,015 acres of orchards and 490 acres of cropland within the mitigation area would be converted to native grassland habitat, which would provide additional San Joaquin kit fox habitat. Because these habitats are in active agricultural use and weed control measures have been implemented, site preparation and weed control would be limited. Prior to planting in the orchards, all orchard trees, including stumps and root balls, would be removed and mulched. Following tree removal, and as the first step for conversion of cropland, the area would be disced or tilled in the spring (March-April) and planted with native grass seed in the late fall/winter. This planting schedule would maximize the plants' first year of growth prior to summer dormancy. Native grass seed would be obtained from a local native species nursery. A detailed description of creation and restoration activities would be included in the banking instrument and mitigation bank management plan.

The existing non-native and ruderal grassland would be enhanced by implementing an exotic species control program. This would include removal of non-native weedy vegetation (e.g., yellow star thistle, Russian thistle) from the grassland, which would increase its value as San Joaquin kit fox habitat. Only one parcel (parcel #27-17-15) within the mitigation bank area is farmed under the Williamson Act. This parcel, which consists of approximately 123.6 acres of both orchards and croplands, would be required to remain in agricultural use. However, conversion of the parcel to non-native grassland with cattle grazing would still be considered agricultural use and would represent habitat for the San Joaquin kit fox (Ford, pers. comm., 1998).

Costs for creation of native grassland would include preparation of a mitigation design and planting plan, materials cost including heavy equipment, seeds, and irrigation supplies, and the staff to complete and implement the plan. Depending on the seed mix that is used and the success rate, cost can range from $44 per acre to $2,654 per acre (Stromberg, *et. al,* 1996). Because the proposed restoration sites are actively farmed and site preparation would likely be limited, non-native grassland creation is estimated to be $50 per acre. Enhancement of the existing non-native grassland would require an initial fee up-front for removal of exotic species and a long-term maintenance fee for continued removal to maintain higher quality grassland. The initial fee for removal of exotics from approximately 1,328 acres of non-native grassland is approximately $100 per acre and includes staffing and equipment costs. The total cost for completion of creation and enhancement of the site is approximately $1,385,300. Kit fox habitat restoration/creation costs could be substantially reduced by focusing purchases on the less expensive annual grassland properties and not on high cost orchard or row-crop lands. Long-term maintenance costs for continued removal of exotic species would be included in the long-term maintenance endowment discussed below.

Long-term Monitoring

The general goal of long-term maintenance and monitoring is to ensure long-term sustainability of created and existing habitats within the mitigation bank. Success criteria would be established and included in the banking instrument that defines the conditions that must be met before the mitigation is deemed successful and credits can be conveyed. This could include criteria as simple as assurances that existing non-native grassland will be preserved, to highly complex criteria that are established to determine the success of native grassland creation and enhancement. Whatever the criteria, monitoring and annual reporting to USFWS and CDFG would be required.

Monitoring activities would likely occur on an annual basis following the first year of conversion of the orchards and cropland to native grassland. Transects, vegetation plots, and/or photo documentation may be conducted in the field to determine the success of vegetative cover. Reports that assess attainment of the yearly target criteria and the progress toward achieving success criteria will be prepared following monitoring. Creation and restoration monitoring will likely occur for a total of 5 years, with a final report submitted to the agencies at the end of this period.

Ongoing monitoring for the life of the bank would be required to monitor the condition, management, and finances of the bank. Reports for these long-term monitoring activities would likely occur on an annual basis. Funding for monitoring and preparation of annual reports is provided by the long-term management endowment discussed below.

Land Management and Long-term Maintenance

There are several options that may be taken for accomplishing land management and long-term maintenance. The County may choose to focus on the creation of the bank, completion of the creation and restoration activities, and sale of credits, and delegate the long-term management of the bank to a public agency or non-profit entity (e.g., USFWS, CDFG, Center for Natural Lands Management (CNLM)). The delegation of long-term management can be accompanied by an endowment that will provide sufficient income (e.g. sufficient to provide a 6% per annum return) to manage the conserved habitat. Alternatively, the management of the bank may be assumed as a public responsibility and funded by taxes, assessments, or other public sources.

For the purposes of this analysis, it is assumed that Stanislaus County will create the bank and complete all creation and restoration activities, and long-term management will be delegated to a non-profit organization, accompanied by an endowment funded by payments from credit purchasers. Costs for setting up the bank and creation and restoration activities are included as their own category. The non-profit organization would establish an endowment fund to cover long-term maintenance, monitoring, and management of the mitigation bank.

Long-term maintenance of the site would include concurrent payment for habitat enhancement (fencing, debris clean-up) and endowment (perpetual maintenance) fees. Based on information provided by the Center for Natural Lands Management (CNLM), review of existing San Joaquin kit fox mitigation bank endowments, and CDFG estimates, these fees are expected to be $150 and $350 per acre. These enhancement and endowment fees would be collected at the time credits are purchased. The up-front costs per acre for endowments can be 60% to 90% lower if a non-profit agency sets up and manages the endowment funds (B. Pace, pers. comm, 1998). Enhancement fees are based primarily on the need for initial improvements, such as fencing. It has been CDFG's experience that per-acre costs for a fencing contractor, materials (fencing, posts, gates), a biological monitor to prevent incidental take during fence construction, and general cleanup of trash, averages approximately $150 per acre.

Endowment costs would be approximately $350 per acre, based on information provided by CDFG and CNLM. The estimate of $350 per acre includes the following considerations: The permanent endowment is intended to produce income sufficient to pay ongoing costs of operation of the bank after deductions for money management costs and offsets for inflation. Ongoing costs of operations include protection of the site (e.g. patrolling, fencing, gates),

management (e.g. exotic plant removal, fire management, trash removal), monitoring (e.g. quantitative assessment of plant community development, analysis to improve management, reporting), and public services (e.g. trail maintenance, educational signs, entrances).

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appendix A

Water and Wastewater Data

WASTEWATER TREATMENT COST SUMMARY

SITE	CONVEYANCE SYSTEM	WASTEWATER TREATMENT	INSTALLATION TREATMENT SYSTEM	TOTAL
Westley	$8,000,000.00	$5,000,000.00	$2,500,000.00	$15,500,000.00
Crows Landing	$12,000,000.00	$8,826,000.00	$4,413,000.00	$25,239,000.00
Fink Road	$14,000,000.00	$6,850,000.00	$3,425,000.00	$24,275,000.00
Stuhr Road	$4,200,000.00	$4,350,000.00	$2,175,000.00	$10,725,000.00

Installation of Wastewater Treatment system is usually 50% of the Capital Costs for the system.

WESTLEY SEWER CONVEYANCE SYSTEM - First Generation Development

Check for designed system to hold minimum flow for first generation development

Qdesign = 3.12 cfs (based on a peaking factor = 2) - minimum flow

n = 0.012 (This friction coefficient is considered satisfactory for pipes up to 35 in.

Point		Type	Length (ft)	Elevation		Slope Calculation			Design Flow	Pipe Diameter Calc.			
							Minimum (1)	Design (2)		Flow (3)			
From	To			High	Low	Slope	Slope	Slope		Condition	do(ft)	do (in)	do(in)
1	3	LAT	6336	280	260	0.0032	0.00298	0.0032	3.120	0.5	1.49	17.8	**18**
2	3	LAT	2640	280	260	0.0076	0.00298	0.0076	3.120	0.5	1.26	15.1	18
3	8	SUB	2112	280	250	0.0142	0.00298	0.0142	6.240	0.67	1.24	14.9	16
4	8	LAT	2376	320	250	0.0295	0.00298	0.0295	3.120	0.5	0.98	11.7	12
5	8	SUB	2640	280	250	0.0114	0.00298	0.0114	9.360	0.67	1.51	18.1	18
6	5	SUB	3696	285	280	0.0014	0.00298	0.0030	6.240	0.67	1.67	20.0	20
7	6	LAT	10560	300	285	0.0014	0.00298	0.0030	3.120	0.5	1.50	18.0	**18**
8	9	MAIN	528	250	240	0.0189	0.00298	0.0189	18.720	0.75	1.66	19.9	20

Velocity Calculation and Check						
	Q(des)/	d/			V/	**Velocity**
Qfull (4)	Q(full)	dmax(5)	Flow-d (6)	Vfull (7)	Vfull (8)	**(9)**
6.39	0.49	0.4	7.2	3.62	0.91	**3.29**
9.90	0.32	0.31	5.58	5.61	0.78	**4.37**
9.90	0.63	0.38	6.08	7.10	0.88	**6.24**
6.62	0.47	0.34	4.08	8.44	0.83	**6.96**
12.13	0.77	0.36	6.48	6.87	0.85	**5.84**
8.22	0.76	0.275	5.5	3.77	0.71	**2.68**
6.21	0.50	0.31	5.58	3.52	0.79	**2.78**
20.73	0.90	0.3	6	9.51	0.75	**7.13**

Velocities are acceptable for current system to run during First Generation Development.

Notes:

(1) For a design flow of 3.12 cfs, from Table 10.5, minimum slope = 2.98 per 1000ft.

(2) Design slope is the steeper of the two slopes: actual slope and minimum slope.

(3) Partial flow Condition based on 1/2 full for lateral, 2/3 full for submain, and 3/4 full for a main or interceptor.

For 1/2 full condition. From Table 10.1, for y/do = 0.50, AR^(2/3) = 0.156do^(8/3)

For 2/3 full condition. From Table 10.1, for y/do = 0.67, AR^(2/3) = 0.2358do^(8/3)

For 3/4 full condition. From Table 10.1, for y/do = 0.75, AR^(2/3) = 0.2840do^(8/3)

Manning's Equation:

$$Q_{design} = (1.486/n)AR^{(2/3)}S^{(1/2)}$$

(4) $Q_{full} = (0.463/n) \times D^{(8/3)} \times S^{(1/2)}$

(5) d/dmax from Figure 10.11, pg 520

(6) d/dmax x diameter of pipe

(7) Vfull = Qfull/do

(8) V/Vfull from Figure 10.11, pg 520

(9) V = V/Vfull x Vfull. If $2 < V < 10$ fps, sewer properly designed

FINK ROAD SEWER CONVEYANCE SYSTEM - First Generation Development

Check for designed system to hold minimum flow for first generation development

Qdesign = 2.4 cfs (based on a peaking factor = 2)

n = 0.012 (This friction coefficient is considered satisfactory for pipes up to 35 in.

Point		Type	Length (ft)	Elevation		Slope Calculation			Design Flow	Pipe Diameter Calc.			
							Minimum (1)	Design (2)		Flow (3)			
From	To			High	Low	Slope	Slope	Slope		Condition	do(ft)	do (in)	do(in)
1	2	LAT	6864	165	145	0.0029	0.00106	0.0029	2.400	0.5	1.37	16.4	25
4	2	LAT	5016	175	145	0.0060	0.00106	0.0060	2.400	0.5	1.19	14.3	22
3	2	LAT	5280	145	130	0.0028	0.00106	0.0028	4.800	0.5	1.78	21.4	32
2	5	SUB	9240	175	130	0.0049	0.00106	0.0049	2.400	0.67	1.06	12.8	20
7	5	LAT	5544	130	121	0.0016	0.00106	0.0016	7.200	0.5	2.30	27.6	42
6	5	LAT	4488	175	121	0.0120	0.00106	0.0120	2.400	0.5	1.05	12.6	20
5	8	MAIN	3960	121	119	0.0005	0.00106	0.0005	9.600	0.75	2.55	30.6	46
9	10	MAIN	10824	175	119	0.0052	0.00106	0.0052	2.400	0.75	0.98	11.8	18

Velocity Calculation and Check						
	Q(des)/	d/			V/	Velocity
Qfull (4)	Q(full)	dmax(5)	Flow-d (6)	Vfull (7)	Vfull (8)	(9)
14.75	0.16	0.28	7	4.33	0.73	3.14
15.02	0.16	0.28	6.16	5.69	0.73	4.13
28.12	0.17	0.29	9.28	5.04	0.75	3.78
10.51	0.23	0.33	6.6	4.82	0.80	3.86
43.90	0.16	0.28	11.76	4.57	0.73	3.31
16.53	0.15	0.26	5.2	7.58	0.71	5.38
31.21	0.31	0.38	17.48	2.71	0.88	2.38
8.18	0.29	0.37	6.66	4.63	0.86	3.98

Velocities are acceptable for current system to run during First Generation Development.

Notes:

(1) For a design flow of 4 cfs, from Table 10.5, minimum slope = 1.06 per 1000ft.

(2) Design slope is the steeper of the two slopes: actual slope and minimum slope.

(3) Partial flow Condition based on 1/2 full for lateral, 2/3 full for submain, and 3/4 full for a main or interceptor.

For 1/2 full condition. From Table 10.1, for y/do = 0.50, AR^(2/3) = 0.156do^(8/3)

For 2/3 full condition. From Table 10.1, for y/do = 0.67, AR^(2/3) = 0.2358do^(8/3)

For 3/4 full condition. From Table 10.1, for y/do = 0.75, AR^(2/3) = 0.2840do^(8/3)

Manning's Equation:

$$Q_{design} = (1.486/n)AR^{(2/3)}S^{(1/2)}$$

(4) $Q_{full} = (0.463/n) \times D^{(8/3)} \times S^{(1/2)}$

(5) d/dmax from Figure 10.11, pg 520

(6) d/dmax x diameter of pipe

(7) $V_{full} = Q_{full}/do$

(8) V/Vfull from Figure 10.11, pg 520

(9) $V = V/V_{full} \times V_{full}$. If $2 < V < 10$ fps, sewer properly designed

STUHR ROAD SEWER CONVEYANCE SYSTEM - First Generation Development

Check for designed system to hold minimum flow for first generation development

Qdesign = 1.48 cfs (based on a peaking factor = 2)

n = 0.012 (This friction coefficient is considered satisfactory for pipes up to 35 in.

Point		Type	Length (ft)	Elevation		Slope Calculation			Design Flow	Pipe Diameter Calc.			
							Minimum (1)	Design (2)		Flow (3)			
From	To			High	Low	Slope	Slope	Slope		Condition	do(ft)	do (in)	do(in)
1	2	LAT	1800	195	185	0.0056	0.00106	0.0056	1.48	0.5	1.01	12.1	18
4	2	LAT	1800	225	185	0.0222	0.00106	0.0222	1.48	0.5	0.78	9.3	14
3	2	LAT	1500	195	185	0.0067	0.00106	0.0067	1.48	0.5	0.98	11.7	18
2	5	SUB	1800	185	180	0.0028	0.00106	0.0028	4.44	0.67	1.49	17.9	26
6	5	LAT	3300	230	180	0.0152	0.00106	0.0152	1.48	0.5	0.84	10.0	16
7	5	LAT	2700	188	180	0.0030	0.00106	0.0030	1.48	0.5	1.14	13.6	20
5	8	SUB	1500	180	170	0.0067	0.00106	0.0067	7.4	0.67	1.53	18.4	28
9	8	LAT	900	180	170	0.0111	0.00106	0.0111	1.48	0.5	0.89	10.6	16
10	8	LAT	3600	180	170	0.0028	0.00106	0.0028	1.48	0.5	1.15	13.8	20
8	11	MAIN	1200	170	165	0.0042	0.00106	0.0042	10.36	0.75	1.77	21.2	32

Velocity Calculation and Check						
	Q(des)/	d/			V/	Velocity
Qfull (4)	Q(full)	dmax(5)	Flow-d (6)	Vfull (7)	Vfull (8)	(9)
8.48	0.17	0.29	5.22	4.80	0.74	3.55
8.68	0.17	0.29	4.06	8.12	0.74	6.01
9.29	0.16	0.28	5.04	5.26	0.72	3.79
15.98	0.28	0.36	9.36	4.34	0.85	3.69
10.23	0.14	0.26	4.16	7.33	0.70	5.13
8.20	0.18	0.3	6	3.76	0.76	2.86
30.17	0.25	0.35	9.8	7.06	0.83	5.86
8.76	0.17	0.29	4.64	6.28	0.74	4.64
7.94	0.19	0.3	6	3.64	0.76	2.77
34.06	0.30	0.38	12.16	6.10	0.87	5.31

Velocities are acceptable for current system to run during First Generation Development.

Notes:

(1) For a design flow of 4.66 cfs, from Table 10.5, minimum slope = 1.06 per 1000ft.

(2) Design slope is the steeper of the two slopes: actual slope and minimum slope.

(3) Partial flow Condition based on 1/2 full for lateral, 2/3 full for submain, and 3/4 full for a main or interceptor.

For 1/2 full condition. From Table 10.1, for y/do = 0.50, AR^(2/3) = 0.156do^(8/3)

For 2/3 full condition. From Table 10.1, for y/do = 0.67, AR^(2/3) = 0.2358do^(8/3)

For 3/4 full condition. From Table 10.1, for y/do = 0.75, AR^(2/3) = 0.2840do^(8/3)

Manning's Equation:

$$Q_{design} = (1.486/n)AR^{(2/3)}S^{(1/2)}$$

(4) Qfull = (0.463/n) x D^(8/3) x S^(1/2)

(5) d/dmax from Figure 10.11, pg 520

(6) d/dmax x diameter of pipe

(7) Vfull = Qfull/do

(8) V/Vfull from Figure 10.11, pg 520

(9) V = V/Vfull x Vfull. If 2<V<10 fps, sewer properly designed

CROWS LANDING SEWER CONVEYANCE SYSTEM - First Generation Development

Check for designed system to hold minimum flow for first generation development

Qdesign = 3.6 cfs (based on a peaking factor = 2)

n = 0.012 (This friction coefficient is considered satisfactory for pipes up to 35 in.

Point		Type	Length (ft)	Elevation		Slope Calculation			Design Flow	Pipe Diameter Calc.			
							Minimum (1)	Design (2)		Flow (3)			
From	To			High	Low	Slope	Slope	Slope		Condition	do(ft)	do (in)	do(in)
1	3	LAT	4000	165	145	0.0050	0.00106	0.0050	3.600	0.5	1.44	17.3	25
2	3	LAT	4000	175	145	0.0075	0.00106	0.0075	3.600	0.5	1.33	16.0	24
3	5	SUB	4000	145	130	0.0038	0.00106	0.0038	7.200	0.67	1.69	20.2	30
4	5	LAT	7000	175	130	0.0064	0.00106	0.0064	3.600	0.5	1.37	16.5	24
5	7	SUB	4000	130	121	0.0023	0.00106	0.0023	10.800	0.67	2.16	25.9	38
6	7	LAT	9000	175	121	0.0060	0.00106	0.0060	3.600	0.5	1.39	16.7	24
7	9	SUB	1000	121	119	0.0020	0.00106	0.0020	14.400	0.67	2.46	29.5	42
8	9	LAT	7500	175	119	0.0075	0.00106	0.0075	3.600	0.5	1.33	16.0	24
9	10	MAIN	1000	119	117	0.0020	0.00106	0.0020	18.000	0.75	2.49	29.9	44

Velocity Calculation and Check						
Qfull (4)	Q(des)/ Q(full)	d/ dmax(5)	Flow-d (6)	Vfull (7)	V/ Vfull (8)	**Velocity (9)**
19.32	0.19	0.31	7.75	5.67	0.78	**4.42**
21.22	0.17	0.29	6.96	6.76	0.74	**5.00**
27.20	0.26	0.35	10.5	5.54	0.84	**4.66**
19.64	0.18	0.3	7.2	6.26	0.76	**4.75**
39.58	0.27	0.36	13.68	5.03	0.84	**4.22**
18.98	0.19	0.31	7.44	6.04	0.78	**4.68**
48.73	0.30	0.38	15.96	5.07	0.88	**4.46**
21.17	0.17	0.29	6.96	6.74	0.74	**4.99**
55.16	0.33	0.4	17.6	5.23	0.90	**4.70**

Velocities are acceptable for current system to run during First Generation Development.

FINK ROAD SUMMARY OF LENGTH AND PIPE DIAMETERS AND COSTS

Nodes		Pipe Length	Pipe Diameter	Costs	Piping Costs	Installation Costs	Total Cost
To	From	(ft)	(in)				
1	2	6864	25	$85.98	$590,196.75	1180393.5	$1,770,590.25
4	2	5016	22	$75.67	$379,541.91	759083.82	$1,138,625.73
3	2	5280	32	$110.06	$581,116.80	1162233.6	$1,743,350.40
2	5	9240	20	$68.79	$635,596.50	1271193	$1,906,789.50
7	5	5544	42	$144.45	$800,851.59	1601703.18	$2,402,554.77
6	5	4488	20	$68.79	$308,718.30	617436.6	$926,154.90
5	8	3960	46	$158.21	$626,516.55	1253033.1	$1,879,549.65
9	10	10824	18	$61.91	$670,100.31	1340200.62	$2,010,300.93
				Total:	$4,592,638.71	$9,185,277.42	$13,777,916.13

Based on Ryan Herco Company PVC Standard Pipe, Schedule 40 costs.

If diameter greater than 16", the cost is a ratio of the size.

For Example:

16" = $55.03 per linear foot

If diameter is 25", then cost = $55.03 x (25/16)

STUHR ROAD SUMMARY OF LENGTH AND PIPE DIAMETERS

Nodes To	Nodes From	Pipe Length (ft)	Pipe Diameter (in)	Cost per lin.ft	Piping Costs	Installation Costs	Total Costs
1	2	1800	18	$61.91	$111,435.75	$222,871.50	$334,307.25
4	2	1800	14	$43.59	$78,462.00	$156,924.00	$235,386.00
3	2	1500	18	$61.91	$92,863.13	$185,726.25	$278,589.38
2	5	1800	26	$89.42	$160,962.75	$321,925.50	$482,888.25
6	5	3300	16	$55.03	$181,599.00	$363,198.00	$544,797.00
7	5	2700	20	$68.79	$185,726.25	$371,452.50	$557,178.75
5	8	1500	28	$96.30	$144,453.75	$288,907.50	$433,361.25
9	8	900	16	$55.03	$49,527.00	$99,054.00	$148,581.00
10	8	3600	20	$68.79	$247,635.00	$495,270.00	$742,905.00
8	11	1200	32	$110.06	$132,072.00	$264,144.00	$396,216.00
				Total:	$1,384,736.63	$2,769,473.25	$4,154,209.88

Based on Ryan Herco Company PVC Standard Pipe, Schedule 40 costs.

If diameter greater than 16", the cost is a ratio of the size.

For Example:

16" = $55.03 per linear foot

If diameter is 25", then cost = $55.03 x (25/16)

CROWS LANDING SUMMARY OF LENGTH AND PIPE DIAMETERS

Nodes		Pipe Length	Pipe Diameter	Cost per	Piping Costs	Installation Costs	Total Cost
To	From	(ft)	(in)	lin.ft			
1	3	4000	25	$85.98	$343,937.50	$687,875.00	$1,031,812.50
2	3	4000	24	$82.55	$330,180.00	$660,360.00	$990,540.00
3	5	4000	30	$103.18	$412,725.00	$825,450.00	$1,238,175.00
4	5	7000	24	$82.55	$577,815.00	$1,155,630.00	$1,733,445.00
5	7	4000	38	$130.70	$522,785.00	$1,045,570.00	$1,568,355.00
6	7	9000	24	$82.55	$742,905.00	$1,485,810.00	$2,228,715.00
7	9	1000	42	$144.45	$144,453.75	$288,907.50	$433,361.25
8	9	7500	24	$82.55	$619,087.50	$1,238,175.00	$1,857,262.50
9	10	1000	44	$151.33	$151,332.50	$302,665.00	$453,997.50
				Total:	$3,845,221.25	$7,690,442.50	$11,535,663.75

Based on Ryan Herco Company PVC Standard Pipe, Schedule 40 costs.

If diameter greater than 16", the cost is a ratio of the size.

For Example:

16" = $55.03 per linear foot

If diameter is 25", then cost = $55.03 x (25/16)

First Generation Development Wastewater Demands

"Highway Commercial" : These uses would develop with a FAR of 0.2 (i.e. 1 building per 5 acres of land). These sites are typically developed with heavy landscaping, and extra wide streets with truck turn lanes. The FAR allows for future expansion on the site.

In Acre-feet/year

Site	Area (Acres)			Average Production Coefficients (cfs/acre)		Wastewater Demands (cfs)			Wastewater Demands (acre-ft/yr)
	Total	Industrial	Commercial	Industrial	Commercial	Industrial	Commercial	Total	Total
Westley	1300	0	260	0.008	0.006	0.00	1.56	1.56	1,130
Sperry	800	0	160	0.008	0.006	0.00	0.96	0.96	695
Crows Landing	2,500	0	500	0.008	0.006	0.00	3.00	3.00	2,173
Fink Road	1,000	0	200	0.008	0.006	0.00	1.20	1.20	869
Stuhr Road	600	0	120	0.008	0.006	0.00	0.72	0.72	522

In Gallons/day

Site	Area (Acres)			Average Production Coefficients (cfs/acre)		Wastewater Demands (cfs)			Wastewater Demands (gal/d)
	Total	Industrial	Commercial	Industrial	Commercial	Industrial	Commercial	Total	Total
Westley	1300	0	260	0.008	0.006	0.00	1.56	1.56	1,008,864
Sperry	800	0	160	0.008	0.006	0.00	0.96	0.96	620,839
Crows Landing	2,500	0	500	0.008	0.006	0.00	3.00	3.00	1,940,123
Fink Road	1,000	0	200	0.008	0.006	0.00	1.20	1.20	776,049
Stuhr Road	600	0	120	0.008	0.006	0.00	0.72	0.72	465,629

In Gallons/minute

Site	Area (Acres)			Average Production Coefficients (cfs/acre)		Wastewater Demands	
	Total	Industrial	Commercial	Industrial	Commercial	(gal/d)	(gal/min)
Westley	1300	0	260	0.008	0.006	1,008,864	701
Sperry	800	0	160	0.008	0.006	620,839	431
Crows Landing	2,500	0	500	0.008	0.006	1,940,123	1,347
Fink Road	1,000	0	200	0.008	0.006	776,049	539
Stuhr Road	600	0	120	0.008	0.006	465,629	323

Notes:

Determining commercial components for area.

Westley Triangle, Sperry Interchange, Fink Road Area, and Stuhr Road Area based on commercial FAR of 0.2. (EDAW memo May 8, 1998).

Crows Landing considered all commercial due to uniqueness of site (EDAW memo May 8, 1998).

Average Production Coefficients

Provided from SCS Environmental Constraints Analysis for Fink Road and Surrounding Lands, May 29, 1997.

Second Generation Development Wastewater Demands

More industrial or heavy commercial uses: These uses would develop with a FAR of 0.17 (1 building per 6 acres of land). These sites are typically developed with heavy landscaping, and extra wide streets with truck trun lanes. The FAR allows for future expansion on the site, although future growth is controlled.
This development is in addition to the First Generation Development.

In Acre-feet/year

Site	Area (Acres)			Average Production Coefficients (cfs/acre)		Wastewater Demands (cfs)			Wastewater Demands (acre-ft/yr)
	Total	Industrial	Commercial	Industrial	Commercial	Industrial	Commercial	Total	Total
Westley	1300	221	260	0.008	0.006	1.77	1.56	3.33	2,411
Sperry	800	136	160	0.008	0.006	1.09	0.96	2.05	1,484
Crows Landing	2,500	0	925	0.008	0.006	0.00	5.55	5.55	4,021
Fink Road	1,000	170	200	0.008	0.006	1.36	1.20	2.56	1,855
Stuhr Road	600	102	120	0.008	0.006	0.82	0.72	1.54	1,113

In Gallons/day

Site	Area (Acres)			Average Production Coefficients (cfs/acre)		Wastewater Demands (cfs)			Wastewater Demands (gal/d)
	Total	Industrial	Commercial	Industrial	Commercial	Industrial	Commercial	Total	Total
Westley	1300	221	260	0.008	0.006	1.77	1.56	3.33	2,152,243
Sperry	800	136	160	0.008	0.006	1.09	0.96	2.05	1,324,457
Crows Landing	2,500	0	925	0.008	0.006	0.00	5.55	5.55	3,589,227
Fink Road	1,000	170	200	0.008	0.006	1.36	1.20	2.56	1,655,571
Stuhr Road	600	102	120	0.008	0.006	0.82	0.72	1.54	993,343

In Gallons/minute

Site	Area (Acres)			Average Production Coefficients (cfs/acre)		Wastewater Demands	
	Total	Industrial	Commercial	Industrial	Commercial	(gal/d)	(gal/min)
Westley	1300	221	260	0.008	0.006	2,152,243	1,495
Sperry	800	136	160	0.008	0.006	1,324,457	920
Crows Landing	2,500	0	925	0.008	0.006	3,589,227	2,493
Fink Road	1,000	170	200	0.008	0.006	1,655,571	1,150
Stuhr Road	600	102	120	0.008	0.006	993,343	690

Notes:

Determining industrial and commercial components for area.

Westley Triangle, Sperry Interchange, Fink Road Area, and Stuhr Road Area based on commercial FAR of 0.2 and an Industrial FAR of 0.17 (EDAW memo May 8, 1998).

Crows Landing considered all commercial due to uniqueness of site (EDAW memo May 8, 1998).

Average Production Coefficients

Provided from SCS Environmental Constraints Analysis for Fink Road and Surrounding Lands, May 29, 1997.

Third Generation Development Wastewater Demands

With maturation of development in the area and availability of infrastructure, the next type of development that could occur may be larger scale sales and marketing facilities (select industries, could include high technology) mixed use regional and local industry, or special uses. These uses would likely develop with a FAR of 0.17 (1 building per 6 acres of land). These site are typically developed with conventional development controls. Third generation includes all development from the first and second generation. Since the description of the site is part commercial and part industrial, I will assume the area is split equally between the two.

In Acre-feet/year

Site	Area (Acres)			Average Production Coefficients (cfs/acre)		Wastewater Demands (cfs)			(acre-ft/yr)
	Total	Industrial	Commercial	Industrial	Commercial	Industrial	Commercial	Total	Total
Westley	1300	332	371	0.008	0.006	2.65	2.22	4.88	3,532
Sperry	800	204	228	0.008	0.006	1.63	1.37	3.00	2,173
Crows Landing	2,500	0	1350	0.008	0.006	0.00	8.10	8.10	5,868
Fink Road	1,000	255	285	0.008	0.006	2.04	1.71	3.75	2,717
Stuhr Road	600	153	171	0.008	0.006	1.22	1.03	2.25	1,630

In Gallons/day

Site	Area (Acres)			Average Production Coefficients (cfs/acre)		Wastewater Demands (cfs)			(gal/d)
	Total	Industrial	Commercial	Industrial	Commercial	Industrial	Commercial	Total	Total
Westley	1300	332	371	0.008	0.006	2.65	2.22	4.88	3,152,699
Sperry	800	204	228	0.008	0.006	1.63	1.37	3.00	1,940,123
Crows Landing	2,500	0	1350	0.008	0.006	0.00	8.10	8.10	5,238,331
Fink Road	1,000	255	285	0.008	0.006	2.04	1.71	3.75	2,425,153
Stuhr Road	600	153	171	0.008	0.006	1.22	1.03	2.25	1,455,092

In Gallons/min

Site	Area (Acres)			Average Production Coefficients (cfs/acre)		Wastewater Demands	
	Total	Industrial	Commercial	Industrial	Commercial	(gal/d)	(gal/min)
Westley	1300	332	371	0.008	0.006	3,152,699	2,189
Sperry	800	204	228	0.008	0.006	1,940,123	1,347
Crows Landing	2,500	0	1350	0.008	0.006	5,238,331	3,638
Fink Road	1,000	255	285	0.008	0.006	2,425,153	1,684
Stuhr Road	600	153	171	0.008	0.006	1,455,092	1,010

Notes:

Determining industrial and commercial components for area.

Westley Triangle, Sperry Interchange, Fink Road Area, and Stuhr Road Area based on commercial FAR of 0.2, Industrial FAR of 0.17, and mixed industrial/commercial FAR of 0.17 (EDAW memo May 8, 1998).

Crows Landing considered all commercial due to uniqueness of site (EDAW memo May 8, 1998).

Which assumes a commerical FAR of 0.2+0.17+0.17=0.54

Average Production Coefficients

Provided from SCS Environmental Constraints Analysis for Fink Road and Surrounding Lands, May 29, 1997.

First Generation Development Water Demands

"Highway Commercial" : These uses would develop with a FAR of 0.2 (i.e. 1 building per 5 acres of land). These sites are typically developed with heavy landscaping, and extra wide streets with truck turn lanes. The FAR allows for future expansion on the site.

Water Demands from the Commercial Portion of the Site

Site	Area (Acres)		Commercial Water Duty (acre-ft/year-acre)		Commercial Water Demands (acre-ft/year)		
	Total	Commercial	Low	High	Low	High	Average
Westley	1300	234	0.667	1.11	156	260	208
Sperry	800	144	0.667	1.11	96	160	128
Crows Landing	2,500	450	0.667	1.11	300	500	400
Fink Road	1,000	180	0.667	1.11	120	200	160
Stuhr Road	600	108	0.667	1.11	72	120	96

Water Demands from Landscaping Portion of the Site

Site	Area (Acres)		Water Duty (acre-ft/ year/acre)	Water Demands (acre-ft/year)
	Total	Landscaping		
Westley	1300	26	4.5	117
Sperry	800	16	4.5	72
Crows Landing	2,500	50	4.5	225
Fink Road	1,000	20	4.5	90
Stuhr Road	600	12	4.5	54

Notes:

Determining commercial area component for each area.

Total Commercial area is the FAR = 0.2 multiplied by total area and subtracting the amount used for landscaping.

Total Commercial Area = (FAR x Total Area) - (Landscaped Area)

Determining Landscaped component for each area.

Assuming that approximately 10% of the gross area in commercial areas would be irrigated for landscaping purposes at a rate of 4.5 acre-ft/year (SCS Critical Constraints Analysis May 29, 1997).

Commercial Water Duty Values

Based on comparing Commercial to Industrial average per capita use found in "Hydrology and Hydraulic Systems, Ram S. Gupta, 1989, page 25)

Table 2.2: Commercial use = 20 gpcd

Industrial use = 45 gpcd

Industrial use is 2.25 times higher than that of commercial.

This ratio was then applied to the known water duties given for Industrial Demands in order to find the water duties for commercial uses.

Summary of Total Water Demands

Site	Area (Acres)	Total Water Demands (acre-ft/year)			Total Water Demands (gal/d)		
	Total	Low	High	Average	Low	High	Average
Westley	1300	273	377	325	243,777	336,316	290,046
Sperry	800	168	232	200	150,016	206,964	178,490
Crows Landing	2,500	525	725	625	468,801	646,761	557,781
Fink Road	1,000	210	290	250	187,521	258,704	223,113
Stuhr Road	600	126	174	150	112,512	155,223	133,868

Site	Total Water Demands (gal/d)			Total Water Demands (gal/min)		
	Low	High	Average	Low	High	Average
Westley	243,777	336,316	290,046	169	234	201
Sperry	150,016	206,964	178,490	104	144	124
Crows Landing	468,801	646,761	557,781	326	449	387
Fink Road	187,521	258,704	223,113	130	180	155
Stuhr Road	112,512	155,223	133,868	78	108	93

Second Generation Development Water Demands

More industrial or heavy commercial uses: These uses would develop with a FAR of 0.17 (1 building per 6 acres of land). These sites are typically developed with heavy landscaping, and extra wide streets with truck trun lanes. The FAR allows for future expansion on the site, although future growth is controlled.
This development is in addition to the First Generation Development.

Water Demands from the Industrial Portion of the Site

Site	Area (Acres)		Industrial Water Duty (acre-ft/year-acre)		Industrial Water Demands (acre-ft/year)		
	Total	Industrial	Low	High	Low	High	Average
Westley	1300	197	1.5	2.5	295	492	394
Sperry	800	121	1.5	2.5	182	303	242
Crows Landing	2,500	397	1.5	2.5	596	993	795
Fink Road	1,000	152	1.5	2.5	227	379	303
Stuhr Road	600	91	1.5	2.5	136	227	182

Water Demands from the Commercial Portion of the Site

Site	Area (Acres)		Commercial Water Duty (acre-ft/year-acre)		Commercial Water Demands (acre-ft/year)		
	Total	Commercial	Low	High	Low	High	Average
Westley	1300	236	0.667	1.11	157	262	210
Sperry	800	145	0.667	1.11	97	161	129
Crows Landing	2,500	472	0.667	1.11	315	524	420
Fink Road	1,000	182	0.667	1.11	121	201	161
Stuhr Road	600	109	0.667	1.11	73	121	97

Water Demands from Landscaping Portion of the Site

Site	Area (Acres)		Water Duty (acre-ft/ year/acre)	Water Demands (acre-ft/year)
	Total	Landscaping		
Westley	1300	48	4.5	216
Sperry	800	30	4.5	133
Crows Landing	1,500	56	4.5	250
Fink Road	1,000	37	4.5	167
Stuhr Road	600	22	4.5	100

Notes:

Determining industrial and commercial components for area.

Westley Triangle, Sperry Interchange, Fink Road Area, and Stuhr Road Area based on commercial FAR of 0.2 and an Industrial FAR of 0.17 (EDAW memo May 8, 1998).

Crows Landing considered all commercial due to uniqueness of site (EDAW memo May 8, 1998). Which assumes a commerical FAR of 0.2+0.17=0.37.

Total Commercial/Industrial area is the FAR multiplied by total area and subtracting the amount used for landscaping.
Total Area = (FAR x Total Area) - (Landscaped Area)

Determining Landscaped component for each area.

Assuming that approximately 10% of the gross area in commercial and industrial areas would be irrigated for landscaping purposes at a rate of 4.5 acre-ft/year (SCS Critical Constraints Analysis May 29, 1997).

Industrial Water Duty Values

Provided from SCS Environmental Constraints Analysis for Fink Road and Surrounding Lands, May 29, 1997.

Commercial Water Duty Values

Based on comparing Commercial to Industrial average per capita use found in "Hydrology and Hydraulic Systems, Ram S. Gupta, 1989, page 25)
Table 2.2: Commercial use = 20 gpcd
Industrial use = 45 gpcd

Industrial use is 2.25 times higher than that of commercial.
This ratio was then applied to the known water duties given for Industrial Demands in order to find the water duties for commercial uses.

Summary of Total Water Demands

Site	Area (Acres)	Total Water Demands (acre-ft/year)			Total Water Demands (gal/d)		
	Total	Low	High	Average	Low	High	Average
Westley	1300	669	971	820	597,443	866,570	732,006
Sperry	800	412	597	505	367,657	533,274	450,466
Crows Landing	2,500	1,161	1,767	1,464	1,036,082	1,577,466	1,306,774
Fink Road	1,000	515	747	631	459,571	666,592	563,082
Stuhr Road	600	309	448	378	275,743	399,955	337,849

Notes:

Total Water Demands derived from adding industrial, commercial, and landscaping water demands..

Site	Area (Acres)	Total Water Demands (gal/d)			Total Water Demands (gal/min)		
	Total	Low	High	Average	Low	High	Average
Westley	1300	597,443	866,570	732,006	415	602	508
Sperry	800	367,657	533,274	450,466	255	370	313
Crows Landing	2,500	1,036,082	1,577,466	1,306,774	720	1095	907
Fink Road	1,000	459,571	666,592	563,082	319	463	391
Stuhr Road	600	275,743	399,955	337,849	191	278	235

Third Generation Development Water Demands

With maturation of development in the area and availability of infrastructure, the next type of development that could occur may be larger scale sales and marketing facilities (select industries, could include high technology) mixed use regional and local industry, or special uses. These uses would likely develop with a FAR of 0.17 (1 building per 6 acres of land). These site are typically developed with conventional development controls. Third generation includes all development from the first and second generation. Since the description of the site is part commercial and part industrial, I will assume the area is split equally between the two.

Water Demands from the Industrial Portion of the Site

Site	Area (Acres)		Industrial Water Duty (acre-ft/year-acre)		Industrial Water Demands (acre-ft/year)			
	Total	Industrial	Low	High	Low	High		Average
Westley	1300	332	1.5	2.5	497	829		663
Sperry	800	204	1.5	2.5	306	510		408
Crows Landing	2,500	637	1.5	2.5	956	1593		1274
Fink Road	1,000	255	1.5	2.5	383	638		510
Stuhr Road	600	153	1.5	2.5	230	383		306

Water Demands from the Commercial Portion of the Site

Site	Area (Acres)		Commercial Water Duty (acre-ft/year-acre)		Commercial Water Demands (acre-ft/year)			
	Total	Commercial	Low	High	Low	High		Average
Westley	1300	371	0.667	1.11	247	411		329
Sperry	800	228	0.667	1.11	152	253		203
Crows Landing	2,500	1350	0.667	1.11	900	1499		1199
Fink Road	1,000	285	0.667	1.11	190	316		253
Stuhr Road	600	171	0.667	1.11	114	190		152

Water Demands from Landscaping Portion of the Site

Site	Area (Acres)		Water Duty (acre-ft/ year/acre)	Water Demands (acre-ft/year)
	Total	Landscaping		
Westley	1300	130	4.5	585
Sperry	800	80	4.5	360
Crows Landing	2,500	250	4.5	1125
Fink Road	1,000	100	4.5	450
Stuhr Road	600	60	4.5	270

Notes:

Determining industrial and commercial components for area.

Westley Triangle, Sperry Interchange, Fink Road Area, and Stuhr Road Area based on commercial FAR of 0.2, Industrial FAR of 0.17, and mixed industrial/commercial FAR of 0.17 (EDAW memo May 8, 1998).

Crows Landing considered all commercial due to uniqueness of site (EDAW memo May 8, 1998).
Which assumes a commerical FAR of 0.2+0.17+0.17=0.54

Determining Landscaped component for each area.

Assuming that approximately 10% of the gross area in commercial and industrial areas would be irrigated for landscaping purposes at a rate of 4.5 acre-ft/year (SCS Critical Constraints Analysis May 29, 1997).

Industrial Water Duty Values

Provided from SCS Environmental Constraints Analysis for Fink Road and Surrounding Lands, May 29, 1997.

Commercial Water Duty Values

Based on comparing Commercial to Industrial average per capita use found in "Hydrology and Hydraulic Systems, Ram S. Gupta, 1989, page 25)

Table 2.2: Commercial use = 20 gpcd
Industrial use = 45 gpcd

Industrial use is 2.25 times higher than that of commercial.
This ratio was then applied to the known water duties given for Industrial Demands in order to find the water duties for commercial uses.

GROUNDWATER WELL CONSTRUCTION AND INSTALLATION COST ESTIMATE

Based on 1993 bids for Well #5 at Crows Landing Community Services District because Well #5 was approximately 500 feet deep.

ITEM	QUANTITY	UNIT	DESCRIPTION	AVERAGE	WESTLEY	CROWS LANDING	FINK	STUHR
1	1	EACH	MOBE, DEMOBE	$4,700.00	$4,700.00	$4,700.00	$4,700.00	$4,700.00
2	1	LS	CLEARING & GRUBBING	$3,087.50	$3,087.50	$3,087.50	$3,087.50	$3,087.50
3	1	EACH	CALIPER LOG	$1,037.50	$1,037.50	$1,037.50	$1,037.50	$1,037.50
4	500	LF	26" BORE HOLE*	$39.00	$9,000.00	$19,500.00	$19,500.00	$12,000.00
5	400	LF	12" BLANK CASING*	$22.71	$4,541.50	$9,083.00	$9,083.00	$6,055.33
6	100	LF	12" WELL SCREEN*	$78.70	$3,935.00	$7,870.00	$7,870.00	$5,246.67
7	1	LS	GRAVEL PACK	$5,822.25	$5,822.25	$5,822.25	$5,822.25	$5,822.25
8	1	LS	CEMENT SEAL	$6,056.50	$6,056.50	$6,056.50	$6,056.50	$6,056.50
9	1	EACH	SET & PULL DEVELOP. PUMP	$3,462.50	$3,462.50	$3,462.50	$3,462.50	$3,462.50
10	40	HRS	DEVELOPING**	$88.75	$3,550.00	$3,550.00	$3,550.00	$3,550.00
11	1	EACH	PUMP PEDESTAL	$1,375.00	$1,375.00	$1,375.00	$1,375.00	$1,375.00
12	250	LF	COLUMN, TUBE & SHAFT**	$27.72	$6,929.38	$6,929.38	$6,929.38	$6,929.38
13	1	EACH	4" PRESSURE BLOW-OFF	$1,571.00	$1,571.00	$1,571.00	$1,571.00	$1,571.00
14	1	EACH	6" CHECK VALVE	$608.00	$608.00	$608.00	$608.00	$608.00
15	1	EACH	8"VALVE (BELOW GROUND)	$562.50	$562.50	$562.50	$562.50	$562.50
16	1	EACH	6" VALVE (ABOVE GROUND)	$347.75	$347.75	$347.75	$347.75	$347.75
17	1	EACH	6" VALVE (BELOW GROUND)	$493.00	$493.00	$493.00	$493.00	$493.00
18	1	EACH	3" VALVE (BELOW GROUND)	$311.50	$311.50	$311.50	$311.50	$311.50
19	1	EACH	2" VALVE (BELOW GROUND)	$196.50	$196.50	$196.50	$196.50	$196.50
20	1	EACH	6" METER	$1,459.75	$1,459.75	$1,459.75	$1,459.75	$1,459.75
21	1	EACH	PIPING & APPURTENANCES	$6,315.25	$6,315.25	$6,315.25	$6,315.25	$6,315.25
22	1	EACH	ELECTRICAL WORK	$8,716.75	$8,716.75	$8,716.75	$8,716.75	$8,716.75
				Totals:	$74,079.13	$93,055.63	$93,055.63	$79,904.63

* For sizes which are different, a ratio of diameters was used to adjust cost

For example:

Cost for 26" bore hole is $39 per linear foot

A 12" bore hole is required.

Cost estimated as (12"/26") x $39 = $18 per linear foot

** Based on half of what was estimated in bid because bid was based on two wells.

Westley well: 12" bore hole, 6" well casing and screen
Crows Landing: 26" bore hole, 12" well casing and screen
Fink Road: 26" bore hole, 12" well casing and screen
Stuhr Road: 16" bore hole, 8" well casing and screen

7/8/98

g:/sw/projects/9801300/WELLCOST.xls

GROUNDWATER WELL CONSTRUCTION AND INSTALLATION COST ESTIMATE

Based on 1993 bids for Well #5 at Crows Landing Community Services District

ITEM	QUANTITY	UNIT	DESCRIPTION	SHANNON	ZIM	DELTA	HOWK	AVERAGE
1	1	EACH	MOBE, DEMOBE	$3,800.00	$2,000.00	$5,000.00	$8,000.00	$4,700.00
2	1	LS	CLEARING & GRUBBING	$4,350.00	$3,000.00	$1,000.00	$4,000.00	$3,087.50
3	1	EACH	CALIPER LOG	$900.00	$900.00	$1,250.00	$1,100.00	$1,037.50
4	1	LF	26" BORE HOLE	$42.00	$39.00	$40.00	$35.00	$39.00
5	1	LF	12" BLANK CASING	$24.83	$21.00	$25.00	$20.00	$22.71
6	1	LF	12" WELL SCREEN	$103.00	$61.80	$80.00	$70.00	$78.70
7	1	LS	GRAVEL PACK	$4,800.00	$5,989.00	$6,500.00	$6,000.00	$5,822.25
8	1	LS	CEMENT SEAL	$4,740.00	$4,286.00	$8,200.00	$7,000.00	$6,056.50
9	1	EACH	SET & PULL DEVELOP. PUMP	$3,400.00	$3,750.00	$3,700.00	$3,000.00	$3,462.50
10	1	HRS	DEVELOPING	$80.00	$75.00	$100.00	$100.00	$88.75
11	1	EACH	PUMP PEDESTAL	$1,450.00	$1,750.00	$500.00	$1,800.00	$1,375.00
12	1	LF	COLUMN, TUBE & SHAFT	$26.87	$20.00	$23.00	$41.00	$27.72
13	1	EACH	4" PRESSURE BLOW-OFF	$994.00	$2,190.00	$1,800.00	$1,300.00	$1,571.00
14	1	EACH	6" CHECK VALVE	$298.00	$634.00	$1,000.00	$500.00	$608.00
15	1	EACH	8"VALVE (BELOW GROUND)	$650.00	$400.00	$600.00	$600.00	$562.50
16	1	EACH	6" VALVE (ABOVE GROUND)	$415.00	$226.00	$450.00	$300.00	$347.75
17	1	EACH	6" VALVE (BELOW GROUND)	$550.00	$272.00	$550.00	$600.00	$493.00
18	1	EACH	3" VALVE (BELOW GROUND)	$500.00	$146.00	$300.00	$300.00	$311.50
19	1	EACH	2" VALVE (BELOW GROUND)	$300.00	$36.00	$250.00	$200.00	$196.50
20	1	EACH	6" METER	$975.00	$1,414.00	$2,350.00	$1,100.00	$1,459.75
21	1	EACH	PIPING & APPURTANCES	$4,666.00	$8,495.00	$3,100.00	$9,000.00	$6,315.25
22	1	EACH	ELECTRICAL WORK	$6,500.00	$7,567.00	$11,800.00	$9,000.00	$8,716.75

Well #5 is similar to these wells in depth.

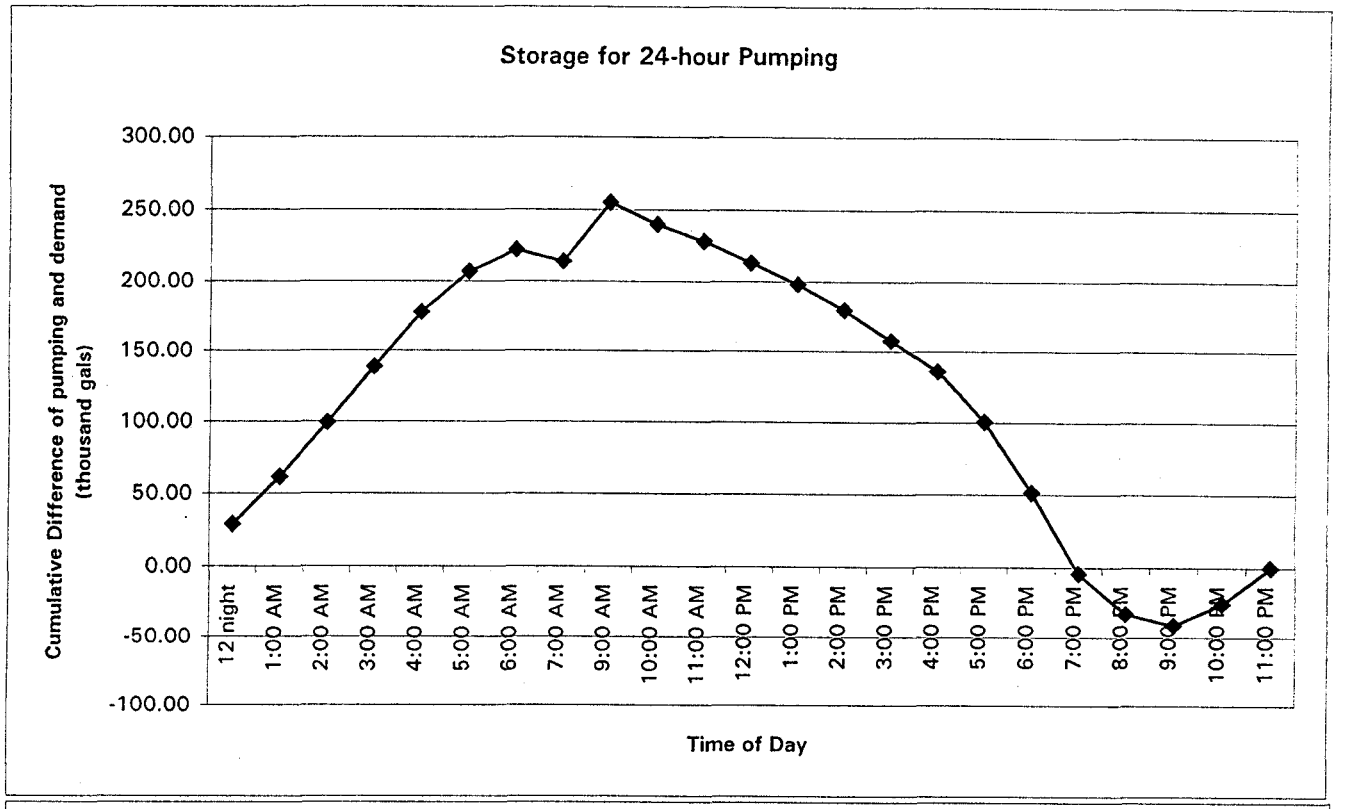
Computations for Water Storage Tank Capacity - Westley Triangle

Average Hourly Demand = ***1131*** gpm
Total Daily Demand = ***1,592.67*** galx1000

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				24-Hour Pumping		12-Hour Pumping	
Time	Hourly Demand Rate (gpm)	Hourly Demand (galx1000)	Cumulative Hourly Demand (galx1000)	Cumulative 24-hour pumping (galx1000)	Cumulative Difference (col.5-col.4) (galx1000)	Cumulative 12-hour pumping (galx1000)	Cumulative Difference (col.7-col.4) (galx1000)
12 night	622.05	37.32	37.32	66.36	29.04	0.00	-37.32
1:00 AM	565.50	33.93	71.25	132.72	61.47	0.00	-71.25
2:00 AM	475.02	28.50	99.75	199.08	99.33	0.00	-99.75
3:00 AM	452.40	27.14	126.90	265.45	138.55	0.00	-126.90
4:00 AM	452.40	27.14	154.04	331.81	177.76	0.00	-154.04
5:00 AM	622.05	37.32	191.37	398.17	206.80	0.00	-191.37
6:00 AM	848.25	50.90	242.26	464.53	222.27	132.72	-109.54
7:00 AM	1,244.10	74.65	316.91	530.89	213.99	265.45	-51.46
9:00 AM	1,526.85	91.61	408.52	663.61	255.10	530.89	122.37
10:00 AM	1,357.20	81.43	489.95	729.98	240.03	663.61	173.67
11:00 AM	1,300.65	78.04	567.99	796.34	228.35	796.34	228.35
12:00 PM	1,357.20	81.43	649.42	862.70	213.28	929.06	279.64
1:00 PM	1,357.20	81.43	730.85	929.06	198.21	1,061.78	330.93
2:00 PM	1,413.75	84.83	815.68	995.42	179.74	1,194.51	378.83
3:00 PM	1,470.30	88.22	903.90	1,061.78	157.89	1,327.23	423.33
4:00 PM	1,470.30	88.22	992.11	1,128.14	136.03	1,459.95	467.84
5:00 PM	1,696.50	101.79	1,093.90	1,194.51	100.60	1,592.67	498.77
6:00 PM	1,922.70	115.36	1,209.27	1,260.87	51.60	1,592.67	383.41
7:00 PM	2,035.80	122.15	1,331.41	1,327.23	-4.18	1,592.67	261.26
8:00 PM	1,583.40	95.00	1,426.42	1,393.59	-32.83	1,592.67	166.26
9:00 PM	1,244.10	74.65	1,501.06	1,459.95	-41.11	1,592.67	91.61
10:00 PM	848.25	50.90	1,551.96	1,526.31	-25.65	1,592.67	40.72
11:00 PM	678.60	40.72	1,592.67	1,592.67	0.00	1,592.67	0.00

Notes:

Values in column 2 were based on a typical variation in usage in a day. (Hydrology & Hydraulic Systems, Ram S. Gupta, page 26, Figure 2.5)


Storage for 24-hour Pumping
Cumulative Difference of pumping and demand (thousand gals)
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
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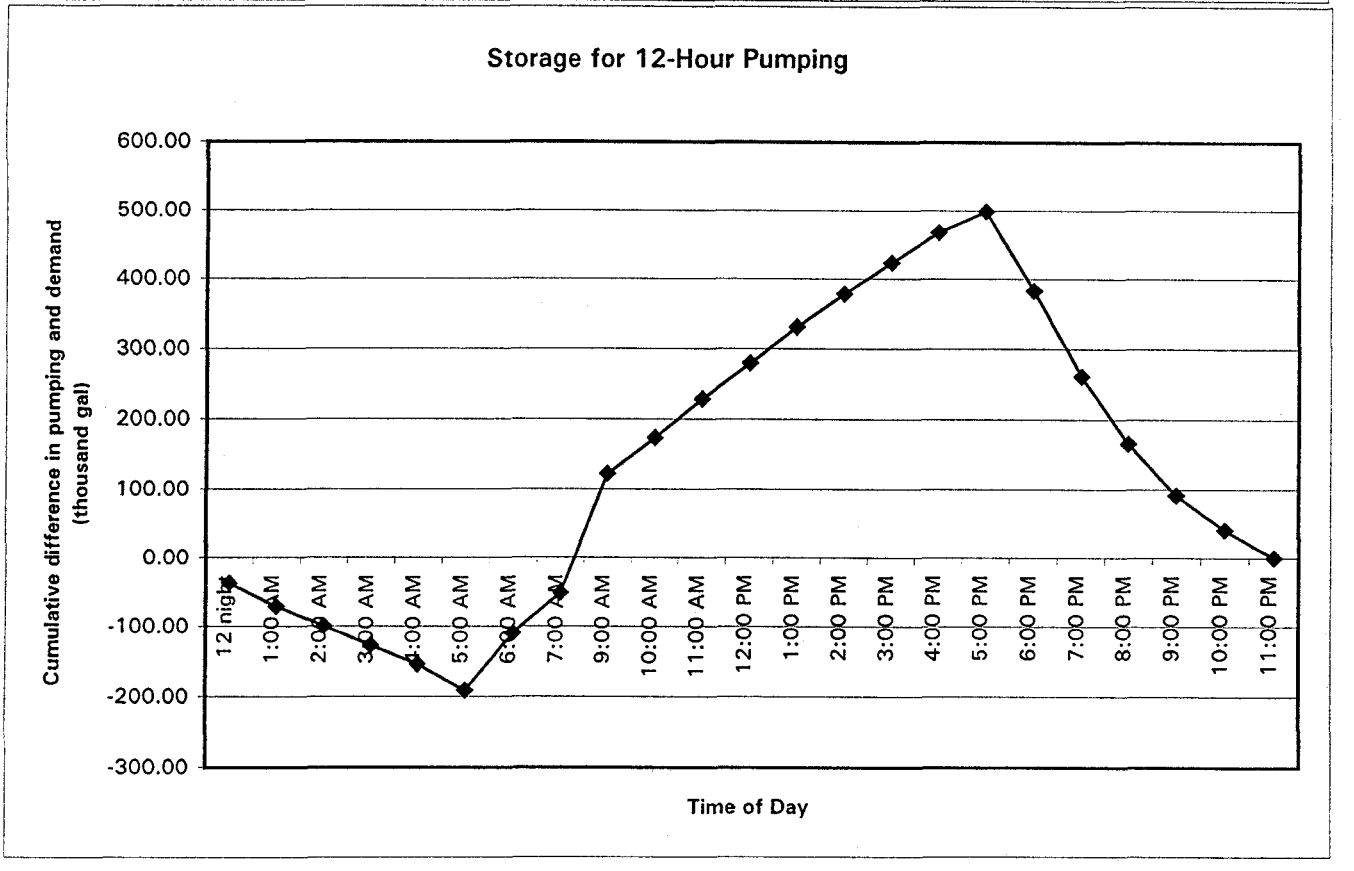
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day


Storage for 12-Hour Pumping
Cumulative difference in pumping and demand (thousand gal)
600.00
500.00
400.00
300.00
200.00
100.00
0.00
-100.00
-200.00
-300.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day

Water Storage Tank Capacity Based on Demand

For:	Tank (gal)
24-Hour	300,000
12-Hour	700,000

Based on maximum distance between the bottom and top peaks on the curves

Emergency Requirements

Emergency requirements for 2 to 3 days capacity are typical. (Gupta)

Total Daily Demand = 1,592,674 gallons

Additional Water Storage to accommodate emergencies = **4,778,023** gallons
(assuming the most conservative value - 3 days)

Fire Demand

Based on "Land Development handbook, Dewberry & Davis, 1996, page 464",
The ISO used the following equation to estimate the required fire flow:

$F = 18 \times C \times \sqrt{A}$

where
F = required fire flow in gpm
C = coefficient related to the type of construction
A = total floor area in square feet, including all stories but excluding basements, for one structure having the largest minimum supply requirement (NFPA 1231 Standard on Water Supplies for Suburban and Rural Fire Fighting, 1993 Edition)

For this particular study, a C = 1.0 is used for ordinary construction

Area is equal to the one structure with the maximum total area on the site.
Since hotels are anticipated to be developed on the site and has multiple floors which contribute to the fire flow calculation for total area, a hotel was chosen as the structure with the maximum fire flow.
For such a small area, a hotel consisting of two floors was assumed as the structure with the maximum total area. Homestead Hotel was used as an example with a total floor area of:

Area = 0.87 acres
37,897 square feet

Therefore,
F = 3,504 gpm

The required duration for fire flow is 4 hours (Dewberry, Davis, page 467).

Required storage for fire flow is:
840,985 gallons

Total Storage Capacity

Pumping	Demand Capacity	Emergency Capacity	Fire Demand	Total Capacity	Total (Mgal)
24-Hour	300,000	4,778,023	840,985	5,919,007	5.92
12-Hour	700,000	4,778,023	840,985	6,319,007	6.32

Sizing of Tanks

Capacity = 6.32 Mgal
Conversion 844,787 cubic feet

Possible Dimensions for One Tank

Height (ft)	Diameter (ft)	Retention Time (d)
25	207	3.97
50	147	3.97
75	120	3.97
100	104	3.97

Retention Time shall not exceed 8 days for health reasons, therefore two storage tanks are required to hold this amount of volume.
(Based on "Land Development handbook, Dewberry & Davis, 1996, page 466")

Possible Dimensions for Two Tanks

Height (ft)	Diameter (ft)	Retention Time (d)
25	147	1.98
50	104	1.98
75	85	1.98
100	73	1.98

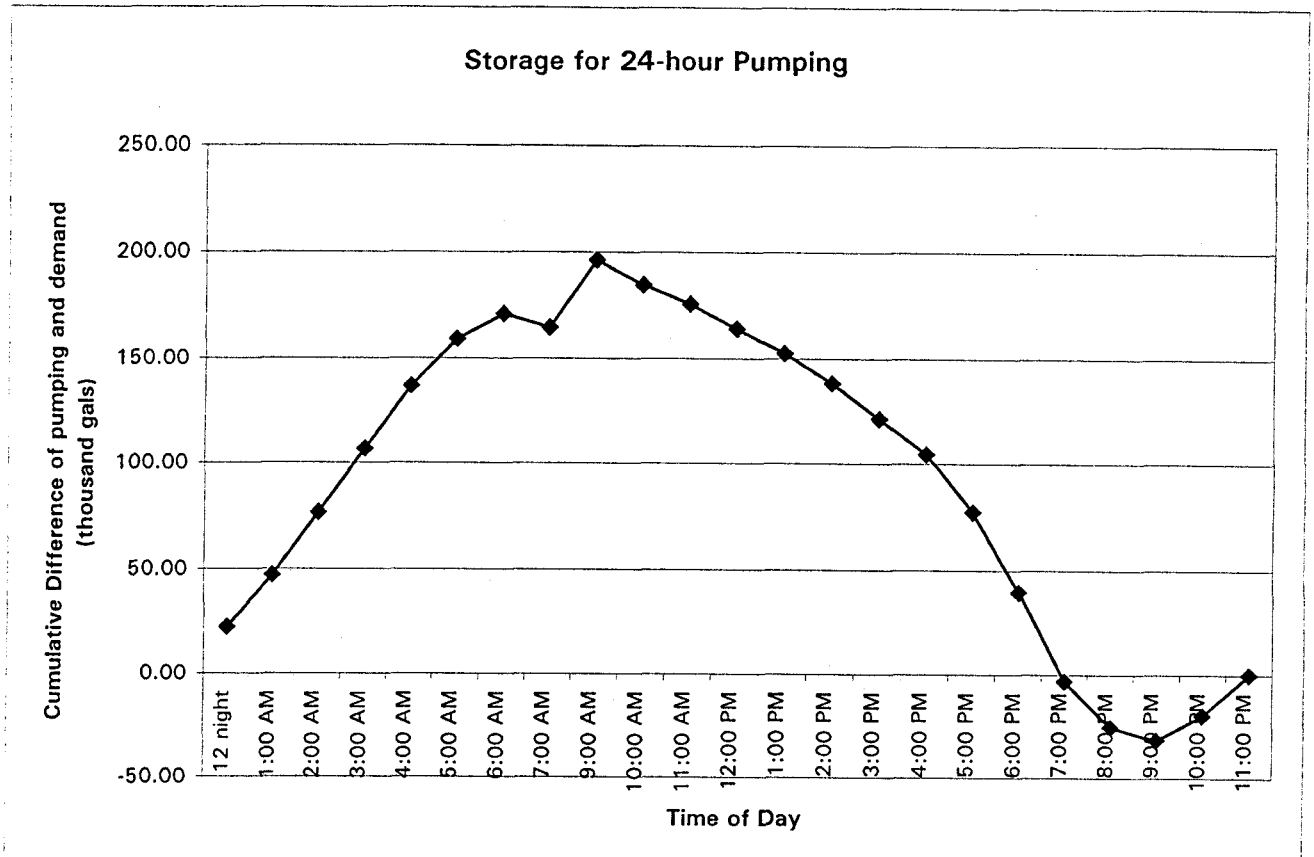
Computations for Water Storage Tank Capacity - Fink Road

Average Hourly Demand ***870.29*** gpm
Total Daily Demand = ***1,225.54*** galx1000

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				24-Hour Pumping		12-Hour Pumping	
Time	Hourly Demand Rate (gpm)	Hourly Demand (galx1000)	Cumulative Hourly Demand (galx1000)	Cumulative 24-hour pumping (galx1000)	Cumulative Difference (col.5-col.4) (galx1000)	Cumulative 12-hour pumping (galx1000)	Cumulative Difference (col.7-col.4) (galx1000)
12 night	478.66	28.72	28.72	51.06	22.34	0.00	-28.72
1:00 AM	435.15	26.11	54.83	102.13	47.30	0.00	-54.83
2:00 AM	365.52	21.93	76.76	153.19	76.43	0.00	-76.76
3:00 AM	348.12	20.89	97.65	204.26	106.61	0.00	-97.65
4:00 AM	348.12	20.89	118.53	255.32	136.79	0.00	-118.53
5:00 AM	478.66	28.72	147.25	306.39	159.13	0.00	-147.25
6:00 AM	652.72	39.16	186.42	357.45	171.03	102.13	-84.29
7:00 AM	957.32	57.44	243.86	408.51	164.66	204.26	-39.60
9:00 AM	1,174.89	70.49	314.35	510.64	196.29	408.51	94.17
10:00 AM	1,044.35	62.66	377.01	561.71	184.70	510.64	133.63
11:00 AM	1,000.83	60.05	437.06	612.77	175.71	612.77	175.71
12:00 PM	1,044.35	62.66	499.72	663.84	164.11	714.90	215.18
1:00 PM	1,044.35	62.66	562.38	714.90	152.52	817.03	254.65
2:00 PM	1,087.86	65.27	627.65	765.96	138.31	919.16	291.50
3:00 PM	1,131.38	67.88	695.54	817.03	121.49	1,021.29	325.75
4:00 PM	1,131.38	67.88	763.42	868.09	104.67	1,123.41	360.00
5:00 PM	1,305.44	78.33	841.74	919.16	77.41	1,225.54	383.80
6:00 PM	1,479.49	88.77	930.51	970.22	39.71	1,225.54	295.03
7:00 PM	1,566.52	93.99	1,024.51	1,021.29	-3.22	1,225.54	201.04
8:00 PM	1,218.41	73.10	1,097.61	1,072.35	-25.26	1,225.54	127.93
9:00 PM	957.32	57.44	1,155.05	1,123.41	-31.64	1,225.54	70.49
10:00 PM	652.72	39.16	1,194.21	1,174.48	-19.73	1,225.54	31.33
11:00 PM	522.17	31.33	1,225.54	1,225.54	0.00	1,225.54	0.00

Notes:

Values in column 2 were based on a typical variation in usage in a day. (Hydrology & Hydraulic Systems Ram S. Gupta, page 26, Figure 2.5)


Storage for 24-hour Pumping
Cumulative Difference of pumping and demand (thousand gals)
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
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4:00 PM
5:00 PM
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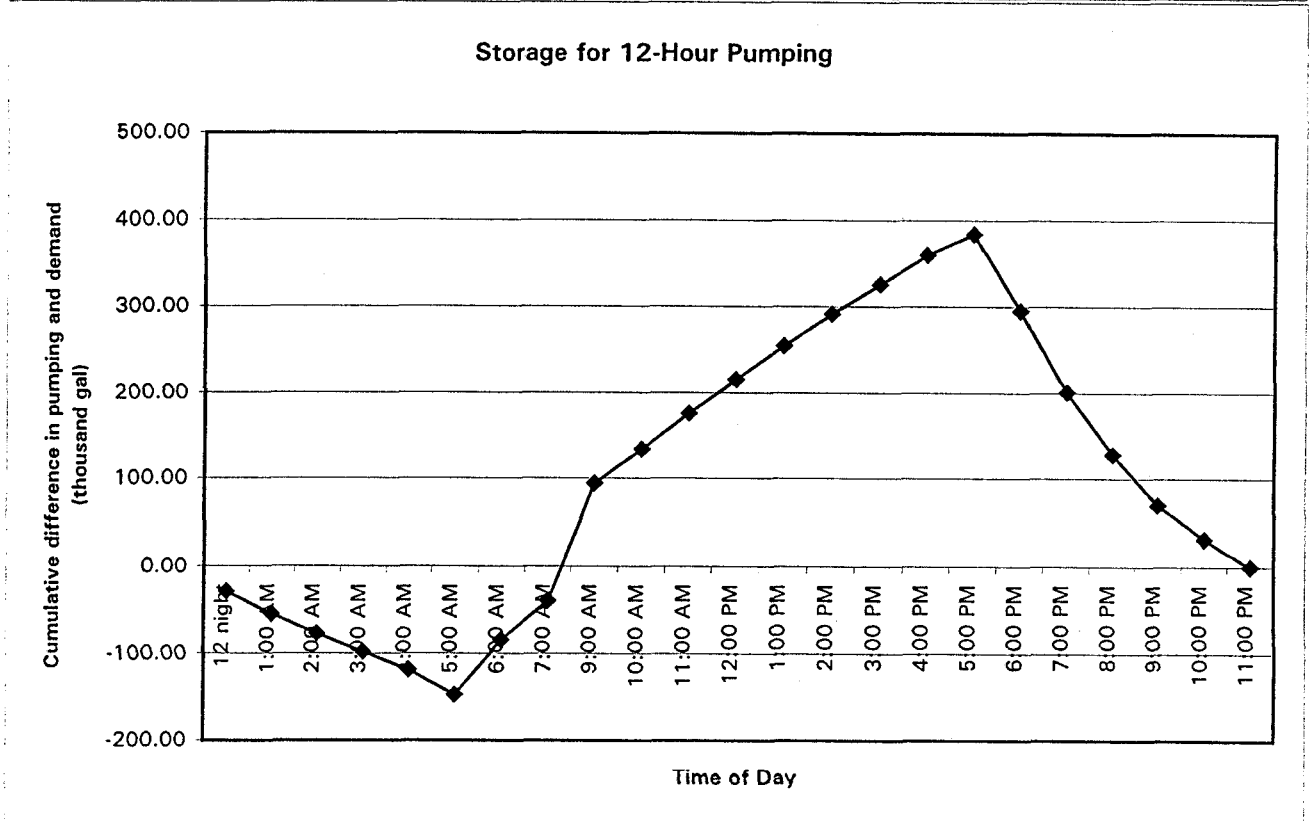
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day


Storage for 12-Hour Pumping
Cumulative difference in pumping and demand (thousand gal)
500.00
400.00
300.00
200.00
100.00
0.00
-100.00
-200.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day

Water Storage Tank Capacity Based on Demand

For:	Tank (gal)
24-Hour	240,000
12-Hour	550,000

Based on maximum distance between the bottom and top peaks on the curves

Emergency Requirements

Emergency requirements for 2 to 3 days capacity are typical.

Total Daily Demand = 1,225,542 gallons

Additional Water Storage to accommodate emergencies = **3,676,627** gallons
(assuming the most conservative value - 3 days)

Fire Demand

Based on "Land Development handbook, Dewberry & Davis, 1996, page 464",
The ISO used the following equation to estimate the required fire flow:

F = 18 x C x sqrt(A)
where
F = required fire flow in gpm
C = coefficient related to the type of construction
A = total floor area in square feet, including all stories but excluding basements, for one structure having the largest minimum supply requirement (NFPA 1231 Standard on Water Supplies for Suburban and Rural Fire Fighting, 1993 Edition)

For this particular study, a C = 1.0 is used for ordinary construction

Area is equal to the one structure with the maximum total area on the site.
Since hotels are anticipated to be developed on the site and has multiple floors which contribute to the fire flow calculation for total area, a hotel was chosen as the structure with the maximum fire flow.
Three hotels with varying number of stories were compared and their floor areas were averaged (Marriott,La Quinta, and Homestead) to obtain a maximum total floor area of:

Area = 3 acres
130,681 square feet

Therefore,
F = 6,507 gpm

So, the required duration for fire flow is 7 hours (Dewberry, Davis, page 467).

Required storage for fire flow is:
2,732,922 gallons

Total Storage Capacity

Pumping	Demand Capacity	Emergency Capacity	Fire Demand	Total Capacity	Total (Mgal)
24-Hour	155,000	3,676,627	2,732,922	6,564,549	6.56
12-Hour	350,000	3,676,627	2,732,922	6,759,549	6.76

Sizing of Tanks

Capacity = 6.76 Mgal
Conversio 903,683 cubic feet

Possible Tank Dimensions

Height (ft)	Diameter (ft)	Retention Time (d)
25	215	5.52
50	152	5.52
75	124	5.52
100	107	5.52

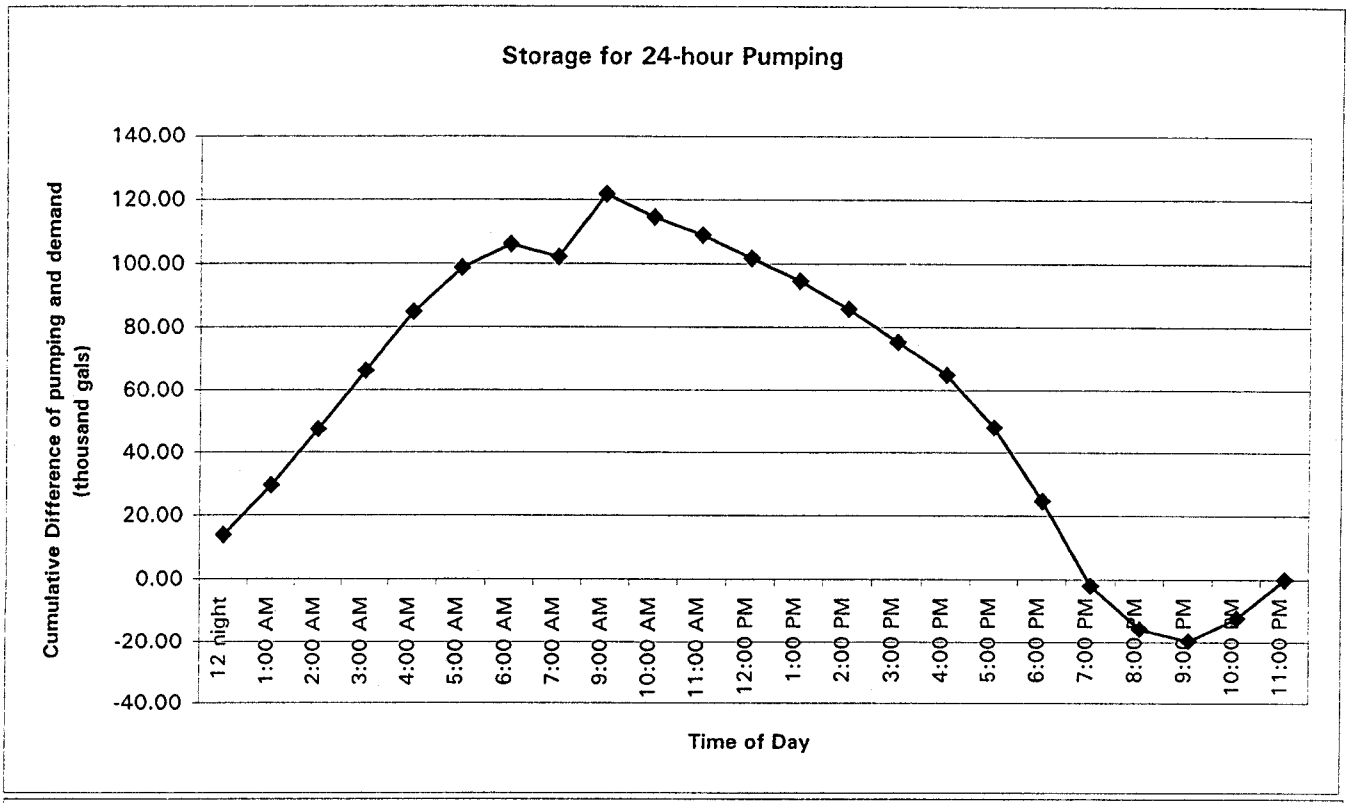
Computations for Water Storage Tank Capacity - Stuhr Road

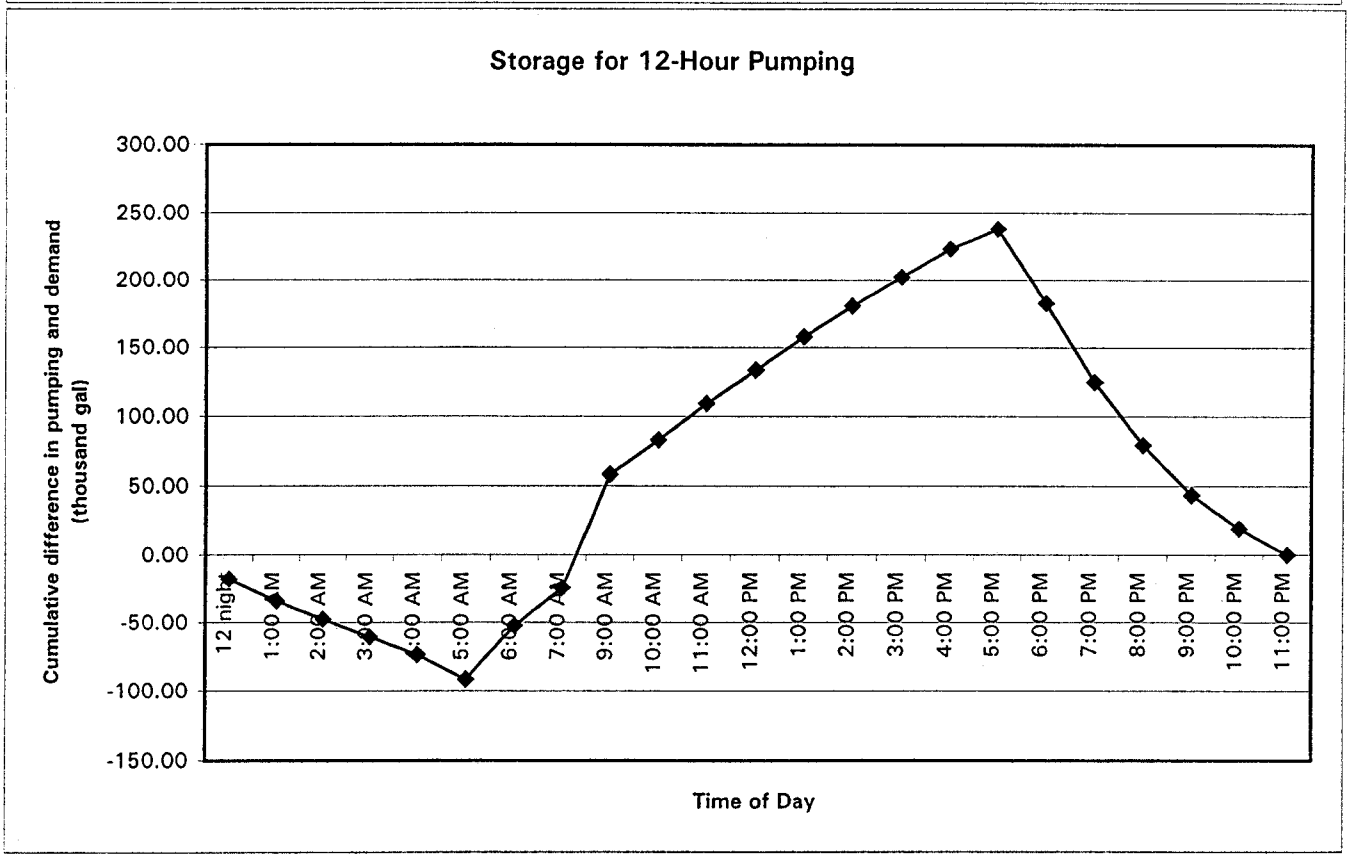
Average Hourly Demand *540* gpm
Total Daily Demand = *760.43* galx1000

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				24-Hour Pumping		12-Hour Pumping	
Time	Hourly Demand Rate (gpm)	Hourly Demand (galx1000)	Cumulative Hourly Demand (galx1000)	Cumulative 24-hour pumping (galx1000)	Cumulative Difference (col.5-col.4) (galx1000)	Cumulative 12-hour pumping (galx1000)	Cumulative Difference (col.7-col.4) (galx1000)
12 night	297.00	17.82	17.82	31.68	13.86	0.00	-17.82
1:00 AM	270.00	16.20	34.02	63.37	29.35	0.00	-34.02
2:00 AM	226.80	13.61	47.63	95.05	47.43	0.00	-47.63
3:00 AM	216.00	12.96	60.59	126.74	66.15	0.00	-60.59
4:00 AM	216.00	12.96	73.55	158.42	84.87	0.00	-73.55
5:00 AM	297.00	17.82	91.37	190.11	98.74	0.00	-91.37
6:00 AM	405.00	24.30	115.67	221.79	106.12	63.37	-52.30
7:00 AM	594.00	35.64	151.31	253.48	102.17	126.74	-24.57
9:00 AM	729.00	43.74	195.05	316.85	121.80	253.48	58.43
10:00 AM	648.00	38.88	233.93	348.53	114.60	316.85	82.92
11:00 AM	621.00	37.26	271.19	380.21	109.03	380.21	109.03
12:00 PM	648.00	38.88	310.07	411.90	101.83	443.58	133.52
1:00 PM	648.00	38.88	348.95	443.58	94.64	506.95	158.00
2:00 PM	675.00	40.50	389.45	475.27	85.82	570.32	180.87
3:00 PM	702.00	42.12	431.57	506.95	75.38	633.69	202.12
4:00 PM	702.00	42.12	473.69	538.64	64.95	697.06	223.37
5:00 PM	810.00	48.60	522.29	570.32	48.03	760.43	238.14
6:00 PM	918.00	55.08	577.37	602.01	24.64	760.43	183.06
7:00 PM	972.00	58.32	635.69	633.69	-2.00	760.43	124.74
8:00 PM	756.00	45.36	681.05	665.37	-15.67	760.43	79.38
9:00 PM	594.00	35.64	716.69	697.06	-19.63	760.43	43.74
10:00 PM	405.00	24.30	740.99	728.74	-12.24	760.43	19.44
11:00 PM	324.00	19.44	760.43	760.43	0.00	760.43	0.00

Notes:

Values in column 2 were based on a typical variation in usage in a day. (Hydrology & Hydraulic Systems, Ram S. Gupta, page 26, Figure 2.5)


Storage for 24-hour Pumping
Cumulative Difference of pumping and demand (thousand gals)
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day


Storage for 12-Hour Pumping
Cumulative difference in pumping and demand (thousand gal)
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day

Water Storage Tank Capacity Based on Demand

For:	Tank (gal)
24-Hour	155,000
12-Hour	350,000

Based on maximum distance between the bottom and top peaks on the curves

Emergency Requirements

Emergency requirements for 2 to 3 days capacity are typical.

Total Daily Demand = 760,428 gallons

Additional Water Storage to accommodate emergencies = **2,281,284** gallons
(assuming the most conservative value - 3 days)

Fire Demand

Based on "Land Development handbook, Dewberry & Davis, 1996, page 464",
The ISO used the following equation to estimate the required fire flow:

$F = 18 \times C \times \sqrt{A}$

where
F = required fire flow in gpm
C = coefficient related to the type of construction
A = total floor area in square feet, including all stories but excluding basements, for one structure having the largest minimum supply requirement (NFPA 1231 Standard on Water Supplies for Suburban and Rural Fire Fighting, 1993 Edition)

For this particular study, a C = 1.0 is used for ordinary construction

Area is equal to the one structure with the maximum total area on the site.
Since hotels are anticipated to be developed on the site and has multiple floors which contribute to the fire flow calculation for total area, a hotel was chosen as the structure with the maximum fire flow.
Three hotels with varying number of stories were compared and their floor areas were averaged (Marriott,La Quinta, and Homestead) to obtain a maximum total floor area of:

Area = 3 acres
130,681 square feet

Therefore,
F = 6,507 gpm

So, the required duration for fire flow is 7 hours (Dewberry, Davis, page 467).

Required storage for fire flow is:

2,732,922 gallons

Total Storage Capacity

Pumping	Demand Capacity	Emergency Capacity	Fire Demand	Total Capacity	Total (Mgal)
24-Hour	155,000	2,281,284	2,732,922	5,169,206	5.17
12-Hour	350,000	2,281,284	2,732,922	5,364,206	5.36

Sizing of Tanks

Capacity = 5.36 Mgal
Conversion 717,140 cubic feet

Possible Tank Dimensions

Height (ft)	Diameter (ft)	Retention Time (d)
25	191	7.05
50	135	7.05
75	110	7.05
100	96	7.05

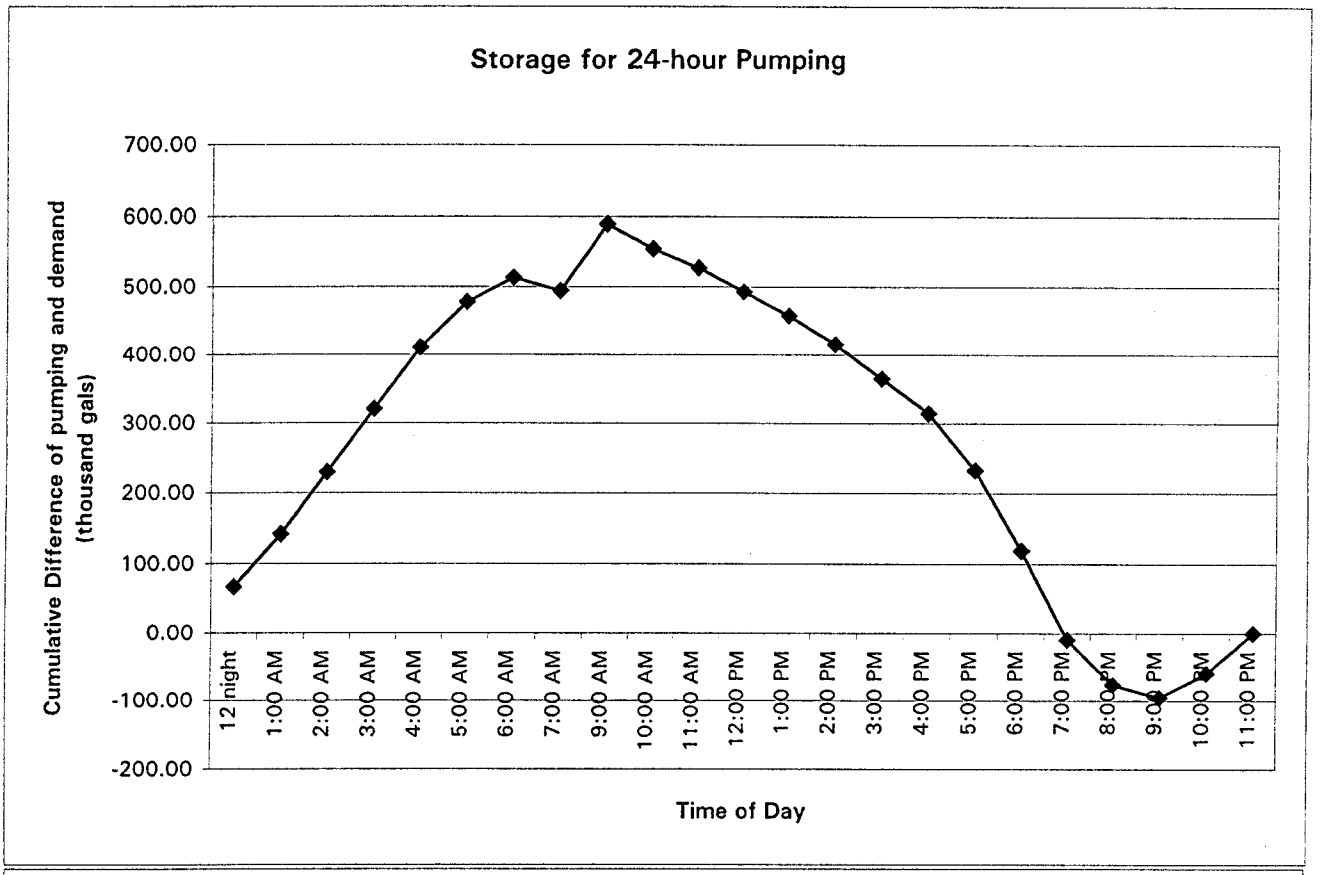
Computations for Water Storage Tank Capacity - Crows Landing

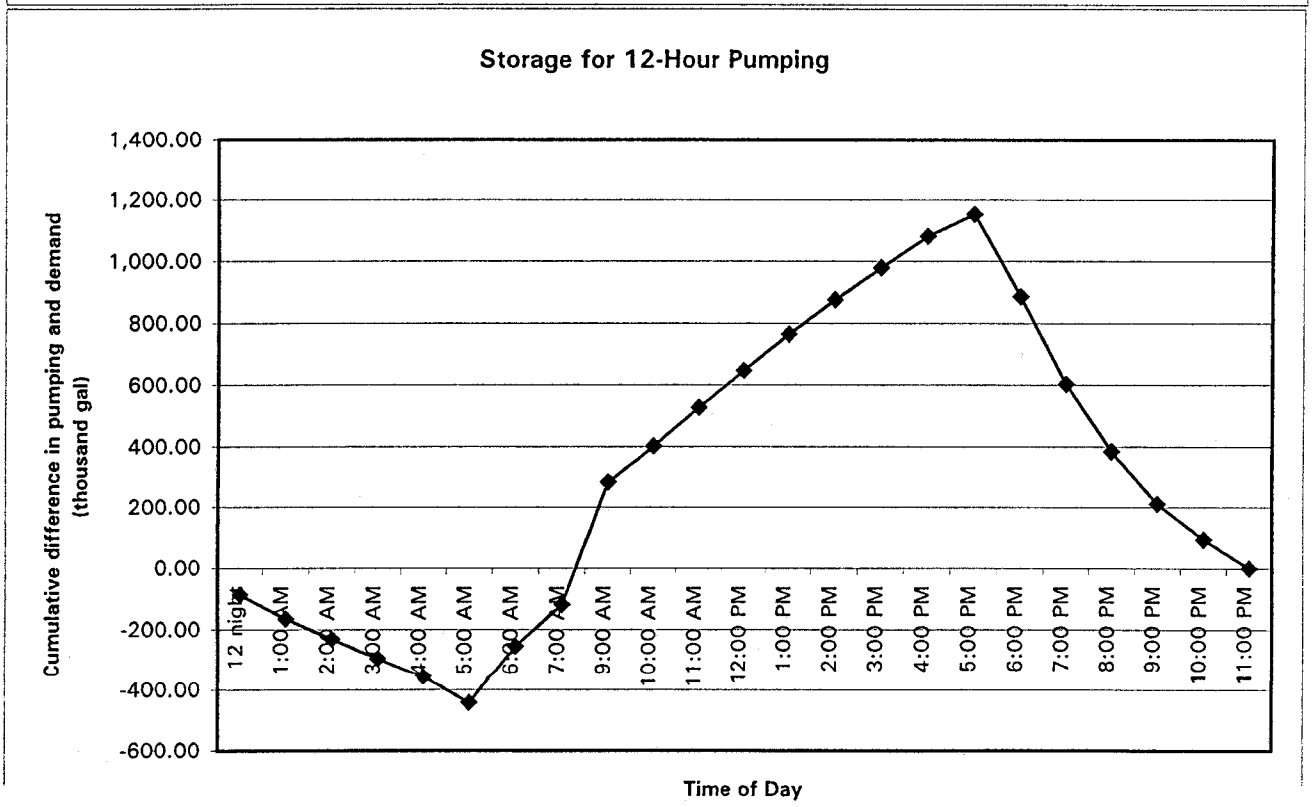
Average Hourly Demand *2614* gpm
Total Daily Demand = *3,681.03* galx1000

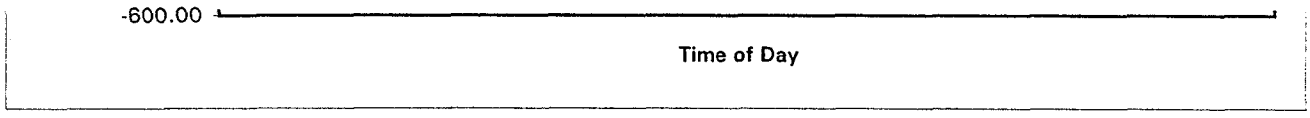
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				24-Hour Pumping		12-Hour Pumping	
Time	Hourly Demand Rate (gpm)	Hourly Demand (galx1000)	Cumulative Hourly Demand (galx1000)	Cumulative 24-hour pumping (galx1000)	Cumulative Difference (col.5-col.4) (galx1000)	Cumulative 12-hour pumping (galx1000)	Cumulative Difference (col.7-col.4) (galx1000)
12 night	1,437.70	86.26	86.26	153.38	67.11	0.00	-86.26
1:00 AM	1,307.00	78.42	164.68	306.75	142.07	0.00	-164.68
2:00 AM	1,097.88	65.87	230.55	460.13	229.57	0.00	-230.55
3:00 AM	1,045.60	62.74	293.29	613.51	320.22	0.00	-293.29
4:00 AM	1,045.60	62.74	356.03	766.88	410.86	0.00	-356.03
5:00 AM	1,437.70	86.26	442.29	920.26	477.97	0.00	-442.29
6:00 AM	1,960.50	117.63	559.92	1,073.64	513.72	306.75	-253.17
7:00 AM	2,875.40	172.52	732.44	1,227.01	494.57	613.51	-118.94
9:00 AM	3,528.90	211.73	944.18	1,533.76	589.59	1,227.01	282.83
10:00 AM	3,136.80	188.21	1,132.38	1,687.14	554.76	1,533.76	401.38
11:00 AM	3,006.10	180.37	1,312.75	1,840.52	527.77	1,840.52	527.77
12:00 PM	3,136.80	188.21	1,500.96	1,993.89	492.94	2,147.27	646.31
1:00 PM	3,136.80	188.21	1,689.17	2,147.27	458.10	2,454.02	764.86
2:00 PM	3,267.50	196.05	1,885.22	2,300.65	415.43	2,760.78	875.56
3:00 PM	3,398.20	203.89	2,089.11	2,454.02	364.91	3,067.53	978.42
4:00 PM	3,398.20	203.89	2,293.00	2,607.40	314.40	3,374.28	1,081.28
5:00 PM	3,921.00	235.26	2,528.26	2,760.78	232.52	3,681.03	1,152.77
6:00 PM	4,443.80	266.63	2,794.89	2,914.15	119.26	3,681.03	886.15
7:00 PM	4,705.20	282.31	3,077.20	3,067.53	-9.67	3,681.03	603.83
8:00 PM	3,659.60	219.58	3,296.78	3,220.91	-75.87	3,681.03	384.26
9:00 PM	2,875.40	172.52	3,469.30	3,374.28	-95.02	3,681.03	211.73
10:00 PM	1,960.50	117.63	3,586.93	3,527.66	-59.27	3,681.03	94.10
11:00 PM	1,568.40	94.10	3,681.03	3,681.03	0.00	3,681.03	0.00

Notes:

Values in column 2 were based on a typical variation in usage in a day. (Hydrology & Hydraulic Systems, Ram S. Gupta, page 26, Figure 2.5)


Storage for 24-hour Pumping
Cumulative Difference of pumping and demand (thousand gals)
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
-100.00
-200.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day


Storage for 12-Hour Pumping
Cumulative difference in pumping and demand (thousand gal)
1,400.00
1,200.00
1,000.00
800.00
600.00
400.00
200.00
0.00
-200.00
-400.00
-600.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day


-600.00
Time of Day

Water Storage Tank Capacity Based on Demand

For:	Tank (gal)
24-Hour	700,000
12-Hour	1,600,000

Based on maximum distance between the bottom and top peaks on the curves

Emergency Requirements

Emergency requirements for 2 to 3 days capacity are typical.

Total Daily Demand = 3,681,035 gallons

Additional Water Storage to accommodate emergencies = **11,043,104** gallons
(assuming the most conservative value - 3 days)

Fire Demand

Based on "Land Development handbook, Dewberry & Davis, 1996, page 464",
The ISO used the following equation to estimate the required fire flow:

F = 18 x C x sqrt(A)
where
F = required fire flow in gpm
C = coefficient related to the type of construction
A = total floor area in square feet, including all stories but excluding basements, for one structure having the largest minimum supply requirement (NFPA 1231 Standard on Water Supplies for Suburban and Rural Fire Fighting, 1993 Edition)

For this particular study, a C = 1.0 is used for ordinary construction

Area is equal to the one structure with the maximum total area on the site.
Since Fink Road is a unique site with atypical uses, the structure with the maximum total floor area may be a school or training center for activities such as hot air ballooning or sky diving.
For such centers, a maximum floor area is assumed to be 1 acre.

Area = 2 acres
87,120 square feet

Therefore,
F = 5,313 gpm

So, the required duration for fire flow is 6 hours (Dewberry, Davis, page 467).

Required storage for fire flow is:

1,912,647 gallons

Total Storage Capacity

Pumping	Demand Capacity	Emergency Capacity	Fire Demand	Total Capacity	Total (Mgal)
24-Hour	155,000	11,043,104	1,912,647	13,110,751	13.11
12-Hour	350,000	11,043,104	1,912,647	13,305,751	13.31

Sizing of Tanks

Capacity = 13.31 Mgal
Conversion 1,778,844 cubic feet

Possible Tank Dimensions

Height (ft)	Diameter (ft)	Retention Time (d)
25	301	3.61
50	213	3.61
75	174	3.61
100	151	3.61

Need three 4 mil tanks and one 1 mil tank

Computations for Water Storage Tank Capacity - Fink Road

(First Generation)

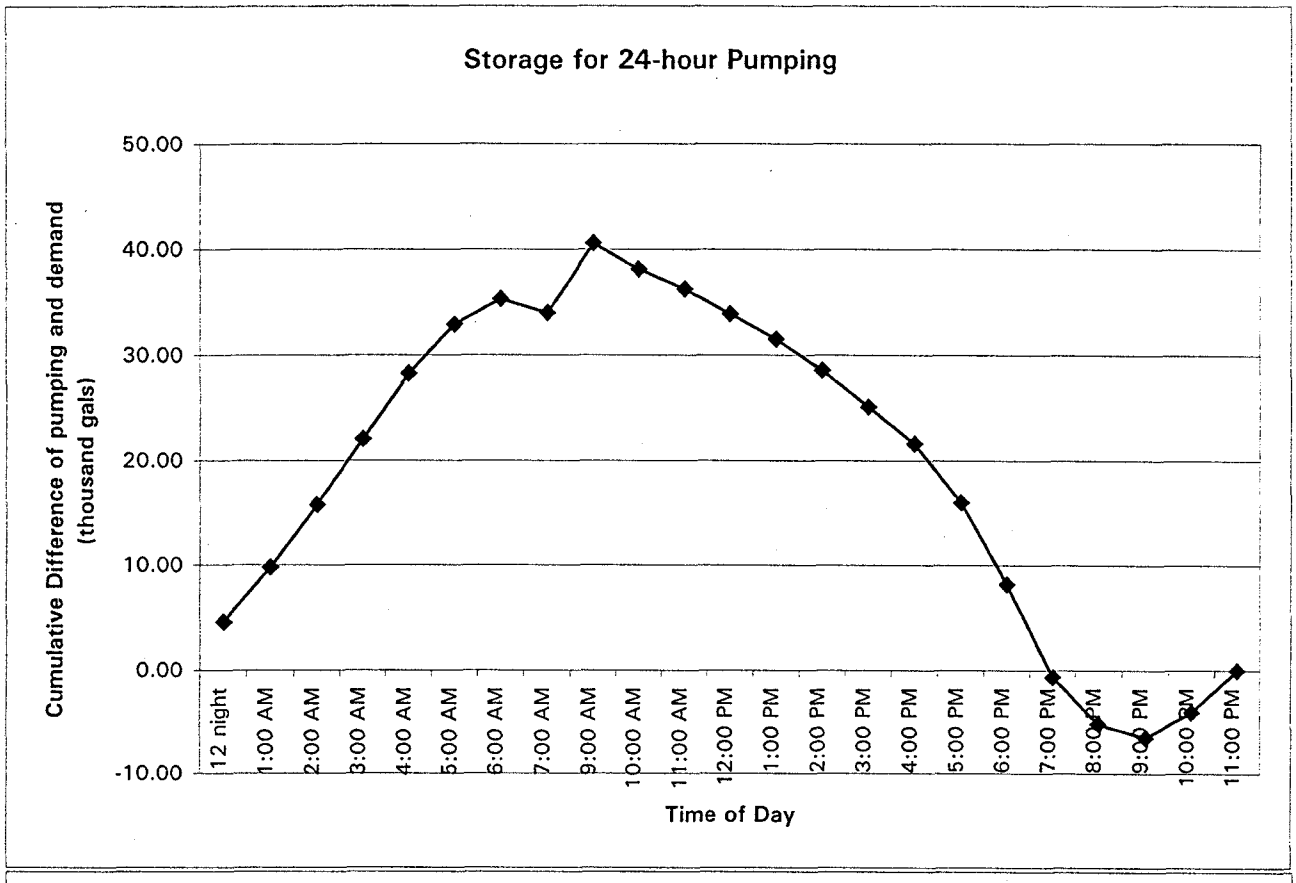
Average Hourly Demand *180* gpm

Total Daily Demand = *253.48* galx1000

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				24-Hour Pumping		12-Hour Pumping	
Time	Hourly Demand Rate (gpm)	Hourly Demand (galx1000)	Cumulative Hourly Demand (galx1000)	Cumulative 24-hour pumping (galx1000)	Cumulative Difference (col.5-col.4) (galx1000)	Cumulative 12-hour pumping (galx1000)	Cumulative Difference (col.7-col.4) (galx1000)
12 night	99.00	5.94	5.94	10.56	4.62	0.00	-5.94
1:00 AM	90.00	5.40	11.34	21.12	9.78	0.00	-11.34
2:00 AM	75.60	4.54	15.88	31.68	15.81	0.00	-15.88
3:00 AM	72.00	4.32	20.20	42.25	22.05	0.00	-20.20
4:00 AM	72.00	4.32	24.52	52.81	28.29	0.00	-24.52
5:00 AM	99.00	5.94	30.46	63.37	32.91	0.00	-30.46
6:00 AM	135.00	8.10	38.56	73.93	35.37	21.12	-17.43
7:00 AM	198.00	11.88	50.44	84.49	34.06	42.25	-8.19
9:00 AM	243.00	14.58	65.02	105.62	40.60	84.49	19.48
10:00 AM	216.00	12.96	77.98	116.18	38.20	105.62	27.64
11:00 AM	207.00	12.42	90.40	126.74	36.34	126.74	36.34
12:00 PM	216.00	12.96	103.36	137.30	33.94	147.86	44.51
1:00 PM	216.00	12.96	116.32	147.86	31.55	168.98	52.67
2:00 PM	225.00	13.50	129.82	158.42	28.61	190.11	60.29
3:00 PM	234.00	14.04	143.86	168.98	25.13	211.23	67.37
4:00 PM	234.00	14.04	157.90	179.55	21.65	232.35	74.46
5:00 PM	270.00	16.20	174.10	190.11	16.01	253.48	79.38
6:00 PM	306.00	18.36	192.46	200.67	8.21	253.48	61.02
7:00 PM	324.00	19.44	211.90	211.23	-0.67	253.48	41.58
8:00 PM	252.00	15.12	227.02	221.79	-5.22	253.48	26.46
9:00 PM	198.00	11.88	238.90	232.35	-6.54	253.48	14.58
10:00 PM	135.00	8.10	247.00	242.91	-4.08	253.48	6.48
11:00 PM	108.00	6.48	253.48	253.48	0.00	253.48	0.00

Notes:

Values in column 2 were based on a typical variation in usage in a day. (Hydrology & Hydraulic Systems Ram S. Gupta, page 26, Figure 2.5)


Storage for 24-hour Pumping
Cumulative Difference of pumping and demand (thousand gals)
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
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7:00 PM
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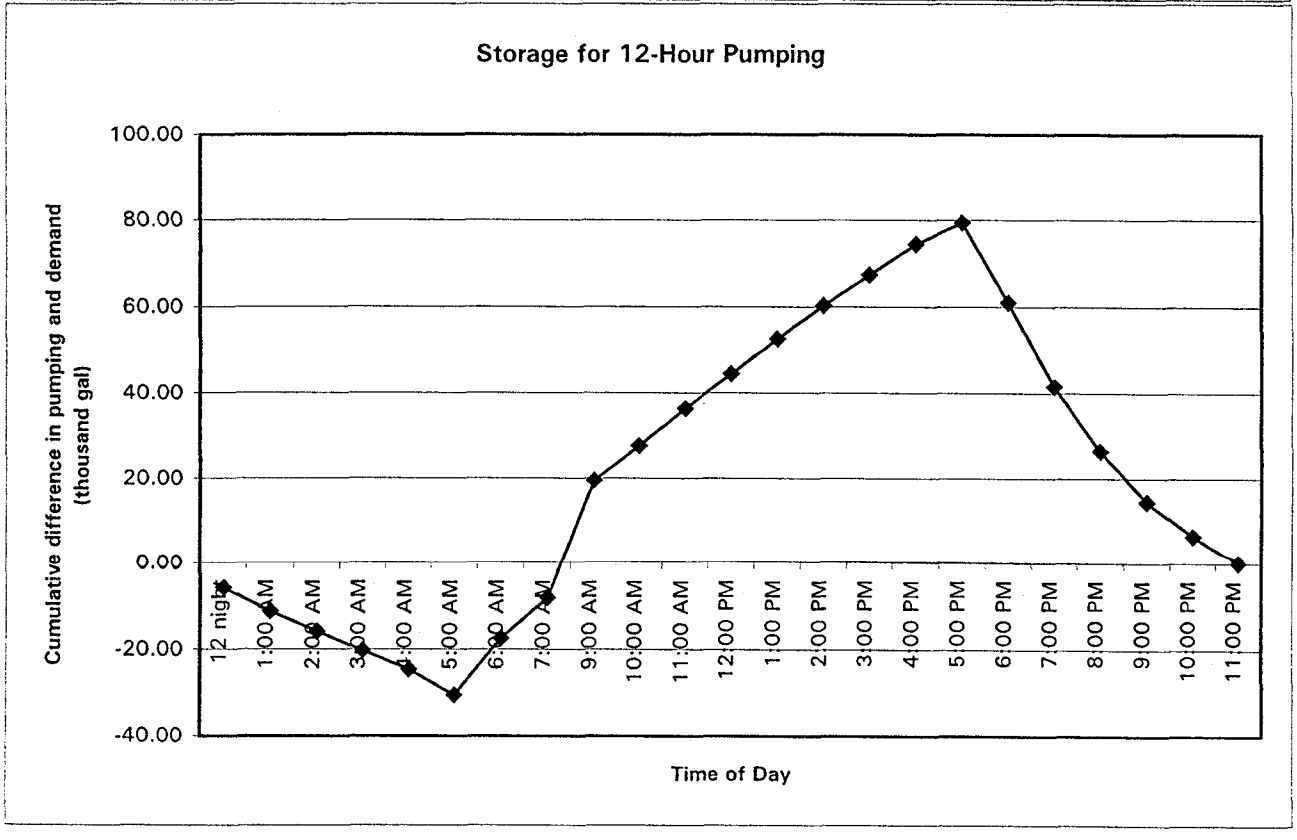
9:00 PM
10:00 PM
11:00 PM
Time of Day


Storage for 12-Hour Pumping
Cumulative difference in pumping and demand (thousand gal)
100.00
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day

Water Storage Tank Capacity Based on Demand

For:	Tank (gal)
24-Hour	50,000
12-Hour	120,000

Based on maximum distance between the bottom and top peaks on the curves

Emergency Requirements

Emergency requirements for 2 to 3 days capacity are typical.

Total Daily Demand = 253,476 gallons

Additional Water Storage to accommodate emergencies = **760,428** gallons
(assuming the most conservative value - 3 days)

Fire Demand

Based on "Land Development handbook, Dewberry & Davis, 1996, page 464",
The ISO used the following equation to estimate the required fire flow:

$F = 18 \times C \times \sqrt{A}$

where
F = required fire flow in gpm
C = coefficient related to the type of construction
A = total floor area in square feet, including all stories but excluding basements, for one structure having the largest minimum supply requirement (NFPA 1231 Standard on Water Supplies for Suburban and Rural Fire Fighting, 1993 Edition)

For this particular study, a C = 1.0 is used for ordinary construction

Area is equal to the one structure with the maximum total area on the site.
Since hotels are anticipated to be developed on the site and has multiple floors which contribute to the fire flow calculation for total area, a hotel was chosen as the structure with the maximum fire flow.
Three hotels with varying number of stories were compared and their floor areas were averaged (Marriott,La Quinta, and Homestead) to obtain a maximum total floor area of:

Area = 3 acres
130,681 square feet

Therefore,
F = 6,507 gpm

So, the required duration for fire flow is 7 hours (Dewberry, Davis, page 467).

Required storage for fire flow is:

2,732,922 gallons

Total Storage Capacity

Pumping	Demand Capacity	Emergency Capacity	Fire Demand	Total Capacity	Total (Mgal)
24-Hour	155,000	760,428	2,732,922	3,648,350	3.65
12-Hour	350,000	760,428	2,732,922	3,843,350	3.84

Sizing of Two Tanks

Capacity = 1.92 Mgal
Conversio 256,908 cubic feet

Possible Tank Dimensions

Height (ft)	Diameter (ft)	Retention Time (d)
25	114	7.58
50	81	7.58
75	66	7.58
100	57	7.58

Need 2-2 million gallon tanks.

Computations for Water Storage Tank Capacity - Stuhr Road

(First generation)

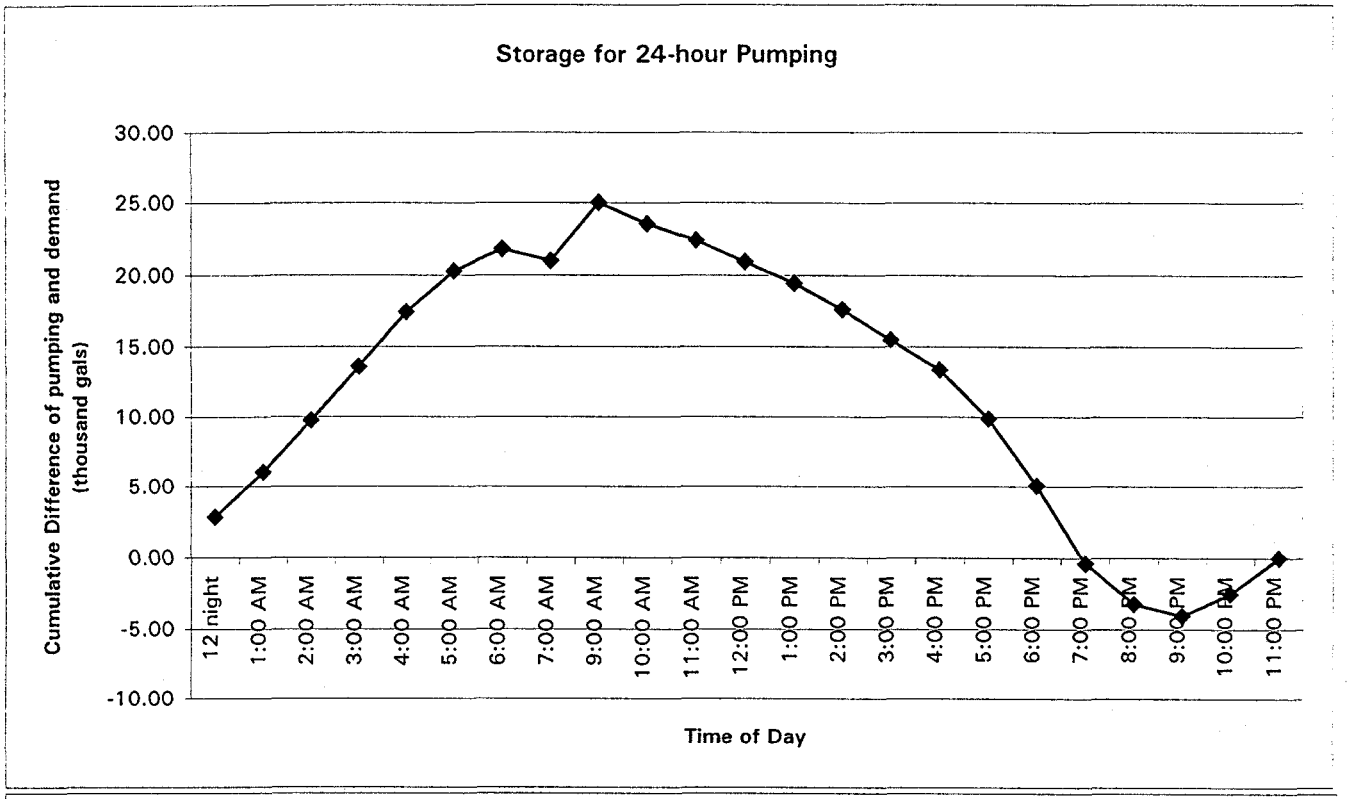
Average Hourly Demand ***111*** gpm

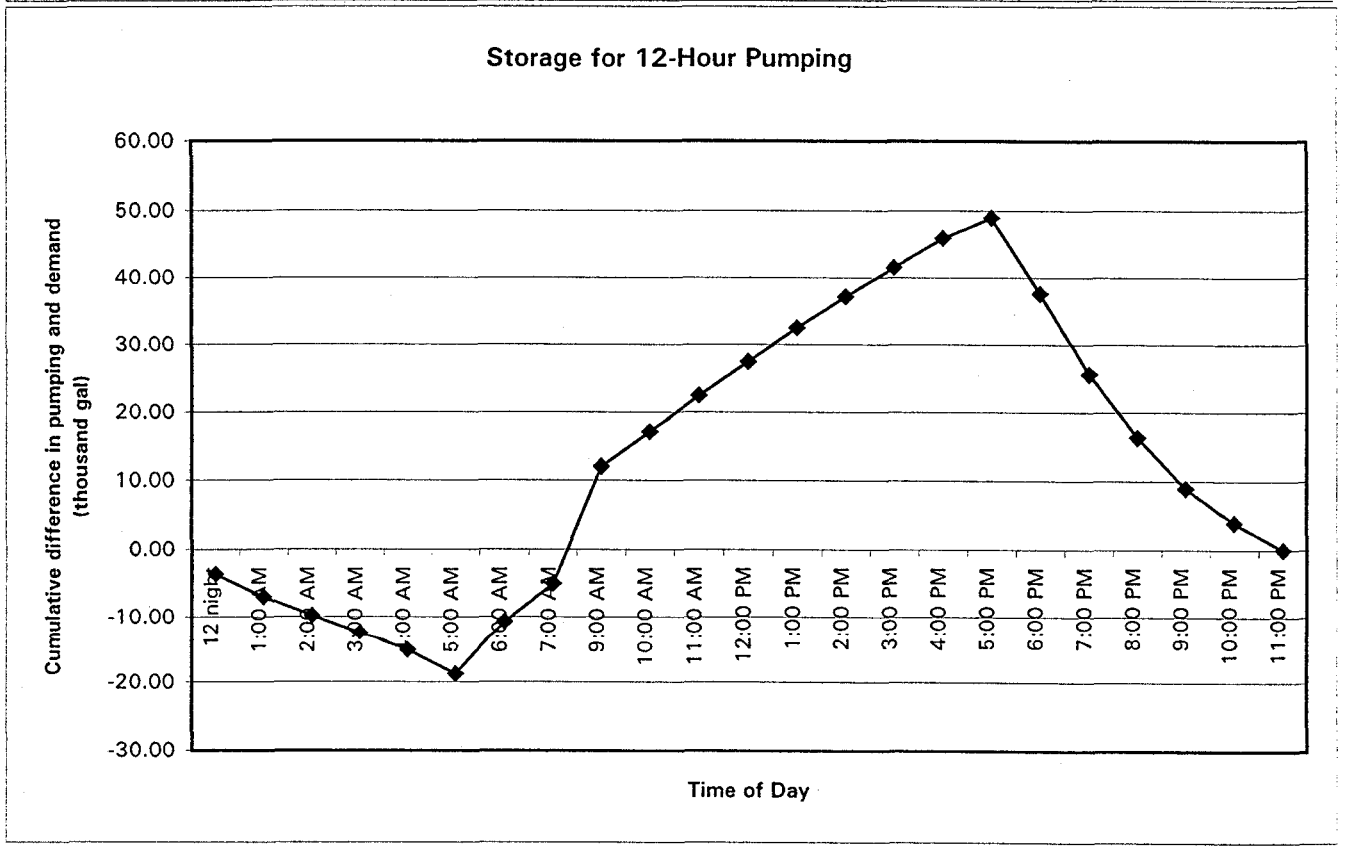
Total Daily Demand = ***156.31*** galx1000

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				24-Hour Pumping		12-Hour Pumping	
Time	Hourly Demand Rate (gpm)	Hourly Demand (galx1000)	Cumulative Hourly Demand (galx1000)	Cumulative 24-hour pumping (galx1000)	Cumulative Difference (col.5-col.4) (galx1000)	Cumulative 12-hour pumping (galx1000)	Cumulative Difference (col.7-col.4) (galx1000)
12 night	61.05	3.66	3.66	6.51	2.85	0.00	-3.66
1:00 AM	55.50	3.33	6.99	13.03	6.03	0.00	-6.99
2:00 AM	46.62	2.80	9.79	19.54	9.75	0.00	-9.79
3:00 AM	44.40	2.66	12.45	26.05	13.60	0.00	-12.45
4:00 AM	44.40	2.66	15.12	32.56	17.45	0.00	-15.12
5:00 AM	61.05	3.66	18.78	39.08	20.30	0.00	-18.78
6:00 AM	83.25	5.00	23.78	45.59	21.81	13.03	-10.75
7:00 AM	122.10	7.33	31.10	52.10	21.00	26.05	-5.05
9:00 AM	149.85	8.99	40.09	65.13	25.04	52.10	12.01
10:00 AM	133.20	7.99	48.09	71.64	23.56	65.13	17.04
11:00 AM	127.65	7.66	55.74	78.16	22.41	78.16	22.41
12:00 PM	133.20	7.99	63.74	84.67	20.93	91.18	27.44
1:00 PM	133.20	7.99	71.73	91.18	19.45	104.21	32.48
2:00 PM	138.75	8.33	80.05	97.69	17.64	117.23	37.18
3:00 PM	144.30	8.66	88.71	104.21	15.50	130.26	41.55
4:00 PM	144.30	8.66	97.37	110.72	13.35	143.28	45.92
5:00 PM	166.50	9.99	107.36	117.23	9.87	156.31	48.95
6:00 PM	188.70	11.32	118.68	123.75	5.06	156.31	37.63
7:00 PM	199.80	11.99	130.67	130.26	-0.41	156.31	25.64
8:00 PM	155.40	9.32	139.99	136.77	-3.22	156.31	16.32
9:00 PM	122.10	7.33	147.32	143.28	-4.03	156.31	8.99
10:00 PM	83.25	5.00	152.31	149.80	-2.52	156.31	4.00
11:00 PM	66.60	4.00	156.31	156.31	0.00	156.31	0.00

Notes:

Values in column 2 were based on a typical variation in usage in a day. (Hydrology & Hydraulic Systems, Ram S. Gupta, page 26, Figure 2.5)


Storage for 24-hour Pumping
Cumulative Difference of pumping and demand (thousand gals)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day


Storage for 12-Hour Pumping
Cumulative difference in pumping and demand (thousand gal)
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day

Water Storage Tank Capacity Based on Demand

For:	Tank (gal)
24-Hour	30,000
12-Hour	70,000

Based on maximum distance between the bottom and top peaks on the curves

Emergency Requirements

Emergency requirements for 2 to 3 days capacity are typical.

Total Daily Demand = 156,310 gallons

Additional Water Storage to accommodate emergencies = **468,931** gallons
(assuming the most conservative value - 3 days)

Fire Demand

Based on "Land Development handbook, Dewberry & Davis, 1996, page 464",
The ISO used the following equation to estimate the required fire flow:

$F = 18 \times C \times \sqrt{A}$

where
F = required fire flow in gpm
C = coefficient related to the type of construction
A = total floor area in square feet, including all stories but excluding basements, for one structure having the largest minimum supply requirement (NFPA 1231 Standard on Water Supplies for Suburban and Rural Fire Fighting, 1993 Edition)

For this particular study, a C = 1.0 is used for ordinary construction

Area is equal to the one structure with the maximum total area on the site.
Since hotels are anticipated to be developed on the site and has multiple floors which contribute to the fire flow calculation for total area, a hotel was chosen as the structure with the maximum fire flow.
Three hotels with varying number of stories were compared and their floor areas were averaged (Marriott,La Quinta, and Homestead) to obtain a maximum total floor area of:

Area = 3 acres
130,681 square feet

Therefore,
F = 6,507 gpm

So, the required duration for fire flow is 7 hours (Dewberry, Davis, page 467).

Required storage for fire flow is:
2,732,922 gallons

Total Storage Capacity

Pumping	Demand Capacity	Emergency Capacity	Fire Demand	Total Capacity	Total (Mgal)
24-Hour	155,000	468,931	2,732,922	3,356,852	3.36
12-Hour	350,000	468,931	2,732,922	3,551,852	3.55

Sizing of Tanks

Capacity = 1.18 Mgal
Conversion 158,282 cubic feet

Possible Tank Dimensions

Need 3 - 1.2 million gallon tanks.

Height (ft)	Diameter (ft)	Retention Time (d)
25	90	7.57
50	64	7.57
75	52	7.57
100	45	7.57

Computations for Water Storage Tank Capacity - Crows Landing

(First Generation)

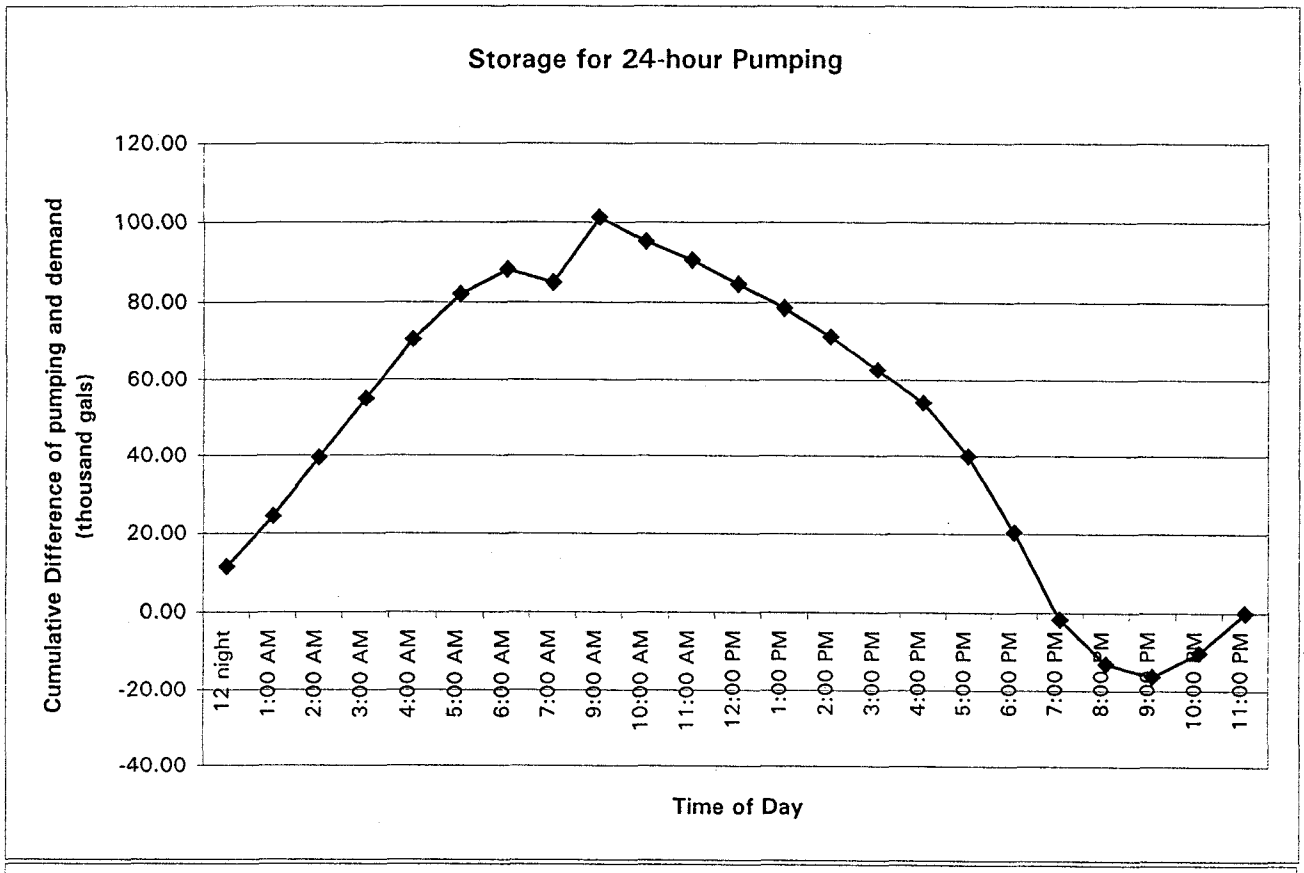
Average Hourly Demand *449* gpm

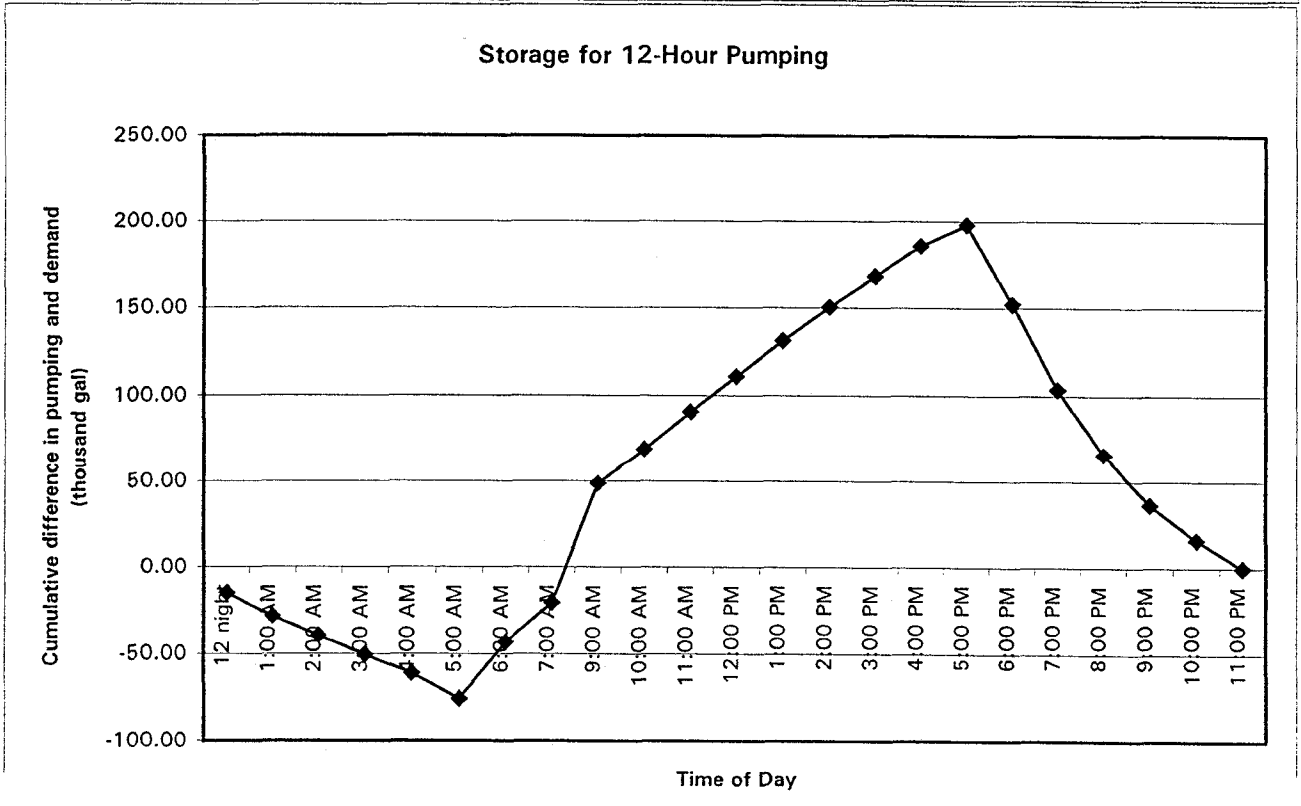
Total Daily Demand = *632.28* galx1000

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				24-Hour Pumping		12-Hour Pumping	
Time	Hourly Demand Rate (gpm)	Hourly Demand (galx1000)	Cumulative Hourly Demand (galx1000)	Cumulative 24-hour pumping (galx1000)	Cumulative Difference (col.5-col.4) (galx1000)	Cumulative 12-hour pumping (galx1000)	Cumulative Difference (col.7-col.4) (galx1000)
12 night	246.95	14.82	14.82	26.35	11.53	0.00	-14.82
1:00 AM	224.50	13.47	28.29	52.69	24.40	0.00	-28.29
2:00 AM	188.58	11.31	39.60	79.04	39.43	0.00	-39.60
3:00 AM	179.60	10.78	50.38	105.38	55.00	0.00	-50.38
4:00 AM	179.60	10.78	61.15	131.73	70.57	0.00	-61.15
5:00 AM	246.95	14.82	75.97	158.07	82.10	0.00	-75.97
6:00 AM	336.75	20.21	96.18	184.42	88.24	52.69	-43.49
7:00 AM	493.90	29.63	125.81	210.76	84.95	105.38	-20.43
9:00 AM	606.15	36.37	162.18	263.45	101.27	210.76	48.58
10:00 AM	538.80	32.33	194.51	289.80	95.29	263.45	68.94
11:00 AM	516.35	30.98	225.49	316.14	90.65	316.14	90.65
12:00 PM	538.80	32.33	257.82	342.49	84.67	368.83	111.02
1:00 PM	538.80	32.33	290.14	368.83	78.69	421.52	131.38
2:00 PM	561.25	33.68	323.82	395.18	71.36	474.21	150.39
3:00 PM	583.70	35.02	358.84	421.52	62.68	526.90	168.06
4:00 PM	583.70	35.02	393.86	447.87	54.00	579.59	185.73
5:00 PM	673.50	40.41	434.27	474.21	39.94	632.28	198.01
6:00 PM	763.30	45.80	480.07	500.56	20.49	632.28	152.21
7:00 PM	808.20	48.49	528.56	526.90	-1.66	632.28	103.72
8:00 PM	628.60	37.72	566.28	553.25	-13.03	632.28	66.00
9:00 PM	493.90	29.63	595.91	579.59	-16.32	632.28	36.37
10:00 PM	336.75	20.21	616.12	605.94	-10.18	632.28	16.16
11:00 PM	269.40	16.16	632.28	632.28	0.00	632.28	0.00

Notes:

Values in column 2 were based on a typical variation in usage in a day. (Hydrology & Hydraulic Systems, Ram S. Gupta, page 26, Figure 2.5)


Storage for 24-hour Pumping
Cumulative Difference of pumping and demand (thousand gals)
120.00
100.00
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time of Day


Storage for 12-Hour Pumping
Cumulative difference in pumping and demand (thousand gal)
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
12 night
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
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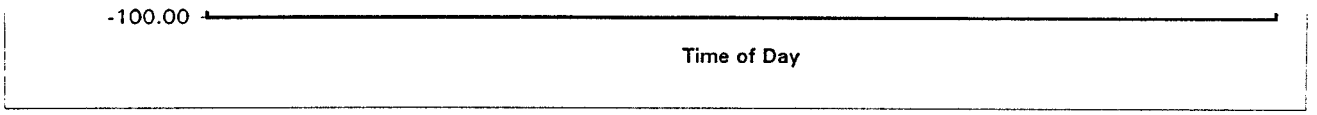
11:00 PM
Time of Day


-100.00
Time of Day

Water Storage Tank Capacity Based on Demand

For:	Tank (gal)
24-Hour	120,000
12-Hour	260,000

Based on maximum distance between the bottom and top peaks on the curves

Emergency Requirements

Emergency requirements for 2 to 3 days capacity are typical.

Total Daily Demand = 632,282 gallons

Additional Water Storage to accommodate emergencies = **1,896,845** gallons
(assuming the most conservative value - 3 days)

Fire Demand

Based on "Land Development handbook, Dewberry & Davis, 1996, page 464",
The ISO used the following equation to estimate the required fire flow:

$F = 18 \times C \times \sqrt{A}$

where
F = required fire flow in gpm
C = coefficient related to the type of construction
A = total floor area in square feet, including all stories but excluding basements, for one structure having the largest minimum supply requirement (NFPA 1231 Standard on Water Supplies for Suburban and Rural Fire Fighting, 1993 Edition)

For this particular study, a C = 1.0 is used for ordinary construction

Area is equal to the one structure with the maximum total area on the site.
Since Fink Road is a unique site with atypical uses, the structure with the maximum total floor area may be a school or training center for activities such as hot air ballooning or sky diving.
For such centers, a maximum floor area is assumed to be 1 acre.

Area = 2 acres
87,120 square feet

Therefore,
F = 5,313 gpm

So, the required duration for fire flow is 6 hours (Dewberry, Davis, page 467).

Required storage for fire flow is:
1,912,647 gallons

Total Storage Capacity

Pumping	Demand Capacity	Emergency Capacity	Fire Demand	Total Capacity	Total (Mgal)
24-Hour	155,000	1,896,845	1,912,647	3,964,492	3.96
12-Hour	350,000	1,896,845	1,912,647	4,159,492	4.16

Sizing of Tanks for Two Tanks

Capacity = 2.08 Mgal
Conversion 278,041 cubic feet

Possible Tank Dimensions

Height (ft)	Diameter (ft)	Retention Time (d)
25	119	3.29
50	84	3.29
75	69	3.29
100	60	3.29

Need one 4 million gallon tanks.

Comparison of First and Third Generation Water Storage Requirements

Site	Area (Acres)	First Generation			Third Generation		
	Total	Flow (gpm)	# Tanks	Tank Size (mil.gal)	Flow (gpm)	# Tanks	Tank Size (mil.gal)
Westley	1300	234	1	2.00	1,131	3	2.00
Sperry	800	144	n/a	n/a	696	n/a	n/a
Crows Landing	2,500	449	1	4.00	2,614	3	4.00
						1	1.00
Fink Road	1,000	180	2	2.00	870	3	2.00
						1	1.00
Stuhr Road	600	108	3	1.20	522	3	2.00

Crows Landing and Fink Road can be upgraded from First Generation to Third Generation.
Westley, Stuhr Road would be difficult to upgrade based on tank size, detention time, and the high fire flow required.

appendix B

Economic Analysis

PLANNING LEVEL ECONOMIC ANALYSIS

I-5 CORRIDOR

SELECTED SITES IN STANISLAUS COUNTY

Prepared for: EDAW

JULY 1998

WILLIAMS-KUEBELBECK & ASSOCIATES, INC.

I-5 CORRIDOR

ECONOMIC ANALYSIS OF SELECTED SITES

INTRODUCTION

The I-5 corridor is the main north south truck route for the movement of goods in California, as well a major north south route for passenger traffic.

Although a picture of the Westley Rest Stop is not included, several site visits found anywhere from 10 to 15 major truck rigs parked at the rest stop enroute south.

The section of I-5 under study is strategically located relative to the Monterey Peninsula, San Francisco Bay Area and Central Valley Counties.

The population exhibit following indicates the significant population pressures in future years on San Joaquin and Stanislaus Counties.

In the twelve years between 1986 and 1998, population is Stanislaus County increased 39% by about 120,000 people. Between 1998 and 2010, the County's population is estimated to increase by 47%, or over 200,000 new residents.

POPULATION ESTIMATES
1986-1998

Year	San Joaquin	Stanislaus	Combined	State Total
1986	425,365	307,278	732,643	26,741,621
1987	441,578	318,900	760,478	27,388,477
1988	454,778	331,741	786,519	28,060,746
1989	466,337	346,393	812,730	28,771,207
1990	477,665	365,119	842,784	29,557,836
1991	490,300	382,000	872,300	30,296,000
1992	499,900	392,100	892,000	30,845,000
1993	507,200	400,400	907,600	31,303,000
1994	513,100	407,100	920,200	31,661,000
1995	519,800	411,300	931,100	31,910,000
1996	528,900	416,100	945,000	32,223,000
1997	535,400	419,500	954,900	32,609,000
1998	545,200	427,600	972,800	33,252,000

Ca. Annual Population & Housing Data, 4-1-80 to 4-1-90; Ca. Dept. of Finance, Demographic Research Unit, Printed 1/15/92

Historical City/County Population Estimates 1991-97, with 1990 Census Counts; Ca. Dept. of Finance, Demographic Research Unit, May 1997

California Demographics Spring 1997, City/County Population Estimates with Percent Change 1-1-96 & 97, Ca. Dept. of Finance, Demographic Research Unit

Ca. Dept. of Finance, Demographic Research Unit, 916/322-4651 Telephone Information

POPULATION PROJECTIONS
2000-2020

Year	San Joaquin	Stanislaus	Combined	State Total
2000	585,600	477,300	1,062,900	34,704,000
2010	745,500	628,400	1,373,900	40,939,000
2020	920,900	793,600	1,714,500	47,507,000

Interim County Population Projections Estimated 7/1/96 and Projected for 2000, 2010 and 2020, Ca. Dept. of Finance, Demographic Research Unit, April 1997

Such growth in the next 12 years could require upwards of 9000 new acres of residential land use and based upon an average per-capita expenditure of about $9,000, the current County rate, over $1.8 billion in new demand for goods and services. Most of these goods and services will be trucked into the County via I-5 or Highway 99.

Although our analysis did not encompass a complete industrial and commercial demand study for the entire county, we attempted to include, where appropriate, (such as the Crows Landing NAS parcel) sites which would provide supply for general county demand.

WK&A was asked to conduct an economic and financial review of five sites. They are 1) Westley Triangle; 2) Sperry Interchange; 3) Fink Road - West Side; 4) Fink Road - Crows Landing; and 5) Stuhr Road.

Our discussion of demand and feasible use of the five sites follows below.

Demand

Demand between 1998 and 2015 is 530 acres for the five I-5 corridor sites, about equally divided between retail (216) and industrial (314). Wholesale Trade, primarily goods storage and movement is included in the above total for industry.

Table Econ - 1 indicates the projected absorption rate by time period.

Table Econ - 1 Projected Demand [1] (Acres) I-5 Corridor			
Period	**Retail**	**Industrial**	**Total**
1998-2000	26	38	64
2001-2005	58	84	142
2006-2010	63	92	155
2011-2015	69	100	169
Total	216	314	530

[1] Does not include possibility of unique large-scale user needing a large site along I-5 (25 acres or more).

Although, historically, demand along I-5 has been substantially less than projected in this report, our research indicates that this historic lack of development was attributable to 1) economic slow down in the late 1980's and early 1990's and 2) lack of available sites with available sewer and water.

With the emergence of the Gateway Project at Sperry Road and additional expansion at Westley, the projected demand, although somewhat optimistic, is attainable.

Supply

The sites are analyzed in some detail elsewhere in the report. From the standpoint of effective demand the sites break down as shown in Table Econ - 2. Although total acreage studied by the project team was about 6,200, WK&A's analysis of developer plans, siting of parcels, access and location indicate, realistically, that about 3,600 acres, (if feasible) have development potential. Of the 3,600 acres possible, about 1100 acres are considered as potentially developable in the next 15-20 years. This "available" acreage is about double the projected demand of 530 acres, exclusive to the I-5 Corridor. This projection excludes potential at the Crows Landing NAS which should share in the general commercial and industrial demand occurring countywide.

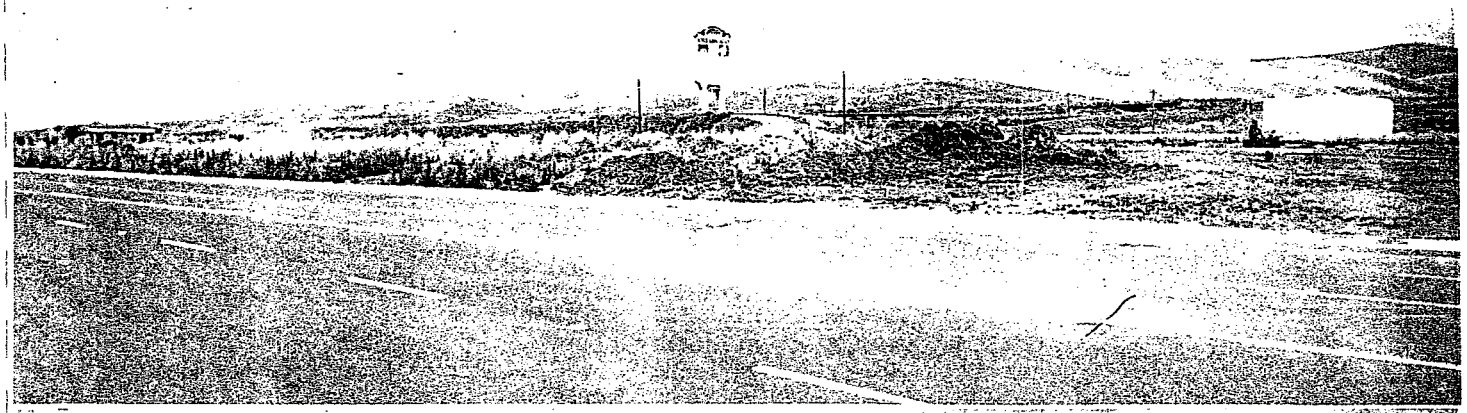
Table Econ 2
Supply vs. Potential Demand
I-5 Interchange Sites
1998-2015

I-5 Sites Studied	Total Acres	1998-2015 Demand	Supply as Percent of Demand
Total Acreage Studied	6,200		
WK&A Survey*	3,600		
Short Term Potential [Based on current availability]	1,050	530	**198%**
Commercial	290	220	**132%**
Industrial	750	310	**242%**
Vacant[Long Term Potential]	4000-5000		

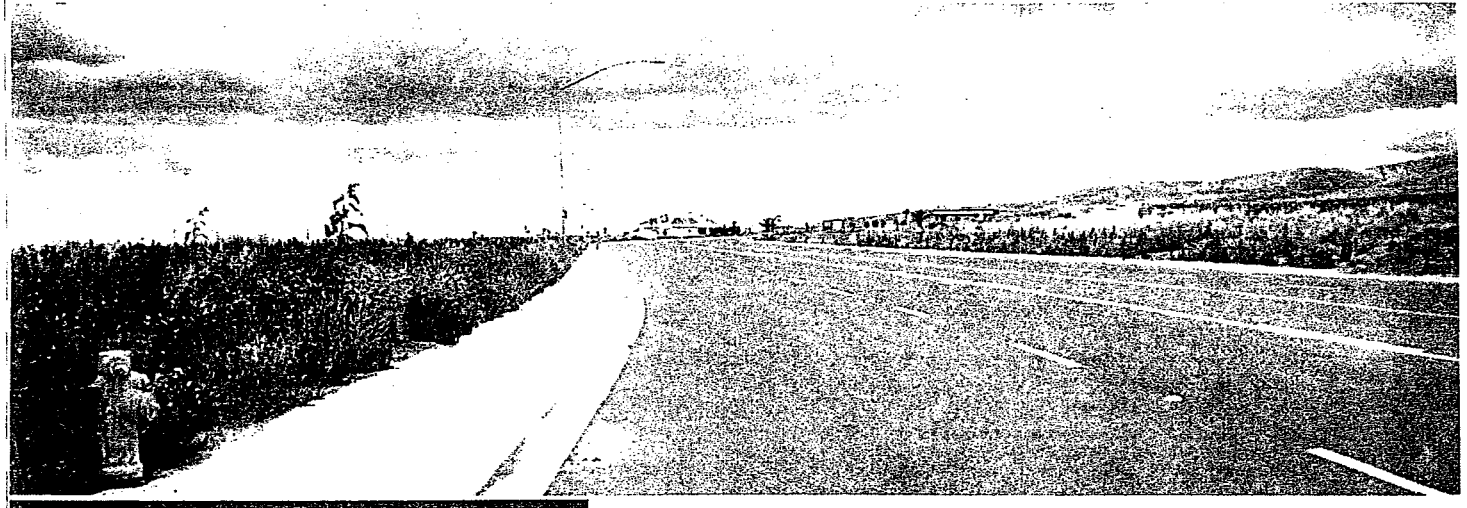
* Realistic Acreage Developable in the short term
Note: Numbers may not add due to independent rounding
Source: Site inspection, discussion with developer, local brokers, parcel and map analysis, WK&A

Site Analysis

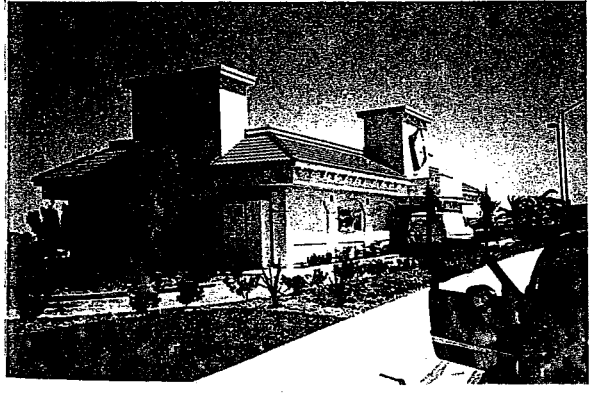
Three sites, Westly Triangle, Patterson Gateway (Sperry Road), and Crows Landing NAS (NASA) have competitive advantage over the other sites. In the case of Westley and Sperry Road their advantage is due to the current level of development and available land for immediate development. The Westley Triangle and Sperry Road, therefore, have immediate short-term (next 5 to 15 years) potential. The 2500 acre Crows Landing site has potential primarily because it has a history of "industrial" use and can be planned, developed and marketed by a public entity. Timing for planning, development and marketing for Crows Landing NAS is not currently precise.

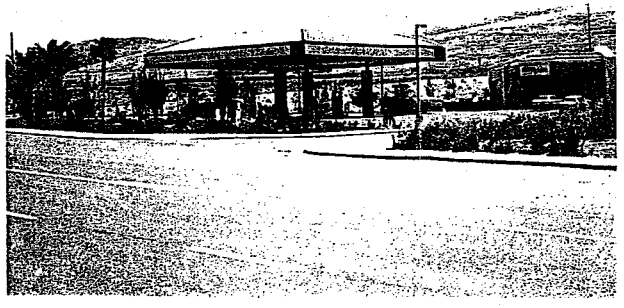


Sperry Road
Stanislaus County, CA
← View from Rogers Road
(note available land and water tank)

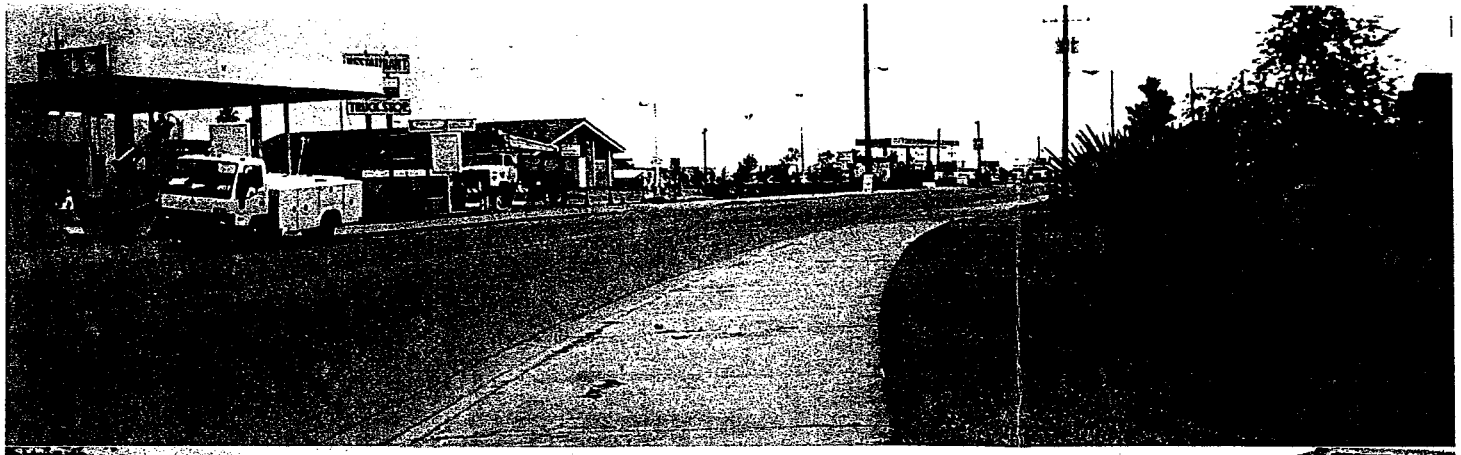


Sperry Road Approaching
Fast Food Establishment
Stanislaus County, CA
← View down Rogers Road
(note available land and water hydrant)



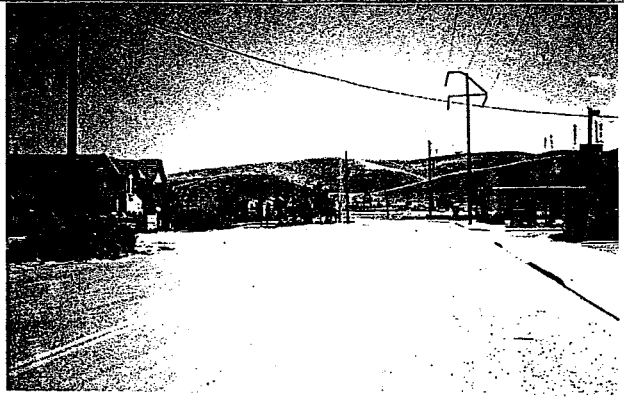


Fast Food Establishment, Gas Station; Sperry Road
Stanislaus County, CA
←



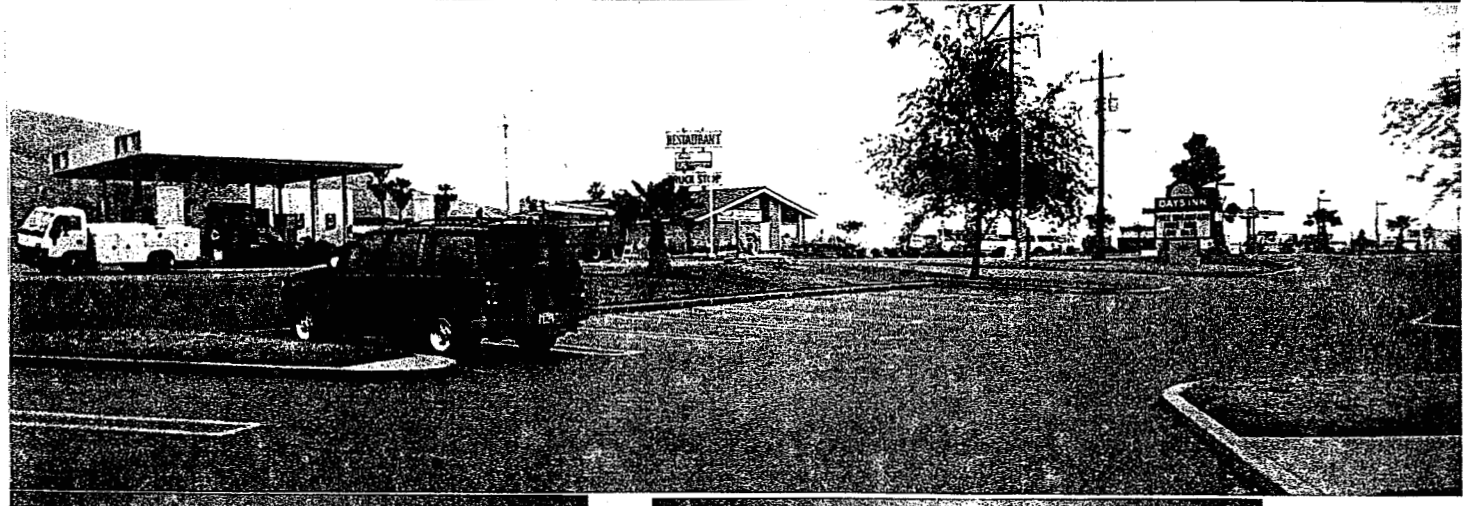
Westley Interchange – East Side
Stanislaus County, CA
← Truck Stop, Restaurant
Services

Westley Interchange – East Side
Stanislaus County, CA
← Restaurant, Hotel

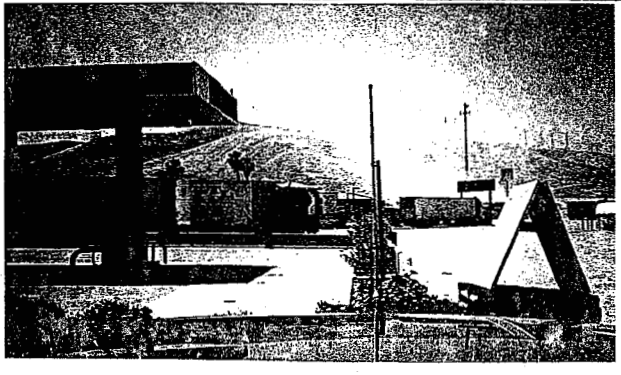


Westley Interchange – East Side
Stanislaus County, CA
← Looking North and South

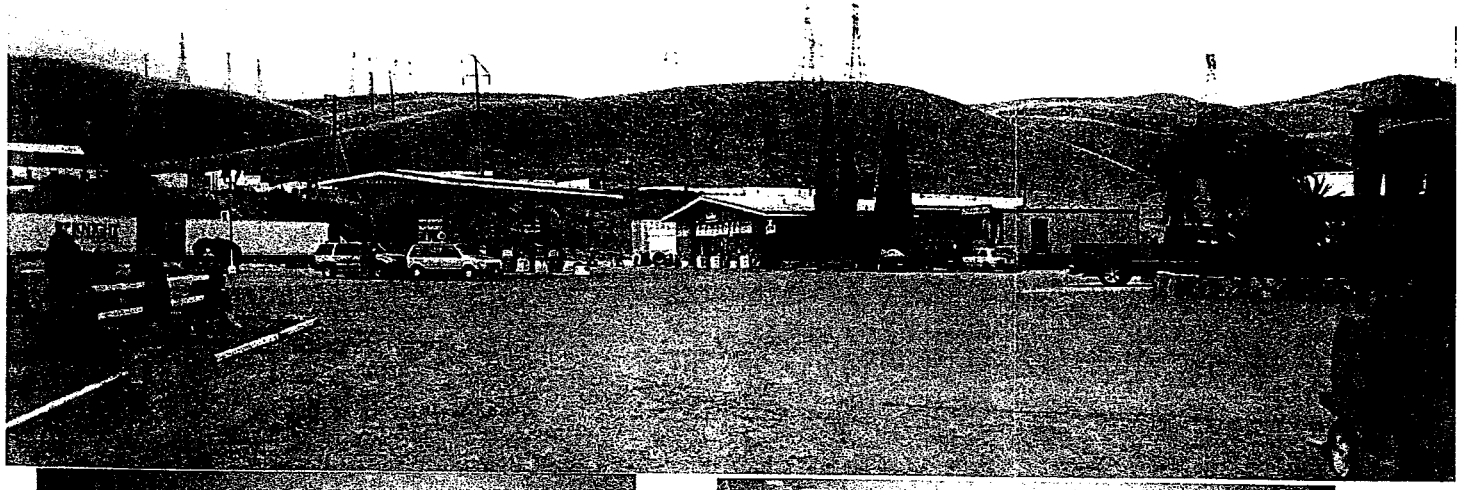
Westley Interchange – East Side
Stanislaus County, CA
← Looking South



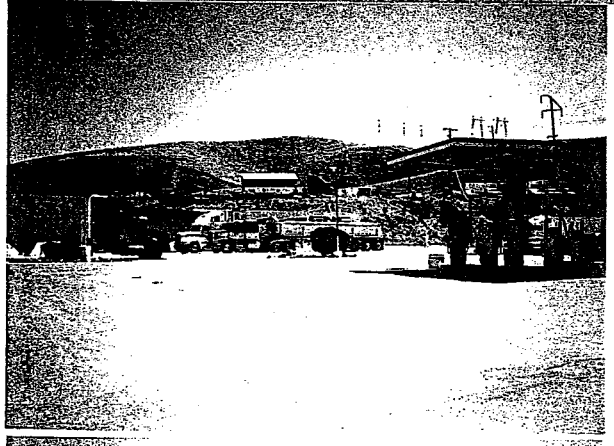
Westley Interchange – East Side
Stanislaus County, CA
← Services



Westley Interchange – East Side
Stanislaus County, CA
Truck Facilities
← Looking West and North



Westley Interchange – West Side
Stanislaus County, CA
← Services
(Note parking on hill)



Westley Interchange – West Side
Stanislaus County, CA
← Services, Trucks, Restaurant

Westley Interchange – West Side
Stanislaus County, CA
← Truck Services

Crows Landing

Table 6 shows the current potential for the Fink Road - Crows Landing site.

Table Econ 6
Fink Road - Crows Landing
Current Potential

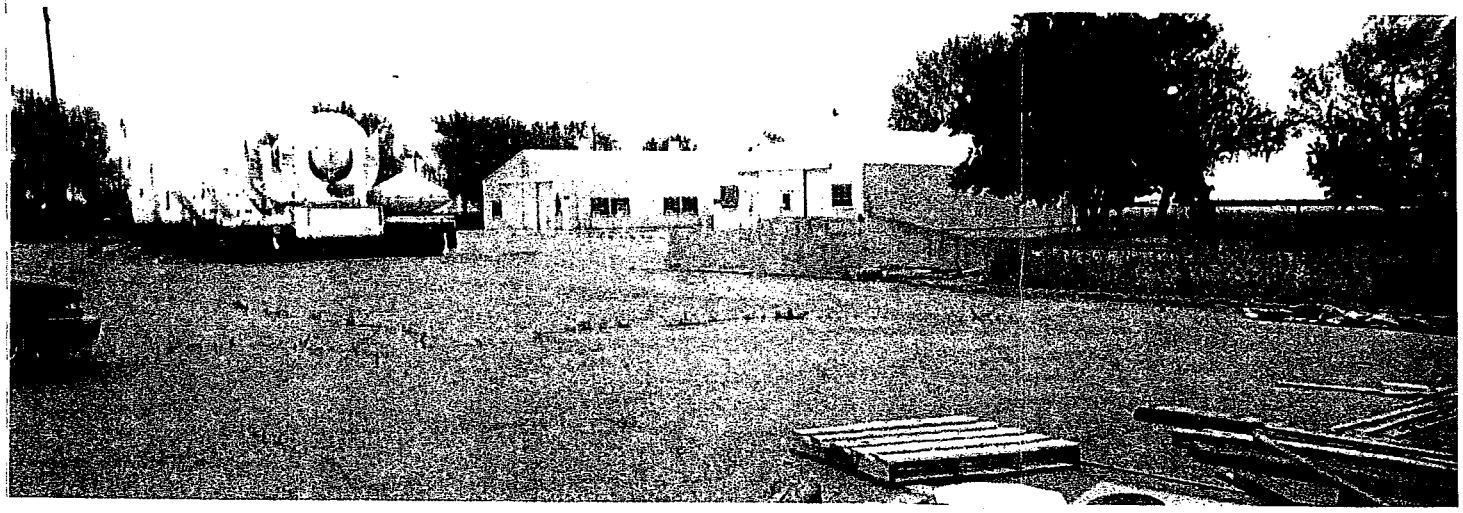
Fink Road/Crows Landing	Acres	Used Acres	Remaining for Development
Total	2500	-	[Acres]
WK&A Analysis			
Total Available	1750	-	1750
Commercial	-	-	-
Industrial	-	-	-
Undesig.*	1750	-	1750
Commercial	320	-	320
Industrial	1430	-	1750
Total Fink Road-Crows Landing	1750	-	1750
Commercial	N/A	-	N/A
Industrial	N/A	-	N/A

* Acreage and building areas for transfer unknown- developable for special purpose commercial, general purpose commercial and industrial use

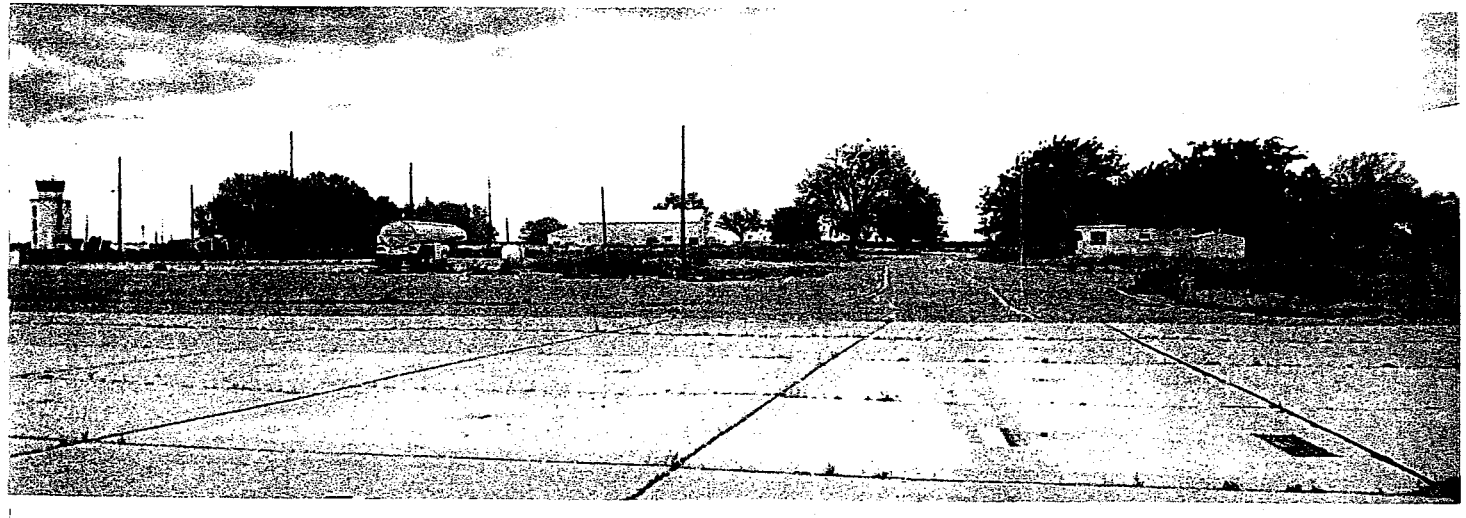
Note: Numbers may not add due to independent rounding

Source: Site inspection, discussion with developer, local brokers, parcel and map analysis, WK&A

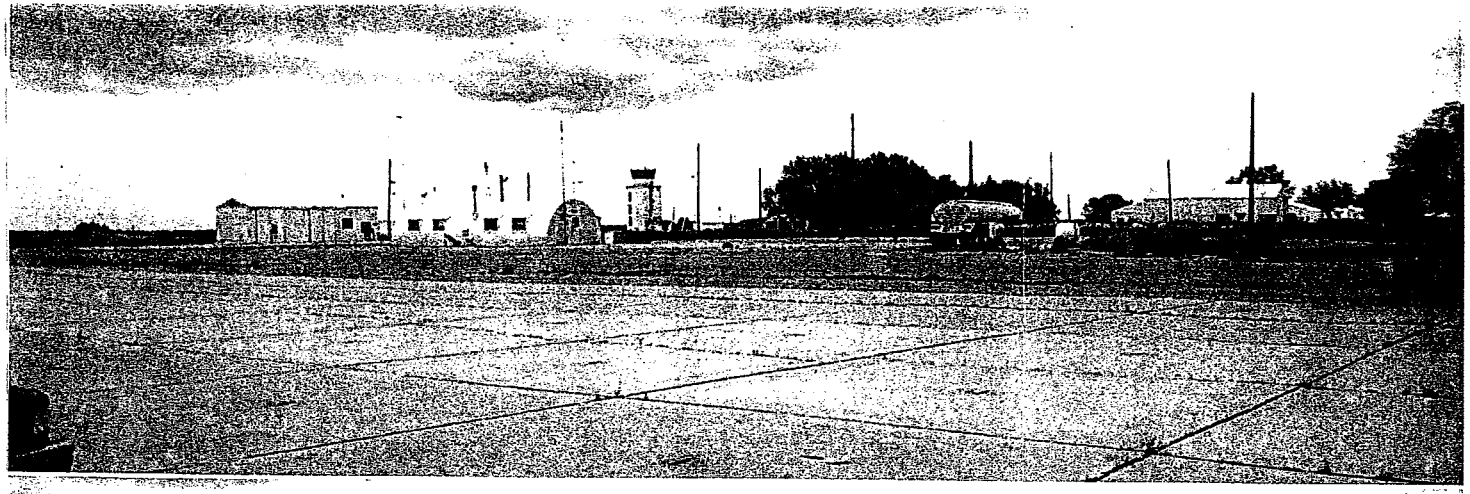
Presently, this site is unused. It appears to be capable of development into a viable industrial and commercial property to meet countywide general demand depending on the terms for its transfer from military to local public use.



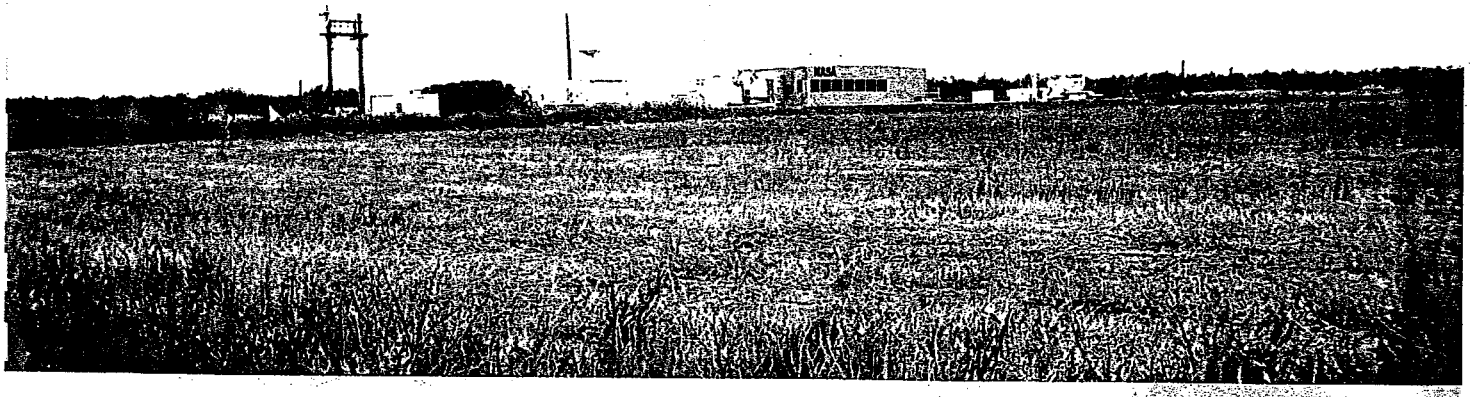
Crows Landing NAS
Shop Area
(Surplus Equipment)



Crows Landing NAS
Looking East to
Entry Road



Crows Landing NAS Apron – Base Operations Area



NASA Facility Vacant (Looking East)

Crows Landing NAS Vacant Buildings (Looking South)

Stuhr Road

Table 7 shows the current potential for the Stuhr Road site.

Table Econ 7
Stuhr Road
Current Potential

Stuhr Road	Acres	Used Acres	Remaining for Development
Total	600	-	[Acres]
WK&A Analysis			
Total Available	600	-	600
Commercial	-	-	-
Industrial	-	-	-
Undesig.*	600	-	600
Commercial	90	-	90
Industrial	510	-	510
Total Stuhr Road	600	-	600
Commercial	N/A	-	N/A
Industrial	N/A	-	N/A

* Excellent Potential due to location and topography-Appears too costly to develop in the short term

Note: Numbers may not add due to independent rounding

Source: Site inspection, discussion with developer, local brokers, parcel and map analysis, WK&A

This site has potential over the long term. It may have short term potential if sewer and water capital costs can somehow be offset. Its interchange is the least costly and the most efficient to reconfigure to handle added traffic.

Summary of Potential

Table 8 shows summary of potential for all sites based on capital costs, on site costs, land development and holding costs versus potential land values. (Sales prices)

Included in Table 8 is a site rating of the sites for short-term industrial and commercial use.

Table Econ 8
Total Costs versus Sales Prices[1]
I-5 Interchange Sites
At Full Development

Development Costs	Westley	Sperry	Fink Road West Side	Fink Road Crows Landing	Stuhr Road
Capital Costs	$ 20,000	$ 9,000	$ 33,000	$ 16,000	$ 24,000
Capital Carrying Costs[10 Years]	$ 14,000	$ 6,000	$ 23,000	$ 11,000	$ 17,000
On Site Costs[Gross Estimate]	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000
Land and Holding Costs[Est.]	$ 15,000	$ 15,000	$ 15,000	$ -	$ 15,000
Subtotal	$ 89,000	$ 70,000	$ 111,000	$ 67,000	$ 96,000
Marketing, O'H. and Developer's Profit	$ 29,000	$ 23,000	$ 37,000	$ -	$ 32,000
Efficiency Loss	$ 22,000	$ 18,000	$ 28,000	$ -	$ 24,000
Contingency @ 15%	$ 17,000	$ 14,000	$ 20,000	$ 16,000	$ 18,000
Total Breakeven	$ 157,000	$ 125,000	$ 196,000	$ 83,000	$ 170,000
Breakeven[Per Sq. Ft][2].	$ 3.60	$ 2.90	$ 4.50	$ 1.90	$ 3.90
Industrial Land Sales Prices	$.75 to $1.25	$1.50 to $2.50	$.75 to $1.25	$.75 to $1.25	$.75 to $1.25
Commercial Land Sales Prices	$4.00 to $5.00	$4.50 to $7.50	$4.00 to $5.00	$3.50 to $4.00	$4.00 to $5.00
Upscale Commercial Land sales Prices	$6.00 to $9.00	$7.00 to $11.00	N/A	N/A	N/A
Short Term Potential-Industrial	Very Poor	Marginal	Very Poor	Marginal	Very Poor
Short Term Potential - Commercial	Good	Very Good	Marginal	Good	Marginal
Short Term Potential - Upscale Commercial	Good	Very Good	N/A	N/A	N/A

[1] Rounded to nearest $1,000
[2] Rounded to nearest 10 cents
Note: By Parcel Cost Allocation[cost spread], some cost shifts may occur among Individual parcels which may make industrial development possible at Westley, Sperry, and Crows Landing. Costs are so high at Fink Road[West Side] and Stuhr Road as to make these sites infeasible without substantial subsidy
Note: Numbers may not add due to independent rounding
Source: EDAW, SCS Engineers, TJKM Transportation Consultants, Williams-Kuebelbeck & Associates
(Costs are per acre. Land Prices are per square foot.)

Conclusion

Summary Table 9 summarizes our findings regarding the feasibility of the five sites The basis for our conclusions as displayed in Table Econ 9 are summarized as follows:

1) Commercial Potential

Two sites, Westley and Sperry, already partially developed, have excellent potential over the short term (5-10 years) to continue developing. They are likely to develop at an increasing rate if the County takes a pro-active position of support. The County should, as a first priority, consider focusing on these two sites in terms of assistance in funding interchange costs and wastewater/water supply and treatment facilities.

Although not at the current market level of these two sites, development at Crows Landing has a good chance of capturing general commercial development which does not necessarily require an interchange location.

As noted earlier, we estimate that demand for land at Crows Landing will be more akin to general market demand countywide, not necessarily limited to highway commercial or industrial uses. We consider this to be an important finding of the study and it will be discussed separately further below under the industrial section.

2) Industrial

Only two sites appear economically viable in terms of potential industrial development. They are the Sperry interchange study area and Crows Landing.

The other sites appear to be too costly relative to market prices for short term industrial development to occur. Further, the capital subsidy needed to attract industrial development is likely to provide low investment return.

Some infrastructure assistance, especially in highway interchange and access improvements may be warranted at the Sperry interchange, thereby allowing for selected industrial development at that site.

a) Crows Landing

In our opinion, the Crows Landing property, although shown as second priority in "Site Rankings", should be pursued vigorously. Costs are close enough to market rate that public assistance could reduce them sufficiently to make industrial development attractive. Also, a smaller first phase could perhaps be identified, which would require less cost. A first phase of 375 acres could be considered likely to be available at the site.

As shown in Table 8, development costs versus market rates are closest for this property, primarily because of public involvement.

In our analysis of the site, we noted that it is not dependent primarily on the highway-oriented market and should share in the general demand for land countywide. (The estimate of 50 acres of annual demand for commercial/industrial land in the I-5 corridor study area over the next 10 years excludes demand for Crows Landing).

The only reason it is listed as a second priority is that the first priority project areas are available at costs closer to market rates and immediate action should be taken help them mitigate capital shortfalls, plan processing, zoning etc. as they occur. Issues of infrastructure cost need to be addressed at Crows Landing to bring its costs more in line with the market.

b) Process and Use Constraints

The process for obtaining the land from the Federal Government is summarized in the main report text. It usually is a time consuming process and we would not expect land to be available for marketing within five years. However, the planning, engineering and marketing process for the site should begin early on.

As a specific approach, a detailed special area plan for Crows Landing and a site-specific economic/marketing study should be undertaken as a next step to ultimate

utilization of the land including targeting sources of development funding. More information is also needed about how to best resolve infrastructure constraints. We looked at the property as an air freight and distribution center and general industrial and commercial site. Caution would indicate that use of the air field for air freight use may not easily occur due to 1) competition and 2) runway load capacity (the runway is rated for planes that are lighter and smaller than air freight carriers' aircraft.). However, there is definite potential for general industrial and commercial use of the site, if development and cost constraints can be mitigated.

It appears that short-term recreation uses, such as hot air ballooning and as a skydiving location, may be appropriate. These types of uses have been found to be compatible with industrial development and agricultural development, and they could take advantage of the existing air field.

For the longer term use of the site, the county should consider aggressive pursuit of economic development funding and federal funding, especially for infrastructure investment at Crows Landing to help reduce the overall development costs. Some form of external grant funding would assist in bridging the gap between market prices and development costs.

Table 9

Rating Potential of I-5 Corridor Sites

Short-Term Industrial and Commercial Land Uses

(Based on Economic Feasibility)

I - 5 Site	Site Rating for:	
	Industrial	Commercial
Westley	Very Poor	Good
Sperry	Marginal	Very Good
Fink Road	Very Poor	Marginal
Crows Landing	Marginal	Good
Stuhr Road	Very Poor	Marginal

Summary

With the exception of the Fink Road and Stuhr Road areas, the site potentials range for commercial development from good to very good. We recommend that the county, as a first priority, undertake a program to assist these good to very good sites to meet demand in an efficient and environmentally sound fashion.

The two sites with potential for industrial development are Sperry and Crows Landing. Both of these are currently marginal in terms of economic viability for private development, without some public assistance with capital costs and mitigation costs, but have sufficient potential if public assistance is forthcoming to reduce development costs.

Site Rankings (Short and Long Term)

Based upon our analysis of the sites from a location standpoint, including potential parcelization, as well as our preliminary Revenue/Cost Analysis, we recommend the following site priorities for anticipated development.

Site Rankings

(Priorities)

Ranking	Interchange	Type Use
First Priority	Westley, Sperry	Highway oriented commercial and industrial
Second Priority	Crows Landing*	General commercial, industrial, recreation
Third Priority	Fink Road; Stuhr Rd.[1]	Highway commercial, industrial interchange
1. Note: Due to the minimal improvements necessary at Stuhr Road, if capital costs of sewer and water can be alleviated at this site (subsidized in some fashion) Stuhr Road has potential, probably after the year 2006.		
** Crows Landing is a second priority only in terms of readiness to meet market demand and the timing necessary to implement a plan and financing strategy and complete the transfer process to bring it to the market place.*		

In summary, it would be appropriate to pursue planning for and zoning of the parcels in the first priority sites for commercial and industrial land use, therefore giving the County both short term and long term commercial and industrial land available to meet future demand. It would also be appropriate to engage in more detailed planning, market, infrastructure, and economic analysis of the Crows Landing site to determine the best way for the county to assist in reducing the development cost and in marketing the site.

Appendix Material

Table A-1
Stanislaus County-Industrial Development
1993-2000
(Number of Jobs)

	1993	2000	Change	Applicable to I-5 Corridor Remarks
Total Industry	121,600	133,700	12,100	Not all
Goods Producing	31,100	34,000	2,900	Not all
Manufacturing	24,500	27,000	2,500	10%
Service Producing	90,500	99,400	8,900	5%
Transportation	5,500	6,000	500	100%
Trade	30,800	35,100	4,300	Part
Wholesale Trade	5,600	6,300	700	100%
Retail Trade	25,200	28,800	3,600	50%
Business Services	2,900	3,600	700	100%
Total	157,900	174,500	16,600	Part

Source: LMI for Stanislaus County, Industrial Outlook, Occupational Outlook, WK&A

Table A-2
Stanislaus County-Industrial Development*
1993-2000

Industry	1993-2000 Change	Applicable to I-5 Corridor	Share Basis	Annual [/7]	Per 1000s.f. Building Area	Square feet Building Area	Square feet Land Area	Development Area
	[Jobs]	[%]	[Jobs]	[Jobs]	[Jobs/ 1000 s.f.]	[s.f.]	[s.f.]	[Acres]
Goods Producing	2,900							
Manufacturing	2,500	10.00%	250	36	4	8,929	53,571	1.2
Service Producing	8,900	5.00%	445	64	4	15,893	95,357	2.2
Transportation	500	100.00%	500	71	2	35,714	214,286	4.9
Trade	4,300							
Wholesale Trade	700	100.00%	700	100	2	50,000	300,000	6.9
Retail Trade	3,600	50.00%	1,800	257	5	51,429	308,571	7.1
Business Services	700	100.00%	700	100	4	25,000	150,000	3.4
Total	16,600	26.48%	4,395	628	2.6	186,964	1,121,786	25.8

* Note:Numbers in appendix tables may not directly correspond to report tables due to rounding
Source: LMI for Stanislaus County, Industrial Outlook, Occupational Outlook, WK&A

Table A-3
Prices For Selected Land
I-5 Corridor
[Per Acre]

Type	1994	1995	1996	1997	Partial 1998	Gross Average All Years
Crop Land						
Sale	$ 2,236	$ 6,122	$ 3,881	$ 8,500	$ 3,960	-
Sale	$ 3,314	$ 4,364	$ 3,072	$ 8,500	$ 4,000	-
Sale	$ 4,040	-	$ 3,881	$ 2,289	-	-
Sale	$ 4,904	-	$ 6,000	$ 6,300	-	-
Sale	-	-	$ 4,516	$ 2,289	-	-
Sale	-	-	$ 4,189	-	-	-
Subtotal	$ 14,494	$ 10,486	$ 25,539	$ 27,878	$ 7,960	-
Average	$ 3,624	$ 5,243	$ 4,257	$ 5,576	$ 3,980	$ 5,670
Mode	$ 4,000	$ 5,000	$ 4,500	$ 7,000	$ 3,950	$ 6,113
Orchard						
Sale*	$ 3,750	-	$ 4,000	$ 6,492	$ 5,473	-
Sale*	$ 3,600	$ 8,933	-	$ 11,995	-	-
Sale*	$ 10,219	-	-	-	-	-
Subtotal	$ 17,569	$ 8,933	$ 4,000	$ 18,487	$ 5,473	
Average	$ 5,856	$ 8,933	$ 4,000	$ 9,244	$ 5,473	$ 8,376
Mode	$ 3,675	$ 8,933	$ 4,000	$ 9,244	$ 5,473	$ 7,831
Westley Interchange						
Commercial	$ 4.00	N/A	$ 1.00	N/A	$4.00 to $5.00 p.s.f.	
Industrial	$ 25,000	N/A	$ 30,000	N/A	$30,000 to $50,000 per acre	
Sperry Interchange						
Commercial	N/A	N/A	N/A	$ 7.50	$7.50 to $10.00 p.s.f.	
Industrial	N/A	N/A	N/A	None	$65,000 to $130,000 per acre.	
Fink Interchange						
Commercial	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	N/A	N/A	N/A	N/A	N/A	N/A
Stuhr Road Interchange						
Commercial	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	N/A	N/A	N/A	N/A	N/A	N/A

Source: Industrial Outlook, Occupational Outlook, Comp Data, Broker Interviews, Developer interviews, WK&A

Table A-4
I-5 Interchange Sites
Current potential
[By Interchange]

Westley	Acres	Used Acres	Remaining for Development	Demand 1998-2015	Wesley %
Total	1396.0	45	1351	-	-
Total Westley[WKA - Short Term]	350.9	45	305.9	-	-
Commercial	124.8	45	79.8	205.3	38.9%
Industrial	216.1	0	216.1	296.9	72.8%
Vacant[Long Term Potential]	1045.1	45	1000.1	-	

Sperry	Acres	Used Acres	Remaining for Development	Demand 1998-2015	Sperry %
Total	785	-			
Total Sperry[WKA - Short Term]	669.8	-			
Gateway	35.8	1.7	34.1		
Other Potential Com.	82.8	0	82.8		
Total Commercial	118.6	1.7	116.9	205.3	56.9%
Industrial	526.2	25	501.2	296.9	168.8%
Vacant[Long Term Potential]	115.2	26.7	618.1	-	-

Fink Road-West Side	Acres	Used Acres	Remaining for Development	Demand 1998-2015	Fink/WS %
Total	1000	-			
Total Fink Road-West Side[WKA - Short Term]	-	-			
Total Fink Road-West Side[WKA - Long Term]					
Commercial	126	-	126	205.3	61.4%
Industrial	574	-	574	296.9	193.3%
Vacant[Long Term Potential]**	700	-	700	-	-

** Constrained due to Interchange costs

Fink Road-Crows Landing	Acres	Used Acres	Remaining for Development	Demand 1998-2015	Fink/WS %
Total	2500	-			
Total Fink Road-Crows Landing[WKA - Short Term]	-	-			
Total Fink Road-Crows Landing[WKA - Long Term]					
Commercial	315	-	315	205.3	153.4%
Industrial[1]	1435	-	1435	296.9	483.3%
Vacant[Long Term Potential]**	1750	-	1750	-	-

[1] Due to location off Hwy 33, the surplus NAS property is the a likely location for long term general commercial and industrial development... Sometime after the year 2005.

** Constrained by interchange costs

Stuhr Road	Acres	Used Acres	Remaining for Development	Demand 1998-2015	Fink/WS %
Total	600	-			
Total Stuhr Road[WKA - Short / Intermediate Term]					
Commercial	91	-	91	205.3	44.5%
Industrial	-	-	-	296.9	-
Total Stuhr Road[WKA - Long Term]					
Commercial	17	-	17	-	-
Industrial	492	-	492	-	-
Vacant[Short and Intermediate Term Potential]*	91	-	91	-	-
Vacant[Long Term Potential]	509	-	509	-	-

* Note:Numbers in appendix tables may not directly correspond to report tables due to rounding

**Although water and interchange costs are low, wastewater cost may make this site infeasible to develope in the short term

Source: TJKM Transportation Consultants,SCS EngineersSite inspection, discussion with developer, local brokers, parcel and map analysis,WK&A

Table A-5
Westley Triangle
[Parcel Analysis]*

East Side	Acres	West Side	Acres	All	
Commercial		Commercial		Commercial	Acres
Existing		Existing		Existing	
Super "8"		S.S & Mini Mart	small parcel		small parcels
Hotel	small parcel**	Restaurant	small parcel		small parcels
Restaurant/Cafe	small parcel	Fruit/Veg Stand	small parcel		small parcels
Fast Food	small parcel	Truck Stop	small parcel		small parcels
S.S	small parcel	Truck Trailer Parking	small parcel		small parcels
Hotel -New	small parcel	Truck Trailer Storage	small parcel		small parcels
S.S.	small parcel				small parcels
Truck Stop	small parcel				small parcels
Truck Repair	small parcel				small parcels
Truck Parking	small parcel				small parcels
Total acres[Est]	25.0	Total Acres[Est]	20.0	Total Acres[Est]	45.0

Vacant		Vacant		Vacant	
Commercial		Commercial		Commercial	
Undesig.	2.7		10.0		10.0
Parcel E1	1.0				
Parcel E2	1.0				
Parcel E3	1.3				
Parcel E4	1.4				
Parcel C1	1.4				
Parcel D1	1.7				
Parcel D2	2				
Parcel D3	2				
Parcel D4	2.4				
Shell Oil Parcel	11.2				
Total	28.1	Total	10.0	Total	38.1
Industrial					
Parcel F1	10.5				
Parcel F2	19.1				
Parcel F3	18.1				
Parcel F4	26.6				
Parcel F5	15.3				
Parcel F6	14.2				
Total	103.8	Total	N/A		103.8
Other[Undesig.]	100.0		64.0		164.0
Total-East Side	256.9	Total-West Side	94.0		360.9

Total Commercial			
Existing	25.0	20.0	45.0
Available	28.1	10.0	38.1

Parcel F1[Part]	167200			
220x760	3.8			
Parcel F3[Part]	153780			
220x699	3.5			
Parcel F4[Part]	43750			
250x175	1.0			
Parcel F5[Part]	117250			
250x469	2.7			
Parcel F6[Part	123250			
250x493	2.8			
Other[Undesig]	339750.0	Other [Undesig]	32.0	
1359x250	7.8			
Potential Commercial	**21.7**	**Potential Commercial**	**32.0**	**53.7**
Developable Commercial	**49.8**	**Developable Commercial**	**32.0**	**81.8**

* Note:Numbers in appendix tables may not directly correspond to report tables due to rounding
**Small Parcel defined as two [2] acres or less

Source: Site inspection, discussion with developer, local brokers, parcel and map analysis,WK&A

Table A-6
Sperry Interchange
Includes Patterson Gateway.
[Parcel Analysis]*

East Side	Acres
Commercial	
Existing	
Parcel #	
23 Fast Food	0.83
1 S.S[Quickmart]	0.83
Total acres[Est]	1.66

	Vacant			Total
Commercial	Acres	Potential Developable	Acres	
Parcel #		Parcel #		
2	0.95	021-25-23	103.0	
3	0.81	Commercial [40%]	41.2	
4	1.08	Industrial [60%]	61.8	
5	0.85	021-26-15	104.0	
6	0.85	Commercial [40%]	41.6	
7	0.97	Industrial [60%]	62.4	
8	1.28	Industrial Potential		
9	1.59	021-26-18[Part-est.]	55.0	
10	1.02	021-26-21	19	
11	2.04	021-26-03	45	
12	3.21	021-26-04	122	
13	4.91	021-26-05	20	
14	1.21	021-26-07	8	
15	0.57	021-26-24,25,26	29	
16	0.92	021-26-30	5	
17	2.06	021-26-31	74	
18	2.15	Subtotal	377.0	
19	1.1	Potential Commercial	82.8	
20	1.2	Potential Industrial	501.2	
21	3.0			
22	2.34			
	34.1		82.8	
Total Commercial	35.8		82.8	118.6
Existing	1.7		0	1.7
Available	34.1		82.8	116.9
Total Industrial			526.2	526.2
Existing[est.]	0		25.0	25.0
Available	0		501.2	501.2

* Note:Numbers in appendix tables may not directly correspond to report tables due to rounding

Source: Site inspection, discussion with developer, local brokers, parcel and map analysis, WK&A

Table A-7
Highway Improvements
Costs at Full Development

Area	Acreage	Amount	Per Acre
Westley Interchange	1,396	$ 5,058,000	$ 3,623
Sperry Interchange	785	$ 7,382,250	$ 9,404
Fink road/Fink Landfill	1,000	$ 5,287,000	$ 5,287
Fink Road/Crows Landing	2,500	$ 4,345,045	$ 1,738
Stuhr Road	600	$ 1,163,000	$ 1,938

Source; TJKM Transportation Consultants

Exhibit 1
Total Capital Costs
I-5 Interchange Sites

Area	Interchange Costs	Water Amount	Sewer Amount	Total
Westley Interchange	$ 5,058,000	$ 5,901,000	$ 15,500,000	$ 26,459,000
Sperry Interchange*	$ 7,382,250	$ 1	$ 1	$ 7,382,252
Fink Road/Fink Landfill	$ 5,287,000	$ 3,746,000	$ 24,275,000	$ 33,308,000
Fink Road/Crows Landing	$ 4,345,045	$ 9,793,000	$ 25,239,000	$ 39,377,045
Sthur Road[1]	$ 1,163,000	$ 2,600,000	$ 10,700,000	$ 14,463,000

* Water and Sewer Amount shown as $1.00 for computation purposes
** Interchange Costs shown as additional road work to accomodate Crows Landing Acreage
[1] Interchange Costs estimated by WKA
Source: EDAW, SCS Engineers,TJKM Transportation Consultants, Williams-Kuebelbeck & Associates

Exhibit 2
Total Capital Costs
I-5 Interchange Sites
At Full Development

Area	Total	Acres	Per Acre
Westley Interchange	$ 26,459,000	1396	$ 18,953
Sperry Interchange	$ 7,382,252	785	$ 9,404
Fink Road/Fink Landfill	$ 33,308,000	1000	$ 33,308
Fink Road/Crows Landing	$ 39,377,045	2500	$ 15,751
Stuhr Road	$ 14,463,000	600	$ 24,105

Source: EDAW, SCS Engineers,TJKM Transportation Consultants, Williams-Kuebelbeck & Associates

Exhibit 3
I-5 Interchange Sites
Summary Of Potential
[By Interchange - Numbers are rounded]

Land Use/Timing/Cost	Sites: Westley	Sperry	Fink Road West Side	Fink Road Crows Landing	Stuhr Road
Total Acreage Studied	1,300	800	500-1000	2,500	600
WK&A Survey*	360	700	700	1,750	110
Short Term Potential	310	700	-	[1]	90
Commercial	80	130	-	[1]	90
Industrial	220	550	-	[1]	[2]
Vacant[Long Term Potential]	1,000	100	700	1,750	510
[1]Because of location, this site has potential to meet general Commercial and Industrial demand when available [2] may be appropriate over intermediate term					
Capital Costs[Off Site]					
Stage One Interchange Costs	$ 1,400,000	$ 2,300,000	$ 5,300,000	$ 4,300,000	$ 400,000
Stage One Water Costs	$ 2,100,000	$ -	$ 2,300,000	$ 3,300,000	$ 950,000
Stage One Wastewater Costs	$ 7,500,000	$ -	$ 9,800,000	$ 10,600,000	$ 7,900,000
Total Off Site capital Costs	$ 11,000,000	$ 2,300,000	$ 17,400,000	$ 18,200,000	$ 9,250,000
Stage One Acreage[allocated] Based on W&S staging	$ 234	$ 144	180	450	91
Off Site Costs per acre	$ 47,000	$ 16,000	$ 97,000	$ 40,000	$ 101,648
On Site Costs[Per Acre-Gross estimate]	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000
Total On Site and Off Site Costs Per Acre*	$ 87,000	$ 56,000	$ 137,000	$ 80,000	$ 141,648
Land and Holding costs Per Acre	$ 20,000	$ 20,000	$ 6,000	$ -	$ 6,000
Total Costs Per Acre[Excludes developer's profit and marketing costs]	$ 107,000	$ 76,000	$ 143,000	$ 80,000	$ 147,648
Total Costs Per Sq. Ft.	$ 2.46	$ 1.74	$ 3.28	$ 1.84	$ 3.39
Industrial Land Sales Prices	.75-1.25	1.50-2.50	.75-1.25	.75-1.25	.75-1.25
Commercial Land sales Prices	4.00-5.00	4.50-7.50	4.00-5.00	3.50-4.00	4.00-5.00
Upscale Commercial Land sales Prices	6.00-9.00	7.00-11.00	N/A	N/A	N/A

*Note: Does not include allowance for Developer's financing costs, profit, or marketing costs or environmental mitigation
Note: Numbers may not add due to independent rounding

Source: TJKM Transportation Consultants,SCS EngineersSite inspection, discussion with developer, local brokers, parcel and map analysis,WK&A

Exhibit 3-1
ProForma Costs vs Revenues
Westley Triangle
At Full Development

Development Costs/Revenue Potential		Westley Per Acre/Sq. Ft.
Capital Costs	$	20,000
Capital Carrying Costs[10 Years]	$	14,000
On Site Costs[Gross Estimate]	$	40,000
Land and Holding Costs[Est.]	$	15,000
Subtotal	$	89,000
Marketing, O'H. and Developer's Profit	$	29,000
Efficiency Loss	$	22,000
Contigency @ 15%	$	17,000
Total Breakeven	$	157,000
Breakeven[Per Sq. Ft].	$	3.60
Current Industrial Values [Per Sq. Ft].	$	1.50
Current Commercial Values [Per Sq. Ft].		$4.00-$5.00

Note: By Parcel Cost Allocation[cost spread], some cost shifts may occur among Individual parcels which may make industrial development possible at Westley, Sperry, and Crows Landing. Costs are so high at Fink Road[West Side] and Stuhr Road as to make these sites infeasible without substantial subsidy

Note: Numbers may not add due to independent rounding

Source: EDAW, SCS Engineers,TJKM Transportation Consultants, Williams-Kuebelbeck & Associates

Exhibit 3-2
ProForma Costs vs Revenues
Sperry Road/Patterson Gateway
At Full Development

Development Costs/Revenue Potential		Sperry
		Per Acre/Sq. Ft.
Capital Costs	$	9,000
Capital Carrying Costs[10 Years]	$	6,300
On Site Costs[Gross Estimate]	$	40,000
Land and Holding Costs[Est.]	$	15,000
Subtotal	$	70,000
Marketing, O'H. and Developer's Profit	$	23,000
Efficiency Loss	$	18,000
Contigency @ 15%	$	14,000
Total Breakeven	$	125,000
Breakeven[Per Sq. Ft].	$	2.90
Current Industrial Values [Per Sq. Ft].	$	2.00
Current Commercial Values [Per Sq. Ft].		$6.00-$9.00

Note: By Parcel Cost Allocation[cost spread], some cost shifts may occur among Individual parcels which may make industrial development possible at Westley, Sperry, and Crows Landing. Costs are so high at Fink Road[West Side] and Stuhr Road as to make these sites infeasible without substantial subsidy

Note: Numbers may not add due to independent rounding

Source: EDAW, SCS Engineers,TJKM Transportation Consultants, Williams-Kuebelbeck & Associates

Exhibit 3-3
ProForma Costs vs Revenues
Fink Road-West Side
At Full Development

Development Costs/Revenue Potential		Fink Road West Side
		Per Acre/Sq. Ft.
Capital Costs	$	33,000
Capital Carrying Costs[10 Years]	$	23,000
On Site Costs[Gross Estimate]	$	40,000
Land and Holding Costs[Est.]	$	15,000
Subtotal	$	111,000
Marketing, O'H. and Developer's Profit	$	37,000
Efficiency Loss	$	28,000
Contigency @ 15%	$	20,000
Total Breakeven	$	196,000
Breakeven[Per Sq. Ft].	$	4.50
Current Industrial Values [Per Sq. Ft].	$	1.50
Current Commercial Values [Per Sq. Ft].		$4.00-$5.00

Note: By Parcel Cost Allocation[cost spread], some cost shifts may occur among Individual parcels which may make industrial development possible at Westley, Sperry, and Crows Landing. Costs are so high at Fink Road[West Side] and Stuhr Road as to make these sites infeasible without substantial subsidy

Note: Numbers may not add due to independent rounding

Source: EDAW, SCS Engineers,TJKM Transportation Consultants, Williams-Kuebelbeck & Associates

Exhibit 3-4
ProForma Costs vs Revenues
Fink Road-Crows Landing
At Full Development

Development Costs/Revenue Potential		Fink Road Crows Landing
		Per Acre/Sq. Ft.
Capital Costs	$	16,000
Capital Carrying Costs[10 Years]	$	11,000
On Site Costs[Gross Estimate]	$	40,000
Land and Holding Costs[Est.]	$	-
Subtotal	$	67,000
Marketing, O'H. and Developer's Profit	$	-
Efficiency Loss	$	-
Contigency @ 15%	$	16,000
Total Breakeven	$	83,000
Breakeven[Per Sq. Ft].	$	1.90
Current Industrial Values [Per Sq. Ft].	$	1.50
Current Commercial Values [Per Sq. Ft].		$4.00-$5.00

Note: By Parcel Cost Allocation[cost spread], some cost shifts may occur among Individual parcels which may make industrial development possible at Westley, Sperry, and Crows Landing. Costs are so high at Fink Road[West Side] and Stuhr Road as to make these sites infeasible without substantial subsidy

Note: Numbers may not add due to independent rounding

Source: EDAW, SCS Engineers,TJKM Transportation Consultants, Williams-Kuebelbeck & Associates

Exhibit 3-5
ProForma Costs vs Revenues
Stuhr Road
At Full Development

Development Costs/Revenue Potential		Stuhr Road Per Acre/Sq. Ft.
Capital Costs	$	24,000
Capital Carrying Costs[10 Years]	$	17,000
On Site Costs[Gross Estimate]	$	40,000
Land and Holding Costs[Est.]	$	15,000
Subtotal	$	96,000
Marketing, O'H. and Developer's Profit	$	32,000
Efficiency Loss	$	24,000
Contigency @ 15%	$	18,000
Total Breakeven	$	170,000
Breakeven[Per Sq. Ft].	$	3.90
Current Industrial Values [Per Sq. Ft].	$	1.50
Current Commercial Values [Per Sq. Ft].		$4.00-$5.00

Note: By Parcel Cost Allocation[cost spread], some cost shifts may occur among Individual parcels which may make industrial development possible at Westley, Sperry, and Crows Landing. Costs are so high at Fink Road[West Side] and Stuhr Road as to make these sites infeasible without substantial subsidy

Note: Numbers may not add due to independent rounding

Source: EDAW, SCS Engineers,TJKM Transportation Consultants, Williams-Kuebelbeck & Associates

Exhibit A-1
Total Capital Costs
I-5 Interchange Sites

Area	Interchange Costs	Water Amount	Sewer Amount	Total	Acreage
Westley Interchange	$ 5,100,000	$ 5,900,000	$ 15,500,000	$ 26,500,000	1300
Sperry Interchange	$ 7,400,000	$ 1	$ 1	$ 7,400,002	800
Fink Road/West Side	$ 5,300,000	$ 3,700,000	$ 24,300,000	$ 33,300,000	1000
Fink Road/Crows Landing	$ 4,300,000	$ 9,800,000	$ 25,200,000	$ 39,300,000	2500
Stuhr Road	$ 1,200,000	$ 2,600,000	$ 10,700,000	$ 14,500,000	600
* Water and Sewer Amount shown as $1.00 for Computation purposes					6200

Source: SCS Engineers, Williams-Kuebelbeck & Associates

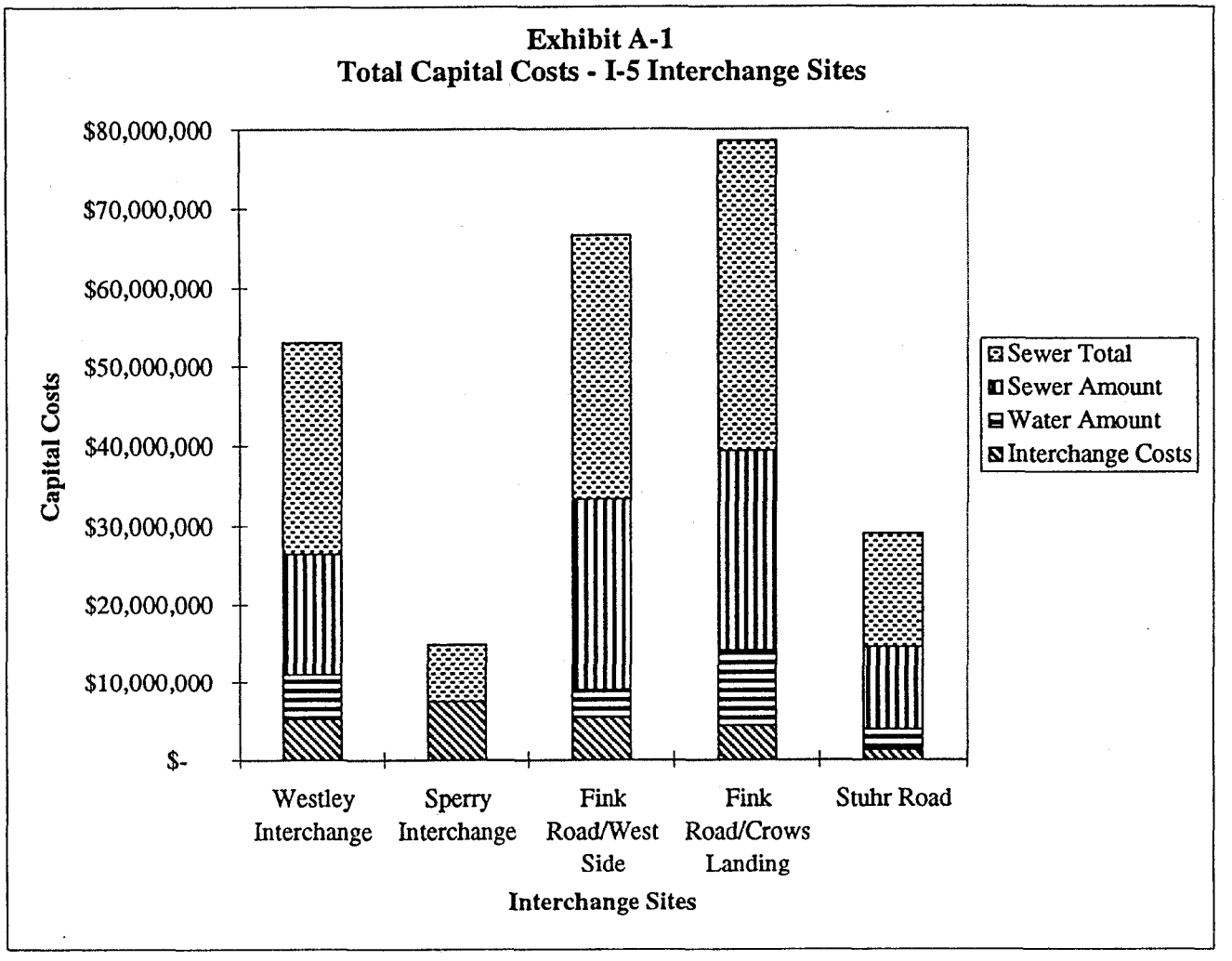


Exhibit A-2
Water & Sewer Acreage Calculation
I-5 Interchange Sites
[Includes Landscaping]

Area	First Generation Acreage	First generation Costs Water	Sewer	Total	Per Acre
Westley Interchange	260	$ 2,100,000	$ 7,500,000	$ 9,600,000	$ 37,000
Sperry Interchange	160	$ -	$ -	$ -	$ -
Fink Road/Fink Landfill	200	$ 2,300,000	$ 9,800,000	$ 12,100,000	$ 61,000
Fink Road/Crows Landing	500	$ 3,300,000	$ 10,600,000	$ 13,900,000	$ 28,000
Sthur Road	120	$ 1,000,000	$ 7,900,000	$ 8,900,000	$ 74,000
Total	1240 *	$ 8,700,000	$ 35,800,000	$ 44,500,000	$ 36,000

* WKA First Generation Acreage calculated at 1100[difference is not significant]
Source: SCS Engineers, Williams-Kuebelbeck & Associates

Exhibit A-3
Highway Improvements
Costs at Full Development

Area	Acreage	Amount	Per Acre
Westley Interchange	1,300	$ 5,100,000	$ 4,000
Sperry Interchange	800	$ 7,400,000	$ 9,000
Fink road/Fink Landfill	1,000	$ 5,300,000	$ 5,000
Fink Road/Crows Landing	2,500	$ 4,300,000	$ 2,000
Stuhr Road	600	$ 1,200,000	$ 2,000
Total	6,200	$ 23,300,000	$ 3,758

Source; TJKM Transportation Consultants