Contents

Appendices

Appendix A
History of the Connector and Alternatives Considered but Rejected

The history of the BART-Oakland Airport Connector (Connector) begins with the formation of the Oakland Airport Access Task Force (OAATF) in 1969. The possibility of providing a transit connector to the Oakland Airport was considered even before the opening of BART in 1972. The alternatives discussed in this section are a result of various studies conducted over the past 30 years. Various route options and technology alternatives have been considered in the:

- Transit Access Feasibility Study for Oakland Airport Access Task Force, October 1970 (Phase I);
- Oakland Airport Transit Access Project, Final Report May 1975 (Phase II);
- Preliminary Definition of Alternatives - Oakland Airport Transit Connector, September 1979 (working paper);
- Oakland Airport Transit Connector System Project, Final Report, Preliminary Design and Engineering Phase, 1980;
- Oakland Airport Transit Connector Draft EIS, March 1981; and
- Project Update Report, BART-Oakland Airport Intermodal Connector Project, December 1, 1993.

Virtually all of these documents are briefly summarized in Section 1.3, Purpose and Need, and Section 2.6, Alternatives Considered but Rejected, in order to demonstrate the history and need for the Connector. In this section, additional information is presented from these documents to explain that a variety of alternatives has been investigated over the years and to provide a context and rationale for the alternative technologies and alignments considered in this Draft EIR/EIS.

Phase I Transit Access Feasibility Study for Oakland Airport Access Task Force (OAATF) (1970)

The OAATF was created under a joint exercise-of-powers agreement and composed of six agencies: Alameda-Contra Costa Transit District, Bay Area Rapid Transit District, County of Alameda, City of Oakland, Port of Oakland, and Oakland-Alameda County Coliseum Complex, Inc. OAATF's main objective was to examine the feasibility of transit service between OIA, BART, the Coliseum Complex, and the Industrial Park (for the purposes of this study, the Industrial Park encompasses the commercial establishments, motels, restaurants, smaller businesses, and the Cargo Distribution Center located along the west side of Hegenberger Road and roughly between Doolittle Drive and I-880).

Four vehicle types were considered as shown in Table A-1.

Table A-1
1970 Transit Access Feasibility Study Vehicle Types

System	***Vehicle Type***	***Description***
BART Extension System	BART vehicle	• No change from the BART vehicle • Minimum horizontal curve restriction: 500-foot radius • Maximum speed: 80 mph • Train lengths: 150 - 710 feet (each car 70 feet)
Connector System	Modified BART vehicle (also called BART Connector System)	• Modified for extra maneuverability • Maximum speed: 80 mph • Minimum horizontal curve restriction: 500 feet radius • Space for luggage • Use BART maintenance facilities and the BART Coliseum Station platform
	Small vehicle	• Air-cushion vehicles, rubber tire or steel vehicles or other concepts • 30 to 50 mph maximum speed • Operate independently or coupled to form trains • Separate maintenance yard, automatic control system and control center • Space for luggage
	Motor Buses	• Appropriately sized • Run on exclusive guideway • Speeds up to 50 mph • Equipment to minimize air pollution • Luggage rack provision

Source: Kaiser Engineers in association with Peat, Marwick, Mitchell & Co. and Okamoto/Liskamm, Inc., Transit Access Feasibility Study for Oakland Airport Access Task Force, October 1970

The Task Force identified four routes (see Figure A-1): Route A would serve the existing commercial and industrial development; Route B would serve the future development potential of Industrial Park and North Airport; Route C would exclusively serve the Airport; and Route D would serve both the existing and future development. The BART Extension System would only use Route C. The BART Connector System with modified BART vehicles or small vehicles was considered for all the routes, and the motor bus could only operate efficiently on a modified Route B.

The combination of lower costs, more frequent service, better service to the Coliseum Complex, and little or no degradation of regular BART service made the Connector System a more suitable choice than the BART Extension System. Even though the small vehicle Connector System was found to be most attractive on the basis of frequency of service, flexibility, capacity and cost, the OAATF judged the BART Connector System using a modified BART vehicle to offer the best solution due to its compatibility with the BART mainline system, a factor noted as very important by OAATF. Moreover, the BART Connector System with the modified BART vehicle would not have prohibitive operating and capital costs, would generate good patronage, would offer good service, could be considered for inclusion in future airport expansion, and would support extension of direct BART services from all points in the BART system to the airport. Subsequently, the BART Connector System was considered for the feasibility analysis. Route B, serving the future development potential of Industrial Park and North Airport, was selected as the basis for the feasibility analysis.

The BART Connector System would operate modified BART vehicles in two- to five-car trains on a 3.8-mile route. The three intermediate stations included one at the Arena, one located to encourage future development of Industrial Park, and one at North Airport. The feasibility analysis showed that the project would be justified economically, would be effective in relieving congestion, and would help serve the projected annual airport volume of 7 million passengers.

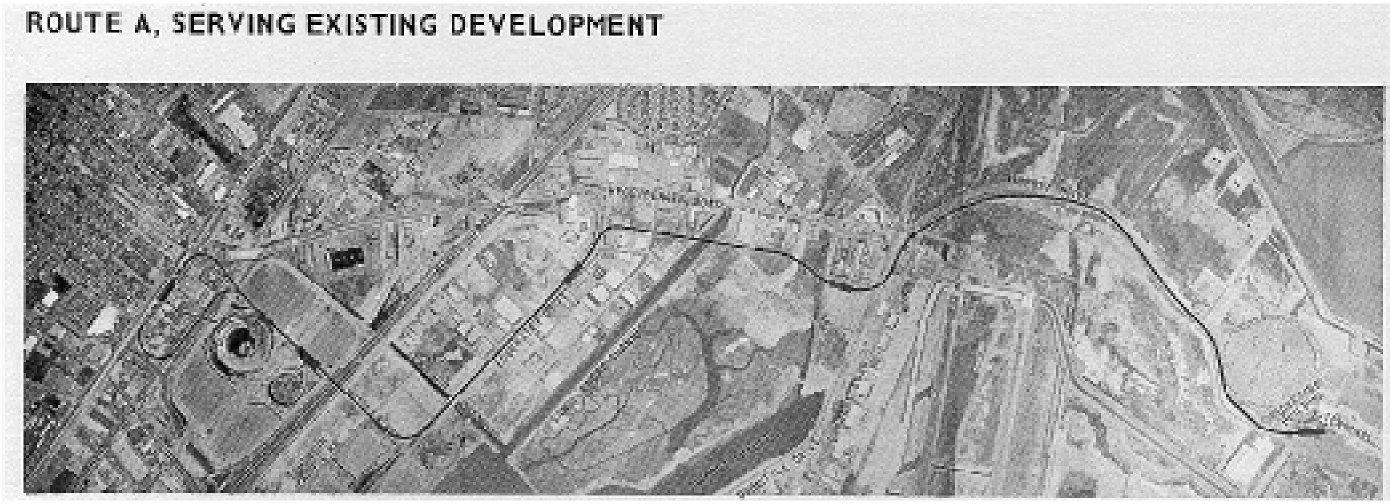
In 1970 dollars, total capital cost for the Connector System would be $47 million. The capital costs would include line work, four stations, electrification, automatic train control, communications, fare collection, vehicles, Oakland Coliseum Stadium walkway, and a right-of-way allowance. The operating and maintenance costs were estimated at $42.7 million. The study estimated a one-way, daily ridership total of 16,000 people, and a two-way ridership total of 32,000 by 1985, which would be sufficient to pay for the operating costs. In the interim, prior to revenue service with the small vehicle Connector System, the OAATF recommended implementation of a shuttle service using motor buses.

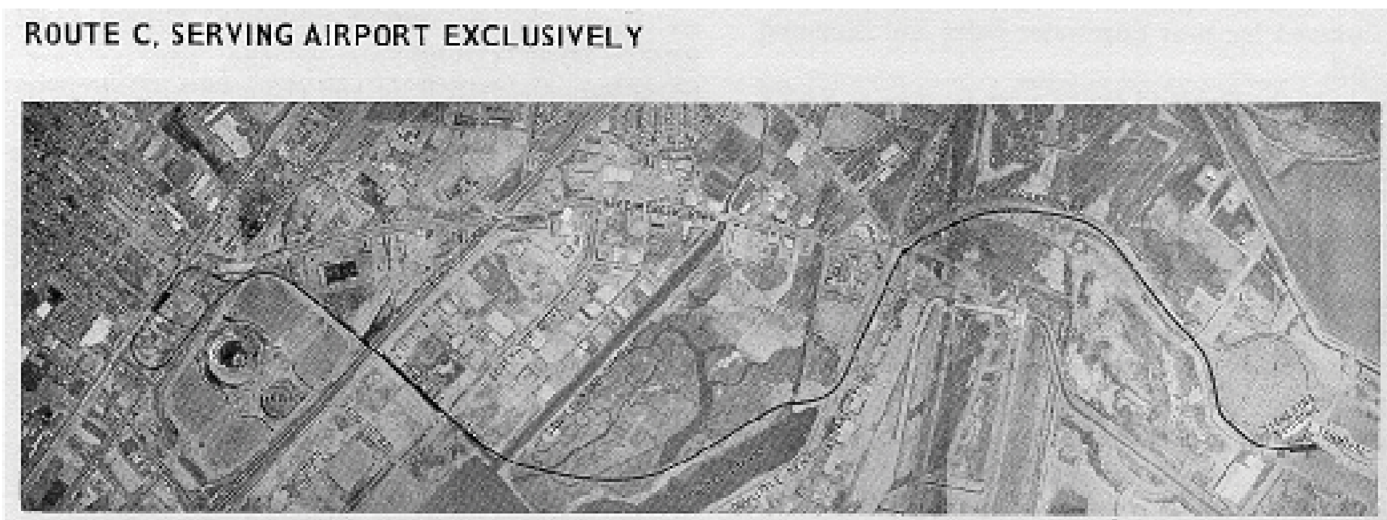
Phase II Oakland Airport Transit Access Project (1975)

Although Phase I established the feasibility of transit access to the airport, agreement on the route and vehicle system was not reached. The Oakland Airport Board, composed of BART, the City of Oakland, the County of Alameda, the Port of Oakland, and the Metropolitan Transportation Commission, initiated a Phase II study with the objective of developing the following two basic systems for providing transit access to the OIA:

- An airport Connector System operating in its own right-of-way from the BART Coliseum Station to a transit station within OIA; and
- A direct extension of the BART system to the OIA following BART mainline criteria as far as possible and using an alignment, which leaves and returns to the existing BART mainline.

The study's scope compared the two systems but did not make a recommendation regarding a preferred alternative. Some of the features of the two systems developed in the 1975 study are presented below.

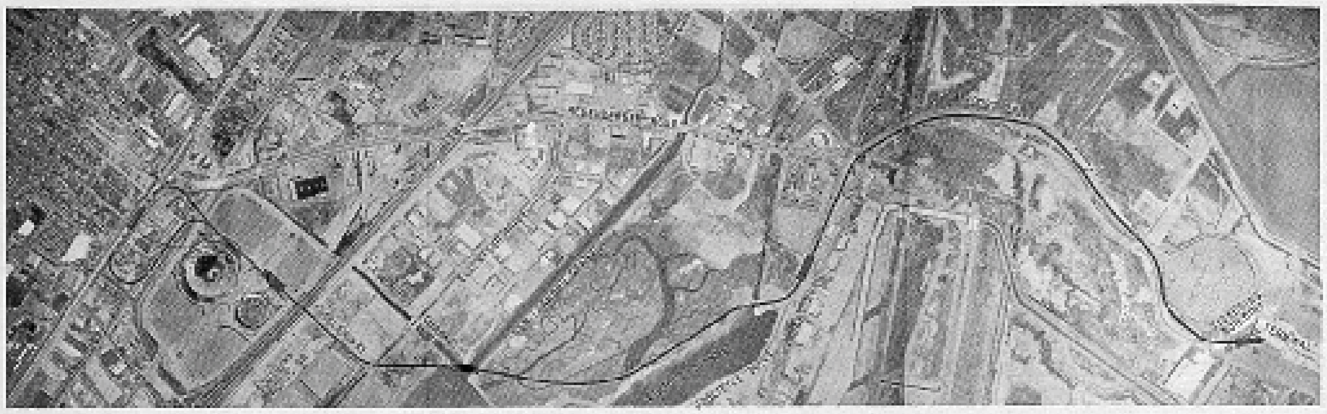




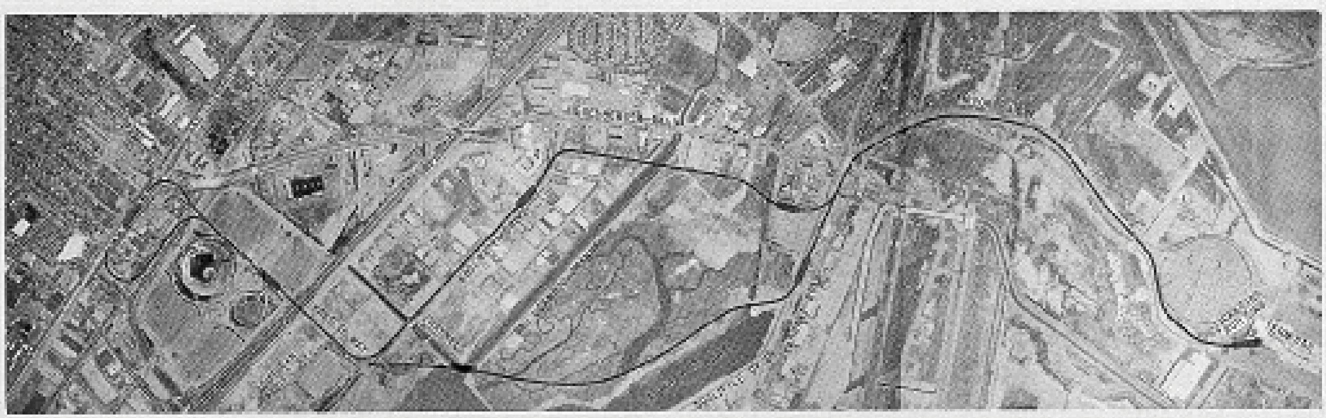
Source: Kaiser Engineers, October 1970

Figure A-1(a)
Oakland Airport Access Task Force Alternative Routes A and C

ROUTE B, SERVING FUTURE DEVELOPMENT



ROUTE D, SERVING BOTH EXISTING AND FUTURE DEVELOPMENT



Source: Kaiser Engineers, October 1970

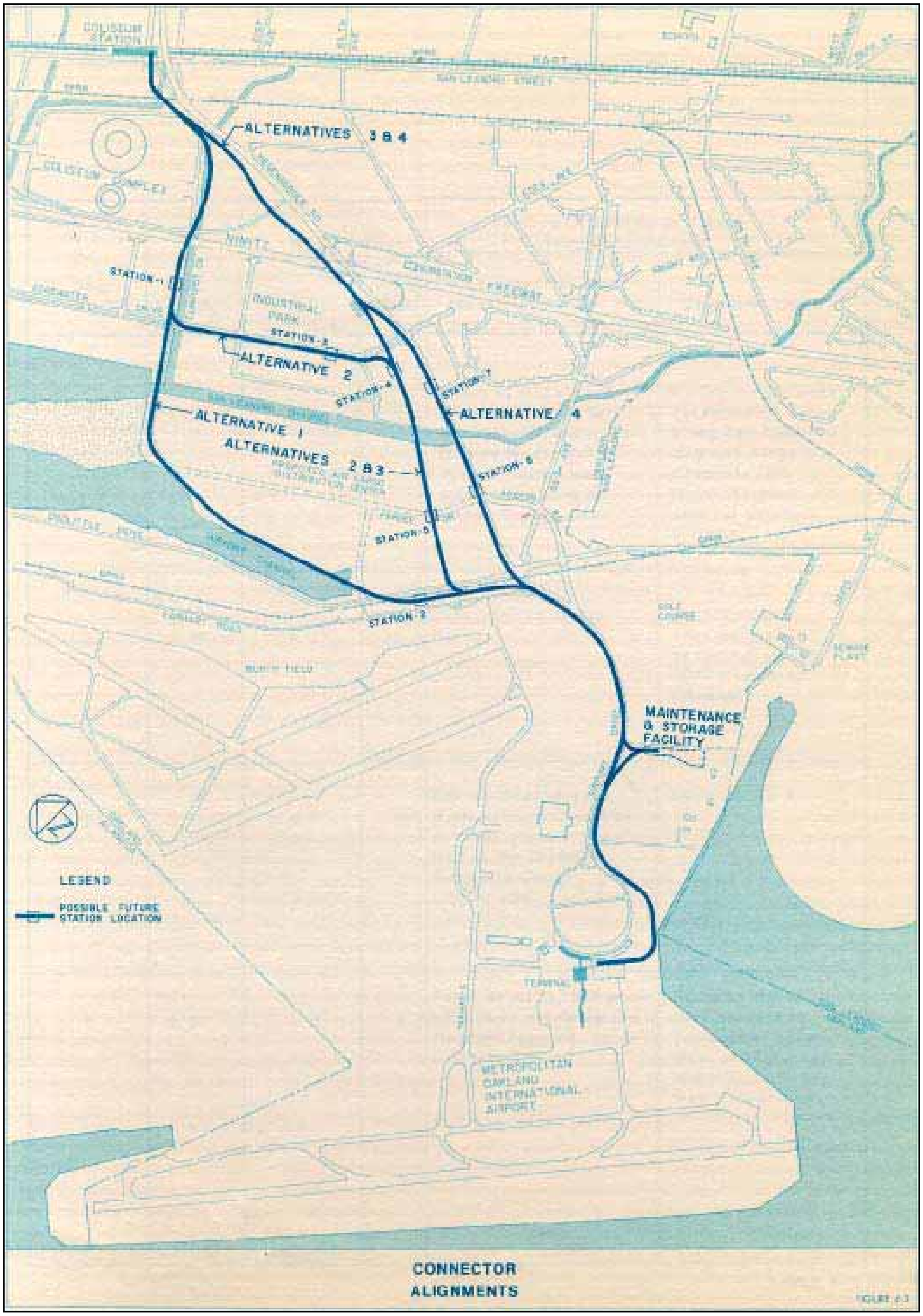
Figure A-1(b)
Oakland Airport Access Task Force Alternative Routes B and D

Connector

The following characteristics were assumed in describing the Connector System:

- Cars smaller than the BART system.
- Right-of-way separate from BART.
- Automatic and separate control system.
- Flexibility of alignment and greater maneuverability compared to BART system.
- Separate platform elevated from the BART platform, accessible by elevators and stairs.
- Fare system integrated with the BART system.
- Electrically propelled, rubber-tired, bottom-supported vehicle light transit system. (Other systems are also acceptable, including dual-rail guidance, side guidance, or center guidance with high or low guide beam; and steel-wheel, rubber-tired, or air cushion support.)
- 50 mph speed, 36-passenger capacity, and 6 minutes travel time.
- Operation of vehicles in single- or multi-vehicle trains. Two vehicle trains planned for peak load conditions at intervals of 1 minute and one-way passenger capacity of 4,000 passengers in an hour.
- No interference with BART train schedules.
- Able to serve points between the Coliseum BART Station and OIA.
- Potential use for intra-terminal transportation if vehicle selection were coordinated with airport expansion design.

Four alternative routes were considered for the study based on length of line, travel time, major environmental impacts, interference with existing structures or recreational facilities, service to the intermediate area between San Leandro Street and OIA, and compatibility of alignment with OIA terminal expansion plans. Alternative 1 follows the Airport Channel route; Alternative 3 is the West Hegenberger route; Alternative 4 follows the Hegenberger route; and Alternative 2 starts on the alignment of Alternative 1, then turns southeast on Edgewater Drive in the Industrial Park and joins Alternative 3 (see Figure A-2). All alternatives follow Airport Drive from Doolittle Drive to the OIA terminal. Alternative 1 was selected for further development of the Connector System, because it caused least interference with commercial and industrial areas, resulted in low disruption during construction, had low construction costs, and was expected to provide an airport passenger service equal to that of other alternatives.



Source: Kaiser Engineers, May 1975

Figure A-2
Oakland Airport Transit Access Project Connector Alignments

The Connector System route would be 3.9 miles in length, three-fourths of which would be aerial, the remainder at grade, in subway, or in retained cut. The total capital cost of the Connector System was estimated at $74.9 million. Estimated annual operating costs, projected forward to the design year 1985, were $1.7 million. Operating costs were based on experience gained in other projects involving rubber-tired, fixed-guideway vehicle systems and direct estimates of labor and supervision for operating cost items unique to the Connector System. The costs reflect those required to operate the Connector fleet as well as those associated with increased cars on the BART system to provide capacity for passengers traveling to and from the airport. The projected increase in BART ridership, plus those riding the Connector, would generate surplus revenues.

BART Extension

The following characteristics were assumed in describing the BART Extension System:

- Branch of the BART mainline, with diversion of some regularly scheduled trains to OIA.
- Same features as BART.
- Automatic train control equipment.
- Capable of acceleration from 0 to 50 mph in 20 seconds and decelerating from 80 mph to a station stop in 27 seconds.
- OIA station consisting of three levels: an upper level at the terminal second level for southbound trains; a lower level at the terminal sub-basement level for northbound trains; and an intermediate, concourse level at the terminal ground level where passengers would enter and leave the system through the fare gates. Station platform lengths would be 700 feet to accommodate 10-car BART trains.
- Dependent on BART schedules: Various alternative peak period operating plans or 'schedules' were developed for comparison. Schedule that could provide direct, no-transfer service from any station on the BART system to OIA was chosen for further development as the BART Extension System.

The planning of the alternative BART extension routes from the BART mainline to the airport needed to consider the basic track configurations that could be used and the limitations to the movement of trains inherent in the track arrangement. Eleven alternative routes were selected which were a combination of four basic horizontal alignments and three track configurations. Considerations in selecting the corridors included length of line, travel time, major environmental impacts, interference with existing structures or recreational facilities, BART mainline stations served (or bypassed), and compatibility of alignment with OIA terminal expansion plans. An open loop configuration (compared to a stub-end configuration) was determined to be preferable operationally and the only layout that could accommodate all BART schedules. The preferred route to accompany this track configuration generally followed Hegenberger Road into OIA and then looped back to the south to tie into the mainline.

Total capital cost of the BART Extension would be $172.4 million. Projected revenues for the BART Extension were comparable to those estimated for the Connector System, but the annual operating costs were projected to be slightly more at $1.8 million in the 1985 design year. As a result, the net revenue generation for the BART Extension would be less than the Connector System.

While both systems were determined to be viable, the intent of the study was not to identify a preferred alternative, but to bring both alternatives up to an equal level of analysis. It is noted parenthetically that the capital cost of the BART Connector System was less than half the cost of the BART Extension, but would result in comparable ridership (about 29,500 daily transit trips) and comparable surplus revenues.

Preliminary Definition of Alternatives - Oakland Airport Transit Connector Working Paper (1979)

This 1979 working paper restudied the Phase II alternatives (the BART Connector System and BART Extension System), and investigated new options including an All-Highway Solution, a Low-Cost Bus Option, a Capital-Intensive Bus System, and the No Build Alternative. The working paper concluded that the All-Highway Solution and the BART Extension System were not viable options for a Connector and were dropped from further consideration, the reasons being as follows:

All-Highway Solution

Description

- Capital-intensive, highway-oriented solution to improve access to the Airport
- Staged improvements, including grade separations, elimination of traffic signals, ramps reconstruction and construction of auxiliary freeway lanes

Reasons for exclusion from further consideration

- High cost of improvement ($16.4 million for Hegenberger elements only; $50 million for cross-airport connector)
- Negative effect on air quality
- Energy-intensive
- Ingress/egress problems from Hegenberger Road
- Risk of obsolescence in the event of reduced vehicle use in future (prolonged energy shortages/gas rationing)

BART Extension System

Description

- Direct extension of BART main line from BART station to OIA

Reasons for exclusion from further consideration

- Most capital intensive of all alternatives (cost of $230 million)
- Service degradation for non-airport BART patrons
- Operational and scheduling problems for BART

Conclusion and Subsequent Effort

The working paper concluded that the other Connector alternatives were worthy of further consideration. Specifically, the BART Connector System (as defined in the 1975 Phase II report), a Low-Cost Bus Option, a Capital-Intensive Bus System, and the No Build Alternative remained as viable options for a Connector.

Following the results of the working paper, a Final Report was prepared in 1980 and included preliminary design and engineering work for the Connector System alternative. The plan and profile drawings for the Connector System were then evaluated as part of a Draft EIS, as described below.

Oakland Airport Transit Connector Draft EIS (1981)

Based on results and recommendations of the 1979 working paper, this 1981 environmental document did not consider the BART Extension System and the All-Highway Solution for further study. This report focused on five alternatives:

- Alternative 1 - no-build;
- Alternatives 2 and 3 - two levels of investment in bus systems; and
- Alternatives 4 and 5 - Automated Guideway Transit Systems (AGT), which were essentially the BART Connector System considered in previous studies.

Alignment options, both horizontal and vertical, were considered for the various alternatives. The route between OIA and the BART station was divided into several segments and several variations were proposed for each segment. Each segment alignment was rated according to engineering factors (curve radii, length of spans, costs), environmental considerations (noise, water crossings, sensitive areas), and socioeconomic effects (displacement, development potential, service provided). The preferred alignment and technology was to have been selected following review of the Draft EIS and public hearings; however, the environmental process was suspended following release of the Draft EIS and no further action was taken regarding transit improvements between the Coliseum BART Station and OIA.

Key characteristics of the alternatives are described below.

Alternative 1: No Build

- Defined as the existing AirBART service between the Airport and the Coliseum BART station
  - a van shuttle (diesel articulated bus, 60 feet in length)
  - 7- to 10-minute headway during peak hours
  - 15- to 20-minute headway during off-peak hours
  - 400 to 450 passengers trips per day
- Improvements to the system, which were previously planned but not part of the Connector project, included
  - widening of Doolittle Drive
  - widening of Airport Drive
  - provision of left turn lanes at the Hegenberger Road/Edgewater Drive intersection
  - left turn lanes at the Hegenberger Road/Doolittle Drive intersection
  - left turn lanes at the Doolittle Drive/Airport Drive intersection
  - replacement of AirBART vehicles with articulated buses to accommodate increased demand
- Since Alternative 1 is defined as the existing AirBART service between the Airport and the Coliseum BART Station, there were no capital or operational costs associated with this alternative. The Draft EIS projected average daily ridership to be 3,700 passengers in 2000.

Alternative 2: Medium Range Bus

- Same route as Alternative 1 (see Figure A-3)
- Represents an intermediate option to the minimal expenditures of Alternative 1 and the capital-intensive investment of Alternative 3
- Improvements were selected to be primarily operational adjustments with capital outlays made only where other alternatives appeared ineffective or were not cost effective
- A transit/carpool preferential lane would be provided along Hegenberger Road. This lane would be implemented by banning parking, moving curbs back two to four feet at intersections and re-striping the existing lanes

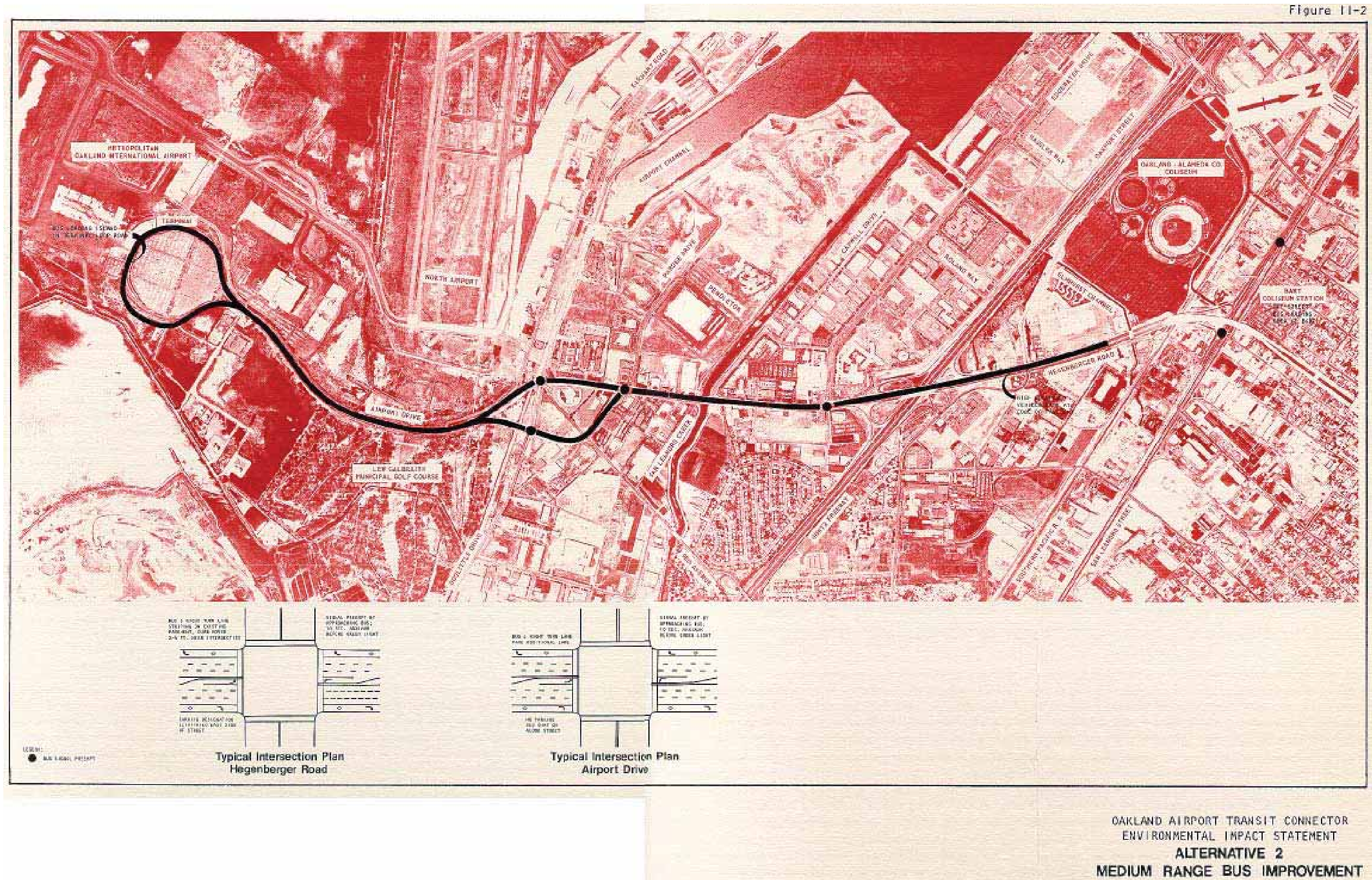
- A dispatcher would coordinate bus movements during peak periods adjusting the 3-minute dwell time at the Airport and BART station to meet passenger demand
- All other features similar to AirBART
- Total capital cost for Alternative 2 would be $2.5 million, with average annual operating costs of $1.1 million. Both of these figures are based on 1980 dollars. The Draft EIS projected average daily ridership of 5,100 passengers in 2000.

Alternative 3: Capital-Intensive Bus

- A separate roadway for exclusive bus use, grade separated at major street and rail crossings, and signalized with bus preemption at the remaining at-grade intersections
- Route passes through Coliseum Complex parking lot and across I-880 in an elevated guideway, at grade along Elmhurst Channel, elevated across San Leandro Creek as it curves eastward along the Airport Channel, at grade along Airport Channel, elevated across Doolittle Drive and then below grade to pass beneath Hegenberger Road, at grade along Airport Drive to the OIA terminal (see Figure A-4)
- Transfer station over the existing BART station with direct vertical transfer
- Integrated with the BART fare system
- Busway terminus in front of the Airport terminal; well-lit, 30-foot wide, covered grade-separated access from the bus platform to the terminal
- Total capital costs for Alternative 3 would be $40.1 million, with average annual operating costs of $1.6 million (1980 dollars). The Draft EIS projected average daily ridership of 8,400 passengers in 2000.

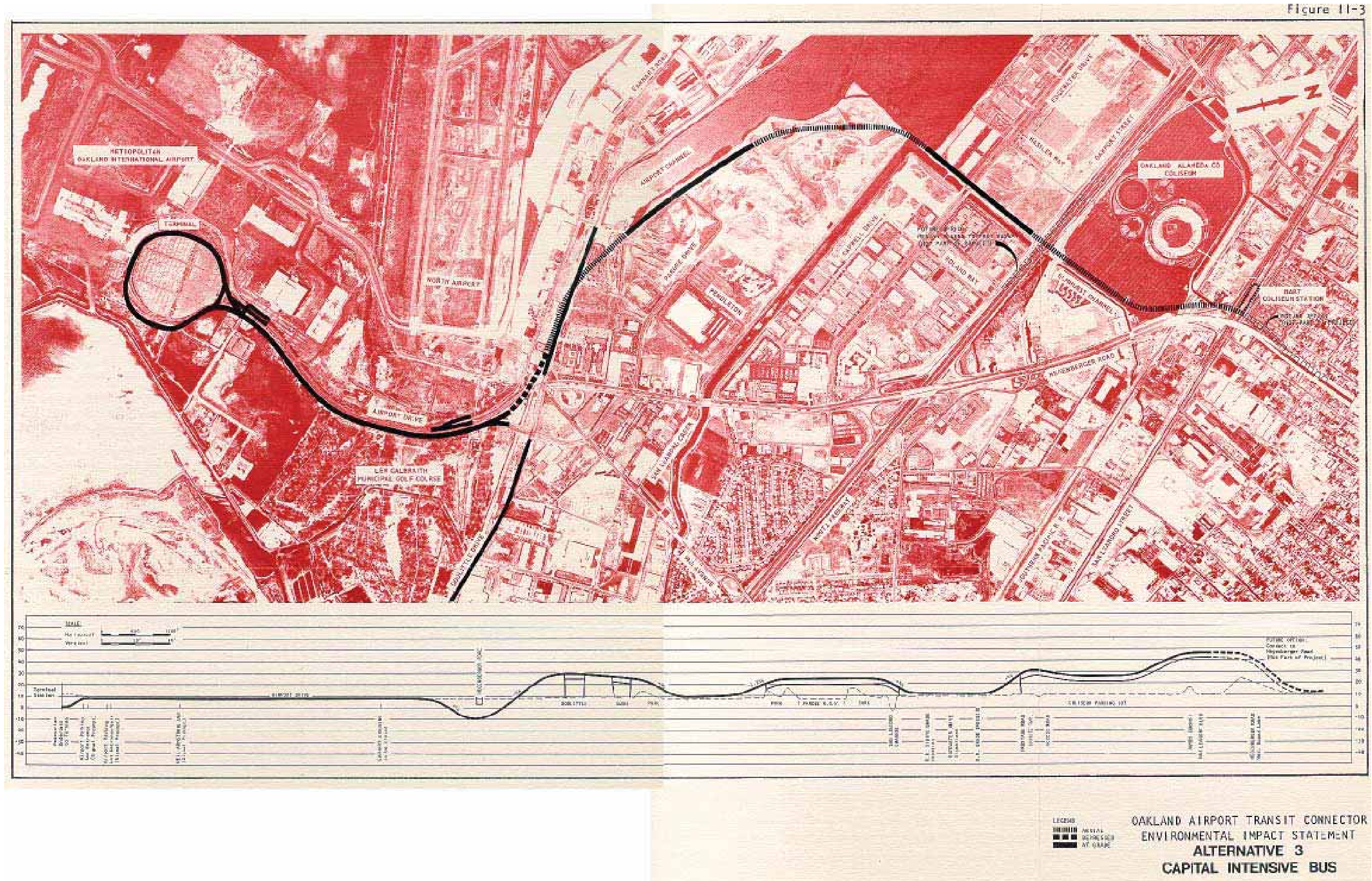
Alternative 4: AGT with Intermediate Stations

- AGT using medium-sized vehicles on an exclusive guideway (electrically propelled, automated 39-foot vehicle)
- Fully automated with no on-board operator
- Direct transfer station at the existing BART station
- Elevated guideway except for a 4,200-foot section in the median of Airport Drive (see Figure A-5); stub end into the airport terminal with vertical access
- Two intermediate stations provided at Hegenberger Road and Pardee Drive and along Elmhurst Channel at Edgewater Drive. The elevated stations would permit joint development beneath for transit-related convenience facilities.
- Power substations along the alignment (4 or 5 and at the stations)



Source: U.S. Department of Transportation, March 1981

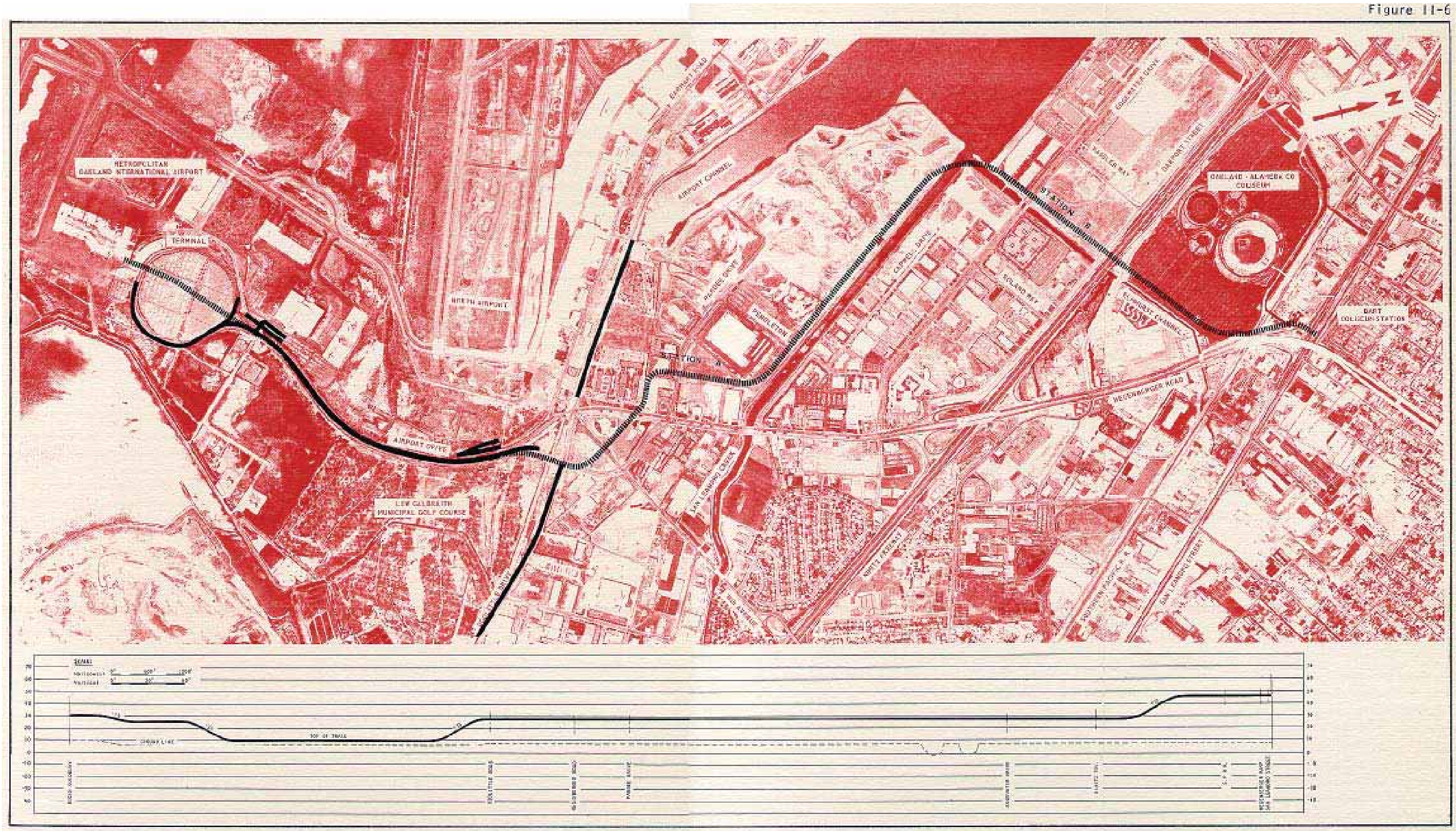
Figure A-3



Source: U.S. Department of Transportation, March 1981

Figure A-4

Figure II-6



OAKLAND AIRPORT TRANSIT CONNECTOR
ENVIRONMENTAL IMPACT STATEMENT
ALTERNATIVES 4 & 5
AGT GUIDEWAY

Source: U.S. Department of Transportation, March 1981

Figure A-5

- An off-line maintenance facility consisting of a siding and building near San Leandro Channel at the UPS building

- Total capital costs for Alternative 4 would be $64.5 million, and average annual operating costs would be $2.1 million (1980 dollars). The Draft EIS projected average daily ridership in 2000 to be 17,700 passengers.

Alternative 5, AGT without Intermediate Stations

- Exactly same as Alternative 4 except no intermediate stations (see Figure A-5)

- Total capital costs for Alternative 5 would be $59.7 million, with average annual operating costs of $1.9 million (1980 dollars). The Draft EIS projected average daily ridership of 13,500 passengers in 2000.

Alternatives Evaluation

Table A-2 shows a comparison of transportation, socioeconomic, land use, and environmental effects of the five alternatives in the study area. For the most part, the Medium Range Bus offers modest service improvements over the No Build Alternative, but it attracts 1,400 more daily passengers. The bus and AGT Alternatives offer relatively rapid travel between the Airport and BART and ridership estimates differ significantly, with the AGT solutions attracting more.

Project Update Report: BART-Oakland Airport Intermodal Connector Project (1993)

This 1993 report studied a variety of technologies but focused on an AGT technology, and identified two basic alignment options for the Connector.

Service and Physical Characteristics

To achieve a level of service that is compatible with the BART system, the Connector should provide high reliability, offer high passenger service levels, fit the constraints imposed by the physical environment, and meet required operational and regulatory standards. The performance criteria required by the system are summarized in Table A-3.

Only an exclusive guideway can meet or exceed all the performance criteria required of the transit service. Exclusive guideways can be below-grade, at-grade, or elevated. Non-exclusive and the semi-exclusive guideways cannot meet the criteria for reliability or in-vehicle travel time, which are two key characteristics for the success of the Connector.

Appendix Table 1.3-2

COMPARISON MATRIX OF IMPACTS BY ALTERNATIVE

IMPACTS	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Transportation					
Average Daily Transit Ridership	3,700	5,100	8,400	17,700	13,500
Peak-hour Design Capacity	375	850	990	1,020	1,020
Transit Travel Time Off-peak	8 minutes	8 minutes	6 minutes	7.5 minutes	6 minutes
Transit Travel Time Peak-hour	23 minutes	15 minutes	6 minutes	7.5 minutes	6 minutes
Auto Travel Time between Air Terminal and Nimitz Freeway	7.24 minutes	6.3 minutes	6.06 minutes	6.06 minutes	5.76 minutes
Daily Vehicle Miles	1,750,000	1,730,000	1,680,000	1,554,000	1,605,000
Volume to Capacity Ratio	1.21	1.20	1.17	1.06	1.11
Land Use					
Businesses Displaced	0	0	0	0	0
Transit-related New Developments[1]	NA	0	0	11,400 sq.ft.	0
Land Taking	NA	NA	14.3 acres	9.9 acres	9.8 acres
Compatibility with Plans	no effect	no effect	positive	positive	positive
Effect on Recreation	no effect	no effect	negative	no effect	no effect
Visual	no effect	no effect	negative	negative	negative
Socioeconomics					
Jobs Displaced	0	0	0	0	0
Transit-induced New Job Opportunities[1]	0	0	0	7,500	0
Potential Workers Served within 1,000 feet of Transit Stop	NA	NA	NA	10,650	NA
Potential to Stimulate Economy/Employment	no effect	no effect	positive	positive	no effect
Natural Environment					
Water Quality/Hydrology	no effect	no effect	negative	negative	nagative
Effect on Vegetation/Habitat	no effect	no effect	no effect	no effect	no effect
Effect on Wildlife	no effect	no effect	no effect	no effect	no effect
Effect on Air Quality	negative	negative	positive	positive	positive
Effect on Energy	negative	negative	positive	positive	positive
Effect on Noise	no effect	no effect	negative	negative	negative

[1]Estimates based on transit alternative effect over base growth

Source: U.S. Department of Transportation, March 1981

Table A-3
Connector Performance Criteria

Minimum on-time reliability	94%
Minimum peak hour capacity	700-800 passengers/hour/direction
Minimum train control requirements	Forced-stop automatic train protection signaling system and adherence to state PUC requirements
Minimum headway	4-6 minutes
Maximum in-vehicle travel time (one way)	5-7 minutes
Minimum grade capability	3.5%-4.5%
Minimum Vertical Turning Radii	2,000-3,000 feet
Minimum Horizontal Curve Radii	100-200 feet

Source: Wilbur Smith Associates in association with Gannett Fleming, ESA, Group 4, Pittman & Hames, for San Francisco Bay Area Rapid Transit District and Port of Oakland, Project Update Report, BART- Oakland Airport, Intermodal Connector Project, December 1, 1993.

Evaluation of Modes

Five transportation modes that operate on exclusive guideways were considered as options for the Connector:

- Busway and guided busway are exclusive guideways for bus transit service. Capacity depends on the size of the vehicle, whether single unit, articulated, or coupled vehicles.
- Light Rail Transit operates on a schedule over a fixed route. The vehicle is supported by steel wheels on steel rails. Operating speeds vary depending on the guideway. Passenger capacity depends on the vehicle size (100-230 passengers/vehicle).
- Personal Rapid Transit has very small vehicle capacity with low speeds.
- Rapid Transit has very high capacities, speeds, and costs.
- AGT is different from other modes in that it provides medium passenger capacity on an exclusive guideway. The various forms of AGT have different features:
    - Guideways can be concrete structure or suspended cable.
    - Vehicles can be track-rubber tire or flat track, steel wheel on steel rail, central beamway or “monorail,” or cable drawn.
    - Vehicle support can be bottom or suspended.

- Suspension can be via air, pneumatic, steel wheel, or cable.
- Propulsion can be AC, DC, cable, or maglev.

A comparison of the various modes in the 1993 report identified the AGT mode as the most appropriate for the Connector, satisfying all the performance criteria, with the exception of some specific technologies within the AGT mode. The screening evaluation summary of the various modes is shown in Table A-4.

Table A-4
1993 Project Update Report Screening Evaluation Summary

Mode	***Technology***	***Key Drawback***
Busways		Aerial structures more expensive than AGT systems
Light Rail Transit		aerial structures more expensive than AGT systems
Personal Rapid Transit		Cannot meet capacity and travel time requirements
Rapid Transit		costs and performance exceed that needed for connector
AGT	cable propelled	Cannot meet route length and/or travel time requirements
AGT	monorail systems	some cannot meet travel time requirements
AGT	other AGT technologies	all criteria satisfied

Source: Wilbur Smith Associates in association with Gannett Fleming, ESA, Group 4, Pittman & Hames, for San Francisco Bay Area Rapid Transit District and Port of Oakland, Project Update Report, BART- Oakland Airport, Intermodal Connector Project, December 1, 1993.

The 1993 report drew several important conclusions regarding the characteristics of available technologies. Regarding the AGT, an aerial alignment would be required because sufficient right-of-way is not available to construct a continuous at-grade configuration. For transportation modes that include heavier vehicles, such as light rail, or have manual steering, such as a motor bus, exclusive guideways for these modes operate most efficiently at-grade. If an aerial guideway must be used, the structure must include massive support features to support the weight of the vehicle (for light rail) or provide sufficient width for driving (for a motor bus). When an aerial structure is needed for a light rail or motor bus, the construction cost per mile of structure approaches that of rapid transit. As displayed in Table A-4, rapid transit costs and performance exceed the cost needed for the Connector. For these reasons, rapid transit is not an appropriate mode for the Connector. Because AGT vehicles are typically lighter and smaller and are positively guided on the guideway, AGT systems generally have lower per-mile costs for aerial structures.

Operating Patterns and Terminal Station Configurations

Various operating patterns and terminal station configurations were studied in the 1993 report and were found to meet the performance criteria for the Connector. However, the scope of the study restricted the identification of the most feasible and optimum technology for the Connector. The 1993 report concluded the need for more extensive engineering and operational studies to find the optimum solution.

Alignments

The alignment analysis began with a review of the major changes in the study area since previous studies. This review was followed by a preliminary screening of possible alternate routes. The alternatives in the 1980 Oakland Airport Transit Connector System Project Final Report and the Draft EIS, and the Route Alternative Analysis Report, and other routes not considered in the above reports were checked for their feasibility. The six basic alignment alternatives that were considered for the screening exercise are shown in Figure A-6. These routes were evaluated in terms of directness, compatibility with adjacent land use, encroachment onto sensitive environmental areas, opportunities to generate ridership, and other issues. This screening process led to two basic alignments, one following Hegenberger Road (designated as Hegenberger Road Corridor), and the other following Elmhurst Channel and Edgewater Drive (designated as Edgewater Drive Corridor) (see Figure A-7). Several segments of the alignments are common to both corridors.

Hegenberger Road Corridor

Key features of this corridor include:

- Route 3.2 miles long.
- Starts at the BART station and runs along the west edge of southbound Hegenberger on-ramp from San Leandro Street. The route continues in the median of Hegenberger to south of Pardee Drive, where it turns south along Airport Drive, crosses Doolittle Drive, and follows Airport Drive to the long-term parking lot. The route travels straight across the parking lot to the area between Terminals 1 and 2.

Edgewater Drive Corridor

Key features of this corridor include:

- Route 3.9 miles long
- Starts at the BART station and follows the on-ramp to Elmhurst Channel. It then travels along the channel to Edgewater Drive, where it turns south. In the vicinity of Pendleton Way, the route branches into several variations in order to reach the intersection of Hegenberger Road and Airport Drive. One variation continue on Edgewater Drive to Hegenberger Road, and then follows Hegenberger Road. Another follows Pendleton Way and Leet Drive. A third option cuts along a property line parallel to and west of Hegenberger Road until entering the vacant lot next to the Hilton Hotel. At this point, the three variations rejoin and follow Airport Drive to the Airport terminals.

Conclusions

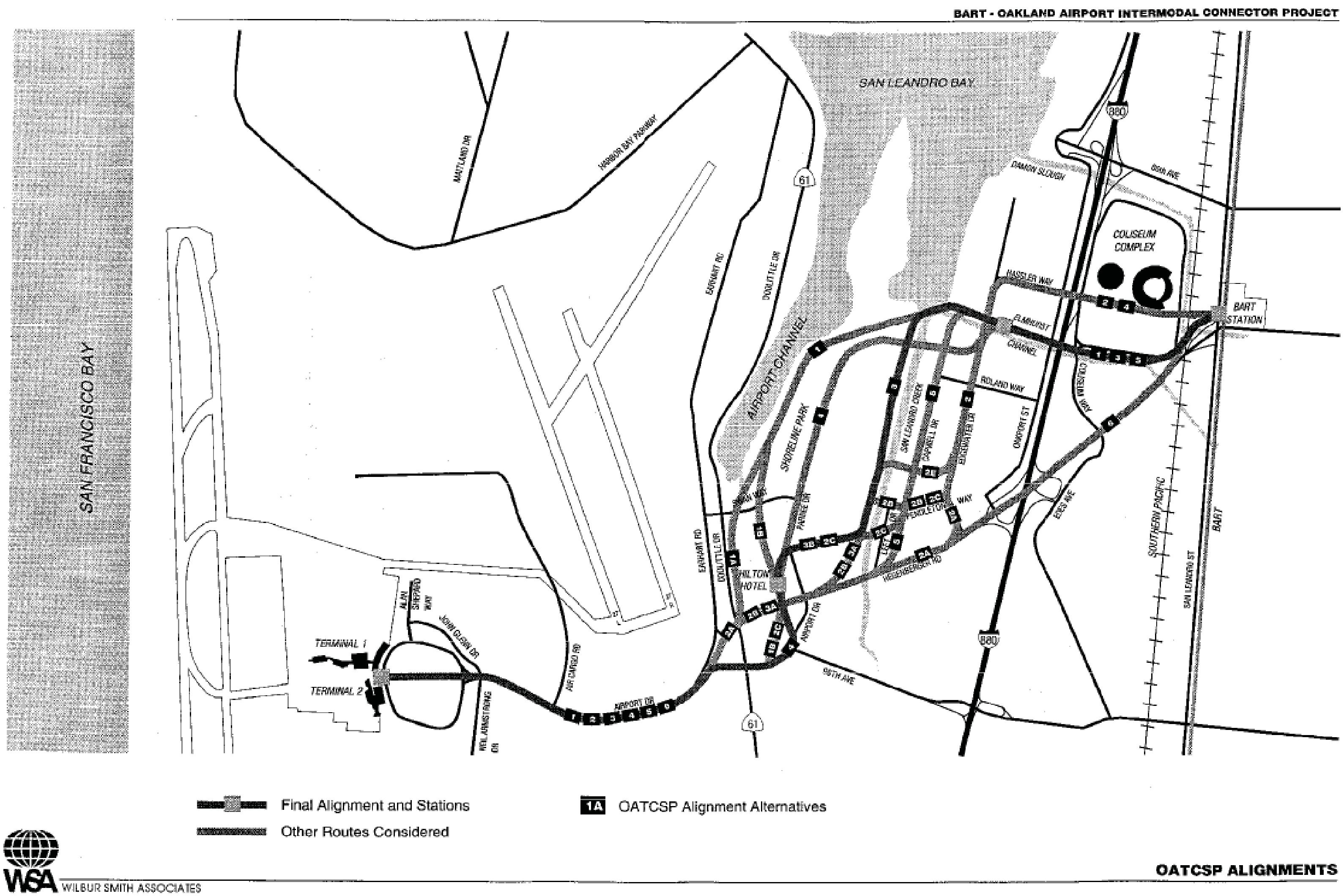
The analysis further investigated the issues from the screening task, with additional emphasis on placement of guideway, right-of-way and relocation requirements, operational constraints, intermediate station locations, and maintenance facility sites. To assist with the analysis, the two corridor routes were divided into several segments - Segment A to Segment I (see Figure A-

8). The conclusion of this analysis resulted in identification of the most feasible options for each route as follows:

- Hegenberger Road Corridor - The only route options occur in Segments B and C. In Segment B, the route option that crosses Airport Drive south of 98th Avenue and travels along the property line of businesses (mostly long-term airport parking lots) along Airport Drive (Airport Access Road) is superior to the route option that uses the median of Airport Drive. The preferred option provides an opportunity for an interim station, and a good site for a maintenance facility. Such sites are rare along the Hegenberger Road Corridor. This route would also have less visual impact on the neighboring properties. This preferred route also applies to the Edgewater Road Corridor since this portion is common to both. In Segments B and C, the route option in the median of Hegenberger Road is superior to the route option along the west side of Hegenberger Road because it would have less adverse effects on adjacent businesses.

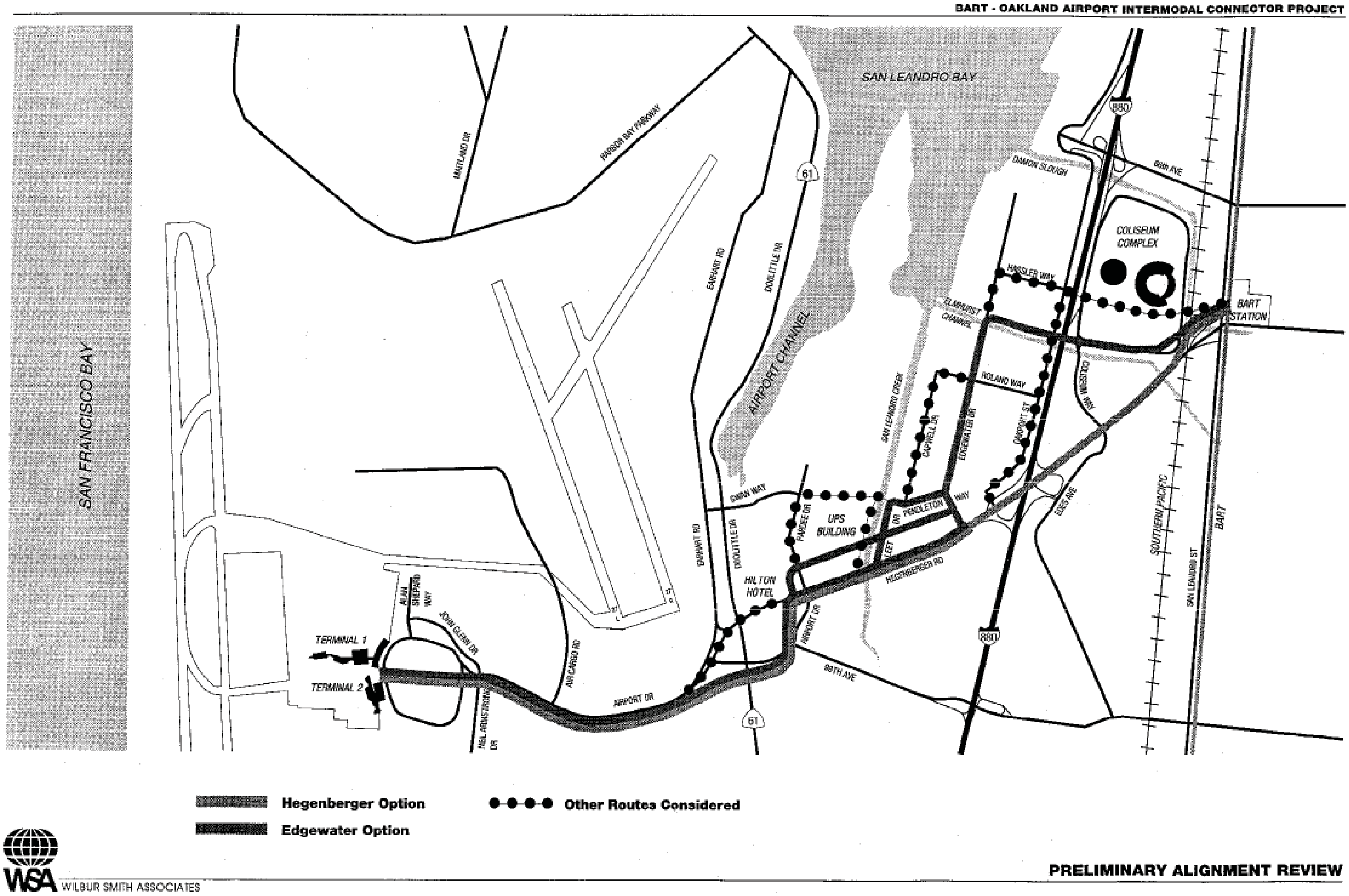
- Edgewater Road Corridor - This corridor considers more alternative route options, as represented by Segments D, E, and F. Of the three segments, Segment D is the least attractive because it is the most circuitous and has the most potential effects on the creek and adjacent businesses. Segments E and F are almost equally preferable. Both would require business relocation, although the gas station in Segment E is more valuable in terms of property value, income generation, and tax revenue to the City of Oakland. Overall, the route option following Segment F is preferred because the visual quality offered by this option is better than the other options and the segment also offers an alternate location for an intermediate station next to the Hilton Hotel.

A qualitative analysis was then performed to assess the relative advantages of the two corridors (see Table A-5). Without assigning any weighting or priority to the analytical factors, the Hegenberger Road Corridor was found to be better than the Edgewater Drive Corridor. The Hegenberger Road Corridor is shorter which reduces travel time, construction costs, and operating costs. It also has fewer curves which also reduces travel time. Because the alignment stays along the highly developed Hegenberger Road, the Hegenberger Road Corridor option has less impact on sensitive environmental areas. The Edgewater Drive Corridor is superior in its ability to provide an intermediate station in the center of the business park, but the Edgewater Drive Corridor's major weaknesses is its length and the additional curves.



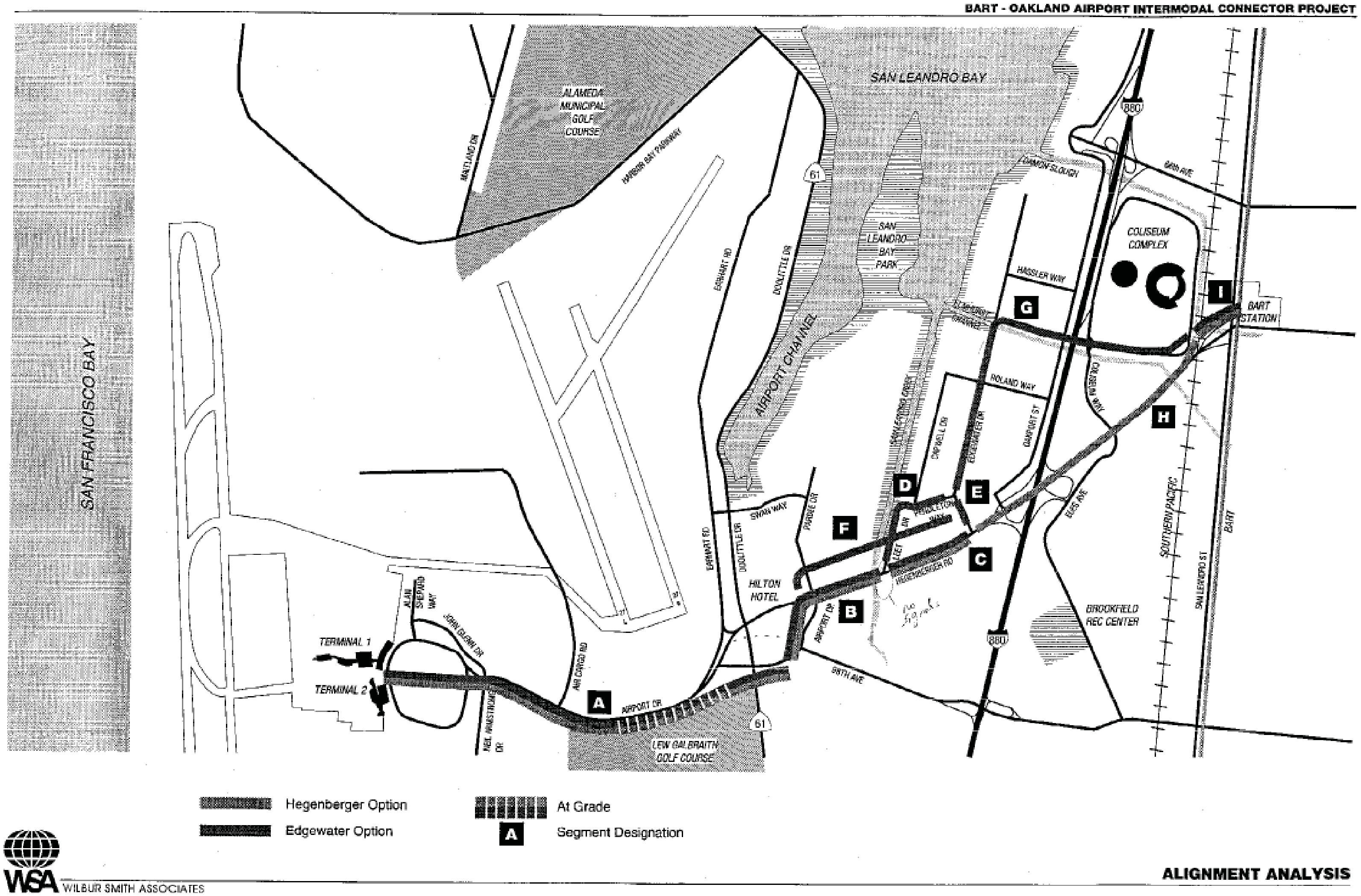
Source: Wilbur Smith Associates, 1993

Figure A-6



Source: Wilbur Smith Associates, 1993

Figure A-7



Source: Wilbur Smith Associates, 1993

Figure A-8

Table A-5
1993 Project Update Report, Alignment Assessment

Factor	***Hegenberger Road Corridor***		***Edgewater Drive Corridor***	
	Rating	***Comment***	***Rating***	***Comment***
Directness of Route	H	Straight line between BART and Airport	L	Only deviation is the bend to Edgewater Drive and Elmhurst Channel
Compatibility with Adjacent Land Use	M	Visual impact on businesses fronting Hegenberger Road	M	Visual and noise impact on Elmhurst Channel trail
Avoids Sensitive Environmental Areas	H	Crosses San Leandro Creek on Hegenberger	M	Crosses San Leandro Creek south of Hegenberger Road
Avoids Operational Constraints	H	Only two curves	M	Four curves
Right-of-way and Relocation Requirements	M	May require right of way to widen street where median is narrow	M	Requires relocation of one business
Opportunities for Intermediate Stations	M	Does not serve Business Park well	H	Serves all potential areas
Opportunity for Maintenance Facility	M	Three potential sites	H	Five potential sites

Source: Wilbur Smith Associates in association with Gannett Fleming, ESA, Group 4, Pittman & Hames, for San Francisco Bay Area Rapid Transit District and Port of Oakland, Project Update Report, BART- Oakland Airport, Intermodal Connector Project, December 1, 1993
Note: H = highest benefit/lowest cost; M = medium benefit/medium cost; L= lowest benefit/highest cost

Appendix B
Transit Ridership Procedures And Inputs

The forecasts of ridership for transit access alternatives to Oakland International Airport are based on a mode choice model. The mode choice model was derived from models developed by the Metropolitan Transportation Commission (MTC) for Bay Area regional airport access studies. It was customized for this study based on specific survey data collected at Oakland International Airport (OIA) by CCS.

Overview Of Methodology

The model evaluates the times and costs for the following eight access modes:

1. Private auto
2. Rental car
3. Scheduled shuttle bus (Santa Rosa Airporter, etc…)
4. Public transit (BART, AC Transit)
5. Door-to-door shuttle (Super Shuttle, etc…)
6. Hotel shuttle
7. Taxi/Limousine
8. Other

Different types of travelers respond differently to different modes of airport access. For example, business travelers are less sensitive to cost than pleasure travelers. Local residents generally have a private car available while visitors may need to rent a car. Therefore, the mode choice model separately evaluates airport access choices for the following five types of travelers:

1. Resident business
2. Resident personal
3. Visitor business
4. Visitor personal
5. Airport Employees

A comprehensive list of time and cost factors is included in the evaluation of each mode. Evaluation of auto travel considers the driving time, parking or drop-off time, average parking cost (including consideration of passengers who are dropped off and average trip durations) and auto operating cost based on mileage. Transit travel considers walk times, wait times, ride times, transfers and fares. Shuttle travel includes additional ride time for other passengers, and higher costs than public transit.

Comparison with Regional Model

The ridership analysis for the BART Oakland Airport Connector (Connector) uses a focused methodology that allows for more precise evaluation of transit connections. A regional travel model, such as the model of the Bay Area maintained by the MTC, aggregates the Bay Area into approximately 1,100 geographical areas (transportation analysis zones, or TAZs). All studies using this model must evaluate all 1,100 x 1,100 combinations of origins and destinations. The analysis used in this study only evaluates trips to and from OIA. The other non-airport ends of the trips are aggregated into 25 representative districts.

The MTC model estimates the generation and distribution of trips throughout the Bay Area based on a number of factors including household characteristics and tendencies obtained from survey data. However, the MTC model does not explicitly consider the special characteristics of airport passenger trips. The trip generation and distribution estimates used for the Connector ridership analysis are based directly on surveys of passengers and employees at OIA conducted by MTC, and Regional Airport Planning Committee (RAPC) forecasts of airline passenger travel demand prepared for MTC.

The Connector ridership analysis does use several inputs that are consistent with the MTC regional model. These include existing and future peak period automobile travel times, and existing distribution and travel mode choices for airport area employees.

Data Sources

The ridership analysis is based on a variety of data sources, including surveys of air passengers and employees at OIA (1995 MTC Air Passenger Survey), surveys of current AirBART passengers (CCS Planning and Engineering, Inc., December 1999 and May 2000), and regional travel information compiled by MTC for the purposes of its regional travel model.

Air Passenger Survey Data

The MTC conducts periodic surveys of air passengers at each of the three major Bay Area airports (Oakland, San Francisco, San Jose). The 1995 MTC Air Passenger Survey was used to extract a large amount of information about air passengers at OIA.

Local Origin. The Air Passenger Survey asked each departing air passenger where they were before coming to the airport. The local origin for departing air passengers was coded to the nearest street intersection to the extent possible. This allows the local origin to be summarized by city, by zip code or by MTC transportation analysis zone. Table B-1 lists the local origins by city for those cities that accounted for one percent or more of local origins. The remaining 27 percent of air passengers came from a variety of cities, none of which accounted for more than one percent of local origins.

Table B-1
Oakland International Airport Departing Passengers Local City of Origin

City	Percent
Oakland	15.3%
San Francisco	11.8%
Berkeley	5.2%
Walnut Creek	4.4%
Alameda	3.4%
Concord	3.1%
Hayward	2.8%
San Leandro	2.7%
San Ramon	2.5%
Pleasanton	2.5%
Danville	2.3%
Fremont	2.1%
Livermore	1.6%
Richmond	1.6%
Antioch	1.4%
Martinez	1.4%
Santa Rosa	1.3%
Castro Valley	1.3%
Pleasant Hill	1.3%
Napa	1.3%
Modesto	1.1%
Benicia	1.1%
Vallejo	1.1%
Other*	27.5%
TOTAL	**100.0%**

*Note: Only cities with more than one percent of air passengers listed.
Source: MTC 1995 Air Passenger Survey, OIA responses only

Traveler Characteristics. The MTC Air Passenger Survey was used to determine information about each of the four traveler types (Table B-2). The largest group of travelers is local residents making personal (non-business) trips. Overall, personal travel accounts for about two-thirds of OIA passengers, and business travelers account for about one-third. More than half (56 percent) of the passengers are local residents rather than visitors. Residents making personal trips are the most likely to use transit (7.1 percent), while residents traveling for business have the lowest transit use (3.4 percent). Average auto occupancies tended to be similar for private car and rental car users, except for business visitors. The higher auto occupancy for private cars may indicate that these travelers are often dropped off by a local driver.

Household Income. Travel choices made for personal travel are assumed to be influenced by income level. Travel choices made for business trips are assumed to be independent of income level, as most business travelers are reimbursed for travel costs. The average annual household income for passengers at OIA was determined to be $75,000 based on the 1995 MTC Air Passenger Survey.

Table B-2 ***Oakland International Airport Traveler Type Characteristics***					
	Resident Business	***Resident Personal***	***Visitor Business***	***Visitor Personal***	***Total Passengers***
Percent of Oakland Airport Passengers	20%	36%	13%	31%	100%
Average Trip Duration (nights)	2.7	4.4	3.0	4.8	4.0
Access Mode					
Private Car	86.7%	83.1%	28.3%	62.4%	70.2%
Rental Car	1.7%	1.1%	51.7%	23.4%	15.2%
Public Transit	3.4%	7.1%	3.9%	4.5%	5.0%
Private Shuttle	5.2%	7.1%	10.6%	6.9%	7.0%
Taxi	2.6%	1.6%	5.3%	2.5%	2.4%
Other	0.4%	0.0%	0.2%	0.3%	0.2%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Average Auto Occupancy					
Private Car	1.6	2.4	2.6	2.8	2.3
Rental Car	1.6	2.4	1.6	2.5	2.1

Source: MTC 1995 Air Passenger Survey, OIA responses only

Employee Travel Data

The residence locations of airport employees were estimated using home-work trip information from the MTC travel model. The home "productions" for trips "attracted" to the MTC zone containing the OIA were compressed to match the 25 geographical districts described above. The highest numbers of employees are estimated to commute from portions of Oakland outside of walking distance to BART (35 percent of employees) and Hayward (26 percent of employees). Table B-3 compares the percentages estimated by the MTC model with the county of residence reported in the MOIA Airport Development Program (ADP) EIR (Table 4.3-2, page 4.3-3) based on actual surveys of employers. The MTC model is generally consistent with the employee residence locations reported by the Port of Oakland.

The MTC model was also used to obtain an estimate of transit and automobile use by airport area employees. These were reported separately for each of the 25 districts. The MTC model estimates the overall transit use at 3.2 percent for employees in the Oakland Airport area. The highest transit percentages are estimated for employees coming from downtown San Francisco (60 percent transit), downtown Oakland (13 percent transit) and Berkeley within walking distance of BART (10 percent).

Table B-3 *OIA Employees Place of Residence*		
County of Residence	***1995 Port of Oakland Survey***	***1998 MTC Model***
Alameda	73.1%	77.5%
Contra Costa	14.7%	12.8%
Marin/Sonoma	2.5%	1.3%
Napa/Solano	1.6%	2.8%
San Francisco	3.4%	2.3%
San Mateo	2.2%	2.1%
Santa Clara	0.8%	1.2%
Other	1.7%	--
TOTAL	**100.0%**	**100.0%**

Sources: Port of Oakland Airport Development Plan EIR; home-work trip data files from MTC model

Existing Transit Passenger Data

A focused interview survey of AirBART passengers was conducted at the Coliseum BART station on Friday, December 3, 1999. The survey was intended to determine how many AirBART riders are air passengers traveling for business or personal reasons, and how many AirBART passengers are employees or visitors at OIA. The survey interviewed 917 passengers between 6:00 A.M. and 10:00 P.M., representing approximately 75 percent of average daily passengers. The survey results are summarized in Table B-4. Approximately 95 percent of the surveyed AirBART passengers were airline passengers as opposed to employees or visitors.

Table B-4 *AirBART Passenger Characteristics*		
Trip Purpose	***Number***	***Percent***
Air Passenger, Business	321	35%
Air Passenger, Personal	547	60%
Airport Area Employee	25	3%
Airport Visitor	21	2%
Other	3	0%
TOTAL	**917**	**100%**

Source: CCS Planning and Engineering survey at Coliseum BART Station, Friday, December 3, 1999

Mode Choice Model

The form of the model is a multinomial logit choice model. A "utility" or rating of relative attractiveness is calculated for each available travel mode based on time and cost factors. The utility is then used in an exponential function to calculate the percentage of travelers that would be likely to choose each mode.

Geographical Districts

The methodology for analysis of access modes requires a grouping of local origins and destinations for air passengers. The aggregation of local origins and destinations ensures statistical reliability of the access mode information, and also provides a more manageable number of locations for evaluation of transit routes. Based on the local origin information in the MTC Air Passenger Survey, 25 analysis districts were established for access mode analysis (Table B-5). The districts are grouped so that the locations within each district have similar access to transit service, in particular the BART system. The district boundaries also stay within MTC "superdistricts" (subsets of counties) and are made up of groupings of MTC transportation analysis zones. This allows for consistency between airport passenger data and other regional travel data.

Mode Choice Model Inputs

The primary inputs to the mode choice model are the specific components of travel time and cost for each travel mode. The inputs for each travel mode are listed in Table B-6. The following sections provide additional information on selected inputs.

Automobile Travel Times. The road networks from the MTC travel model were used to estimate automobile travel times to and from OIA. In order to represent travel times with typical congestion levels faced by airport passengers, it is necessary to use travel model information that includes peak period traffic volumes and congested roadway speeds; this is referred to as a "loaded" road network. Road networks containing A.M. peak period traffic volumes and congested travel speeds were used for the analysis.

The closest available MTC analysis years were selected. A 1998 MTC network was used to represent 1999 base year travel times (MTC does not provide information for 1999). A 2020 Regional Transportation Plan (RTP) road network was used for future travel times. The MTC regional model contains a generalized representation of the local street system. Therefore, it may not explicitly represent all of the current and future street improvements in the OIA area, such as the 98th Avenue grade separation at Doolittle Drive. However, the MTC model is the best available source for information on average travel times with future regional congestion levels.

Table B-5 ***Oakland International Airport Connector Analysis Districts***			
District Number	***Label***	***MTC Superdistrict***	***MTC Zones***
1	SF Downtown	1	All
2	SF Southeast	3	All
3	SF West	2,4	All
4	San Mateo North	5	All
5	San Mateo South	6,7	All
6	Santa Clara	8-14	All
7	Pleasanton Dublin Station	15	526,527,529
8	Pleasanton/Livermore	15	All others
9	Fremont	16	All
10	Hayward	17	All
11	Hegenberger	18	646,647,653,654
12	Oakland BART	18	668-670,711-713
13	Oakland Downtown	18	694-700
14	Oakland Other	18	All others
15	Berkeley BART	19	719,720,725-728,730-733,738,743,744
16	Berkeley Other	19	All others
17	El Cerrito/Richmond	20	748-767
18	Pinole/Hercules	20	All others
19	Concord	21	All
20	Lafayette/Walnut Creek	22	All
21	Danville/San Ramon	23	All
22	Bay Point	24	868-873
23	Contra Costa East	24	All others
24	Solano/Napa	25-28	All
25	Marin/Sonoma	29-34	All

Source: CCS Planning and Engineering, 2000

Table B-6 ***Mode Choice Model Inputs***		
Travel Mode	***Input***	***Value and Source***
Private Car	Drive time	MTC travel model peak period congested auto times
	Drop-off factor for visitor trips only, representing inconvenience for drivers dropping off or picking up air passengers	Multiply auto time by 1.5
	Parking time penalty for resident trips only, representing time to park and walk or park and take parking lot shuttle bus	Estimated at 10 minutes in vehicle plus 6 minutes walk (0.3 miles) or shuttle ride
	Perceived driving cost	Estimated at $0.15 per mile, with distances based on MTC travel model
	Average airport parking cost per passenger	Estimated separately for each passenger type based on $8 per day, factored by average trip duration and average passengers per vehicle from MTC air passenger survey
	Average downtown parking cost	Estimated at $8.00 for trips to/from downtown San Francisco and $4.00 for trips to/from downtown Oakland.
Rental Car	Drive time	MTC travel model peak period congested auto times
	Average cost per passenger	Estimated at $50 per day basic rate, factored by average trip duration and average passengers per vehicle from MTC air passenger survey
	Pick-up/drop off time	Estimated at 12 minutes time from MTC air passenger survey plus 4 minutes walk (0.2 miles)
Scheduled Airporter Shuttle	Auto access between home and shuttle stop	Estimated at 10 minutes and $1.00 of perceived auto operating cost
	Ride time on shuttle	MTC travel model peak period congested auto times
	Walk at terminal	2 minutes (0.1 miles)
	Shuttle fare	Estimated at $0.50 per mile based on telephone survey of rates
	Time penalty for leaving home early/waiting at airport to meet shuttle schedule	18 minutes based on MTC air passenger survey
Public Transit	Walk/drive access to each transit route	Estimated based on size of area served
	Wait time for each transit route	One-half of scheduled headway
	Ride time on each transit route	Transit schedules
	Fare on each transit route, with reductions for transfer discounts	Published transit information
	Average wait and ride time on BART Connector	Varies depending on alternative
	Walk at terminal	2 minutes (0.1 miles)
	Time penalty for leaving home early to meet transit schedule	2 minutes based on MTC air passenger survey

Table B-6 (continued)
Mode Choice Model Inputs

Travel Mode	***Input***	***Value and Source***
Door-to-Door Shuttle	Ride time on shuttle	MTC travel model peak period congested auto times
	Time penalty for picking up/dropping off other passengers	Estimated at 10 minutes
	Walk at terminal	2 minutes (0.1 miles)
	Time penalty for leaving home early/waiting at airport to meet shuttle schedule	10 minutes based on MTC air passenger survey
	Shuttle fare	Estimated at $1.50 per mile based on telephone survey of rates
Hotel Shuttle	Wait time	Estimated at 10 minutes
	Ride time	MTC travel model peak period congested auto times
	Walk at terminal	2 minutes (0.1 miles)
	Time penalty for leaving hotel early to meet shuttle schedule	20 minutes based on MTC air passenger survey
	Shuttle fare	Free
Taxi	Ride time	MTC travel model peak period congested auto times
	Walk at terminal	2 minutes (0.1 miles)
	Time penalty for leaving home early/waiting at airport to meet taxi schedule	6 minutes based on MTC air passenger survey
	Fare	$2.00 base fare plus $2.00 per mile based on City of Oakland rates
Other Modes	Mode shares assumed to be consistent with 1995 surveyed mode shares	

Source: CCS Planning and Engineering, 2000

A representative transportation analysis zone was selected for each of the 25 geographical analysis districts. The MINUTP model software was then used to extract travel times based on congested roadway speeds between the 25 representative zones and the zone containing OIA. The software selects the shortest-time path between each origin and destination, and may select different routes to and from the airport. The access mode choice analysis uses the average of the congested times to and from the airport.

Walk Times. Walk times are estimated based on an average walking speed of three miles per hour (approximately four feet per second). Therefore, a distance of 500 feet is assumed to require two minutes. An additional 0.5 minutes is added for walk connections that require a majority of passengers to use an escalator. Average walk times to or from BART or AGT trains are measured from the center of the train. Walk times at the airport are measured to and from the security gates, representing a common point for all arriving and departing passengers.

Wait Times. Average wait times for transit are generally estimated as one-half of the frequency of service, or headway. This assumption is consistent with standard practice for transit planning.

Coefficients. Separate "weighting" coefficients are applied for in-vehicle travel time, out-of-vehicle time (wait or walk), and cost. These weighting coefficients differ for each of the four passenger types and employees. The coefficients for the four groups of airline passengers were adapted from the "ACCESS Models of Airport Access and Airport Choice for the San Francisco Bay Region, Version 1.2" (Greig Harvey, Deakin, Harvey, Skabardonis, prepared for the Metropolitan Transportation Commission, December 1989). The coefficients for employees were adapted from the MTC mode choice model for home-based work trips. The coefficients are listed in Table B-7.

Table B-7
Mode Choice Model Logit Coefficients

Variable	***Resident Business***	***Resident Personal***	***Visitor Business***	***Visitor Personal***	***Employee***
Auto Time (minutes)	-0.071	-0.044	-0.068	-0.039	-0.02683
Rail Transit Time (minutes)	-0.053	-0.031	-0.050	-0.029	-0.02683
Bus Transit Time (minutes)	-0.093	-0.051	-0.089	-0.045	-0.02683
Walk Distance (miles)	-5.17	-3.28	-4.69	-2.94	-1.1552
Wait Time (minutes)	-0.107	-0.077	-0.096	-0.071	-0.0418
Cost (cents)	-0.00277	$-1.04/(HHINC)^{1.5}$	-0.00256	$-0.973/(HHINC)^{1.5}$	-0.001468
Constants					
Rental Car	-3.8	-4.2	0.7	-1.2	n/a
Scheduled Shuttle	-0.5	-1.4	0	-1.2	n/a
Transit	-1.5	-1.2	-1.0	-1.8	-2.0
Door-to-Door Shuttle	0	-0.9	+1.0	-0.9	n/a
Hotel Shuttle	n/a	n/a	-3.2	-4.2	n/a
Taxi	-0.2	-1.6	0.8	-0.8	n/a

HHINC = Annual household income in thousands of dollars
n/a = Mode is not available for this group

Sources: Greig Harvey for the Metropolitan Transportation Commission, "ACCESS: Models of Airport Access and Airport Choice for the San Francisco Bay Region, Version 1.2", December, 1989
CCS Planning and Engineering, 2000

Constants. Table B-7 also lists the mode-specific constants that are used to represent factors other than time and cost, such as perceptions of safety, comfort, convenience and reliability. These constants were determined during model calibration as described below. This analysis did not include mode-specific constants that would differentiate perceptions of reliability for rail versus bus transit. Instead, reliability is accounted for during the determination of average travel times for each of the transit modes.

Calibration of Mode Choice Model

The access mode choice model was calibrated by inputting 1999 base year characteristics of each travel mode (for example, existing auto and transit travel times and fares). The model constants were then adjusted until the model closely matched the surveyed access mode percentages for each of the five traveler types (see Table B-2 for observed access mode percentages). The results were then checked for each of the 25 geographical districts to ensure that the model is assigning reasonable choices (for example, most public transit riders should be coming from Oakland and San Francisco rather than Napa).

Ridership Forecasts

The ridership model was applied to estimate transit ridership for two forecast years (2005 and 2020) and three basic alternatives:

- No Project (AirBART)
- Quality Bus
- Automated Guideway Transit (AGT)

A variety of design scenarios were tested for each basic alternative. For Quality Bus, several different options were tested in terms of travel time, walking distance at each end of the route, and frequency of service. For AGT, the scenarios included speed of service (30 miles per hour, 50 miles per hour, and composite speeds based on alignment), length of track, type of transfer connection at each end of the line, and the number of train sets in operation. The design scenarios resulted in different input assumptions for travel time between the BART Coliseum Station and the airport terminal, average wait time based on frequency of service, and passenger walk times and distances at each end of the connector service.

Demand Assumptions

Airline Passenger Demand. Future airline passenger travel demand at OIA in 2010 and 2020 was based on the Regional Airport Planning Committee (RAPC) forecasts prepared for MTC (Roberts, Roach and Associates, "San Francisco Bay Area Aviation Demand Forecasts, February 2000). Air passenger demand for the intervening years of 2005 and 2015 was interpolated from the RAPC data by BART (Donald Dean, BART, memorandum dated June 23, 2000). The total annual passengers at Oakland Airport would be 13.35 million air passengers (MAP) in 2005 and 24.74 MAP in 2020.

Ground Access. The RAPC forecasts projected 4 percent connecting passengers and 96 percent local (non-connecting) passengers at OIA. The annual passengers requiring ground access would be approximately 12.8 million in 2005 and 23.75 million in 2020. The average daily number of passengers (annual divided by 365) requiring ground access would be approximately 35,100 in 2005 and 65,000 in 2020.

Employee Travel. The Port of Oakland provided estimates of direct jobs for the 1999 base year and related to the 2020 passenger forecasts (fax from Anne Whittington, Port of Oakland, March 13, 2000). The Port of Oakland's economic model estimates full-time equivalent Bay Area employment due to aviation activities at OIA. This model does not estimate the number of people who actually commute to the airport for jobs on a given day. Some aviation industry jobs are not on airport property, and some jobs, particularly in air cargo, are part-time.

The total direct jobs estimated for the 1999 base year was approximately 10,200. The total direct jobs related to the projected 2020 passenger and air cargo activities would be 16,700 full-time equivalent employees. The number of employees in 2005 was estimated through interpolation as 12,630 full-time-equivalent employees (Don Dean, BART, June 23, 2000). These direct jobs are assumed to be located on Airport property or close enough to be accessible by transit lines serving the airport (including local AC Transit bus service).

Full-time equivalent employees work the equivalent of five days per week, but work shifts can cover all seven days of the week. Therefore, the average daily employment at the airport is estimated as 5/7 times the number of full-time equivalent employees. This results in 1999 estimates of 7,300 average daily employees generating 14,600 average daily commute trips to and from the airport area, 2005 estimates of 9,020 average daily employees generating 18,040 average daily commute trips, and 2020 estimates of 11,930 average daily employees generating 23,860 average daily commute trips.

Total Ground Access Trips. The total average daily ground access trips for the 2005 horizon year would be 35,100 passenger trips plus 18,040 employee commute trips, for a total of 53,140 daily person trips. The total average daily ground access trips for the 2020 horizon year would be 65,000 passenger trips plus 23,860 employee commute trips, for a total of 88,860 daily person trips.

Service Assumptions

The base input assumptions for each Connector transit alternative are listed in Table B-8. Variations in these input assumptions were also evaluated during the course of the study. An iterative evaluation process was used, where initial results of the ridership analysis were used for subsequent refinements in the assumptions for frequency of service and numbers of vehicles required.

Table B-8
Connector Service Assumptions

	1999	***2005***			***2020***		
Characteristic	***Existing AirBART***	***No Action AirBART***	***Quality Bus***	***AGT[1]***	***No Action AirBART***	***Quality Bus***	***AGT[1]***
Transfer walk at Coliseum BART	4 minutes	4 minutes	3 minutes	3 minutes	4 minutes	3 minutes	3 minutes
Additional wait time at fare machine	2 minutes	2 minutes	0 minutes	0 minutes	2 minutes	0 minutes	0 minutes
Frequency of service	10 minutes	10 minutes	4 minutes	3.2 minutes	5 minutes	4 minutes	3.2 minutes
Average wait time	5.0 minutes	5.0 minutes	2 minutes	1.6 minutes	5.0 minutes[2]	2 minutes	1.6 minutes
Average in-vehicle travel time to/from terminals[3]	13 minutes	13 minutes	11 minutes	5.6 minutes	14 minutes	12 minutes	5.6 minutes
Walk between transit and terminal	2 minutes	2 minutes	3 minutes	2 minutes	2 minutes	3 minutes	2 minutes
Cost	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00

[1] Representative AGT service using 45 mile per hour cruise speed, 4 train sets, two stations, double track, based on memorandum from Lea+Elliott, dated June 16, 2000.
[2] Minimum wait time of 5 minutes assumed due to projected queuing at bus loading areas
[3] In-vehicle time not including wait times or loading/unloading times

Sources: Wilbur Smith Associates, 2000; Lea+Elliott, 2000; CCS Planning and Engineering, 2000

Employee Ridership

The current employee transit ridership to and from OIA consists of the following components:

40	AirBART passenger trips
125	AC Transit 58, transfer to/from BART
100	AC Transit 58, transfer to/from other AC Transit at Coliseum BART
265	AC Transit 58, no transfer
530	Total Transit Trips (3.6% of 14,600 total daily employee trips)

About 50 percent of the transit trips in the Hegenberger corridor (265 out of 530) use AC Transit Line 58 to and from points east of Coliseum BART. These people would have no reason to transfer to a Connector service, as it is easier to just use one vehicle (the 58 bus) for the entire trip. The existing AirBART service carries about 15 percent of the employee trips between the Coliseum BART Station and the airport area. This percentage would be expected to continue for future No Action conditions.

The improved Connector service under the Quality Bus or AGT Alternatives would be expected to attract additional employee passengers, particularly between BART and the airport area. The future No Action numbers of employee trips on AC Transit Line 58 are assumed to remain constant for any Connector alternative, representing employees who live in areas not directly served by BART. Because the new Connector would likely provide more frequent and reliable service compared to AC Transit, the additional employee trips attracted by each alternative are assumed to use the new Connector service rather than AC Transit.

Ridership Results

Ridership forecasts for the initial service alternatives are presented in Table B-9. For the 2020 horizon year, implementation of a Quality Bus service is projected to increase the transit ridership to and from the airport by about 72 percent compared to the "No Action" AirBART service. The AGT service would nearly triple the rate of transit access compared to the AirBART service.

Table B-9
Connector Passenger and Employee Ridership Forecasts

	Average Daily Transit Riders (Transit Percent of Total Ground Access Trips)			
	Air Passenger Trips	***Employee Trips***		***Total Trips***
Scenario	***On Connector***	***All Transit***	***On Connector***	***On Connector***
1999 Existing Transit Service	1,190 (4.8%)	530 (3.6%)	40	1,230
2005 No Action	1,840 (5.3%)	540 (3.0%)	40	1,880
2005 Quality Bus	3,140 (9.0%)	740 (4.1%)	240	3,380
2005 AGT 45 mph, 4 trains, 2 stations	5,540 (15.8%)	920 (5.1%)	420	5,960
2005 AGT Option D	6,220 (17.7%)	970 (5.4%)	470	6,690
2005 AGT Intermediate Stops*	5,190 (14.8%)	880 (4.9%)	380	7,980
2020 No Action	3,290 (5.1%)	710 (3.0%)	50	3,340
2020 Quality Bus	5,720 (8.8%)	970 (4.1%)	310	6,030
2020 AGT 45 mph, 4 trains, 2 stations	10,380 (16.0%)	1,220 (5.1%)	560	10,940
2020 AGT Option D	11,530 (17.7%)	1,290 (5.4%)	630	12,790
2020 AGT Intermediate Stops*	9,590 (14.8%)	1,170 (4.9%)	510	14,620

Source: CCS Planning and Engineering, 2000
Note: *Under the AGT Intermediate Stops Option, approximately 2,410 and 4,520 average daily passengers would enter and exit the AGT system at the intermediate stops.

Dowling Associates, Inc.

180 Grand Avenue • Suite 995 • Oakland, California 94612
(510) 839-1742 • FAX: (510) 839-0871 • E-mail: maronson@dowlinginc.com

MEMORANDUM

To:	**Company:**	**Voice:**	**FAX:**
Randall Smith	Camp, Dresser and McKee One Walnut Creek Center 100 Pringle Avenue, Suite 300 Walnut Creek, CA 94596	(925) 296-8062	(925) 933-4174
From:		**Project No.:**	**No. of Pages:**
Mike Aronson		P00065.3	3
Date:	Tuesday, February 12, 2002		
Subject:	**BART Oakland International Airport Connector** **Revisions to Transit Ridership Forecasts**		

The methodology and assumptions used for the forecasts of transit ridership for transit access alternatives to Oakland International Airport are documented in the *Draft Environmental Impact Report for the BART-Oakland International Airport Connector*, (U.S. Department of Transportation Federal Transit Administration and the San Francisco Bay Area Rapid Transit District, July, 2001), Appendix B, Transit Ridership Procedures and Inputs (DEIR). The proposed design of the Automated Guideway Transit (AGT) alternative has been modified based upon airport terminal and parking structure design refinements proposed by the Port of Oakland. In response to a request from BART, this memorandum presents modified service assumptions and ridership forecasts for the AGT alternative.

Service Assumptions

Connector service assumptions for each alternative are listed in Table B-8 on page B-12 of the DEIR. Table 1 lists the service assumptions for the AGT from the DEIR and the revised service assumptions. The same service assumptions are used for the AGT for both the 2005 and 2020 forecast years.

The ridership analysis in the DEIR assumed that the AGT station would be placed above the airport terminal, resulting in an average walk time between the AGT station and the terminal security checkpoint of about two minutes including level changes. The revised airport terminal and parking structure design would place the AGT station in the parking structure, at a walking distance of approximately 700 feet plus level changes, estimated to require an average time of three minutes.

Table 1
Revised Connector Service Assumptions

Characteristic	AGT 2-Station (DEIR)	AGT 2-Station (Revised)	AGT 4-Station (Revised)
Transfer walk at Coliseum BART	3 minutes	3 minutes	3 minutes
Additional wait time at fare machine	0 minutes	0 minutes	0 minutes
Frequency of service	3.2 minutes	3.2 minutes	3.5 minutes
Average wait time	1.6 minutes	1.6 minutes	1.8 minutes
Average in-vehicle time to/from terminals	5.6 minutes	5.6 minutes	6.4 minutes
Walk between transit and terminal	2 minutes	3 minutes	3 minutes
Cost	$2.00	$2.00	$2.00

Sources: Oakland Airport Connector DEIR, Appendix B, Table B-8; Lea+Elliott, 2002; Dowling Associates, 2002

Ridership Results

Connector passenger and employee ridership ridership forecasts for each alternative are listed in Table B-9 on page B-14 of the DEIR Appendix B. Table 2 lists the ridership forecasts for the AGT from the DEIR and the revised ridership forecasts based on the revised service assumptions. The mode choice model used for the ridership forecasts is sensitive to the distance that passengers walk during trips to and from the airport terminal. The additional walk distance included in the revised service assumptions results in ridership forecasts that are approximately 14 percent lower for the two-station scenarios and approximately seven percent lower for the scenarios with intermediate stops.

Table 2
Revised Connector Passenger and Employee Ridership Forecasts

Scenario	Average Daily Transit Riders (Transit Percent of Total Airport Ground Access Trips)				
	Air Passenger Trips	Employee Trips		Intermediate Stops	Total Trips
	On Connector	All Transit	On Connector	On Connector	On Connector
2005 AGT 2 Stations (DEIR)	5,540 (15.8%)	920 (5.1%)	420	0	5,960
2005 AGT 2 Stations (Revised)	4,780 (13.6%)	870 (4.8%)	370	0	5,150
2005 AGT Intermediate Stops* (DEIR)	5,190 (14.8%)	880 (4.9%)	380	2.410	7.980
2005 AGT Intermediate Stops* (Revised)	4,620 (13.2%)	850 (4.7%)	350	2,410	7,380
2020 AGT 2 Stations (DEIR)	10,380 (16.0%)	1,220 (5.1%)	560	0	10,940
2020 AGT 2 Stations (Revised)	8,860 (13.6%)	1,160 (4.9%)	500	0	9,360
2020 AGT Intermediate Stops* (DEIR)	9,590 (14.8%)	1,170 (4.9%)	510	4,520	14,620
2020 AGT Intermediate Stops* (Revised)	8,560 (13.2%)	1,120 (4.7%)	460	4,520	13,540

Sources: Oakland Airport Connector DEIR, Appendix B, Table B-9; Dowling Associates, 2002
Note: *Under the AGT Intermediate Stops Option, approximately 2,410 (2005) and 4,520 (2020) average daily passengers would enter and exit the AGT station at intermediate stops.

m:\projects\00065.3 - bart oac\020212 memo smith.doc

Parking Management Toolkit

Strategies for Action in BART Station Areas

Prepared for: Bay Area Rapid Transit District
Prepared by: Richard Willson, Ph.D. AICP
October 2000

Parking Management Toolkit

trate ie or ction in tation rea

Pre are or a rea a i ran it i trict

Pre are ic ar i on P P

cto er

o to e i oo it

i too it o t ine a to a re ar in i e in t e icinit o t e tation t i inten e to e e ta e o er co nit e er cit o icia ro ert o ner erc ant an ot er a t e e e o ar in trate ie t at ort co nit oa

e re ort ro i e a te te roce or e orin ar in i e an e ectin ar in ana e ent trate ie e too it inc e or eet t at can e e to aci itate ro e o in at co nit eetin an or o

Par in ana e ent tec ni e or e t en t e are tai ore to oca con ition one i e it a a roac i e e ecti e t an carr in o t t e eci ic annin acti itie e te in t i too it i i in t i re ort to ort co a orati e a roac e to ar in ana e ent

o t

e te con i t o i e o trac an tation in o r a rea co ntie o n er con tr ction t e an ranci co nternationa ir ort ten ion i a i e o ne re en e er ice trac an o r ne tation in an ateo o nt

connect re i entia area it e e o ent o in an recreationa e tination t ro o t t e a rea t t e a e ti e ro i e a oc or co nit e e o ent in t e area rro n in t e tation Par in or atron an oca e i an inte ra art o tation area annin

e te i c an in a are t e an e attern aro n tation or ri er i i an t e co in ten ion i ro i e ne er ice an acce i i it or an oca co nitie tation area e e o ent re ent o ort nitie or ar in ana e ent i too it ro i e a roce or a re in t e e i e an i ea a o t e ecti e trate ie

o to a or ore n or ation

i ro i in t i oc ent a re o rce to co nit e er cit o icia ro ert o ner erc ant an ot er e ri ar re on i i it or a re in oca ar in re ation ie it t e re ecti e citie e a o t i e ent an en orce on treet ar in re ation et o icie or cit o ne o treet ar in an contro t e a o nt o ar in t at ri ate e e o er t ro i e o e er ro ert o ner erc ant e o er an ot er enera contro t e e o o treet ar in ina ana e t e ar in in it o n tation aci itie

o i to i c tation area ar in i e in o r cit o o ca o r cit ta a in t e P annin or n ineerin e art ent

or eci ic e tion ca Peter ert tation rea P annin ana er at

ntro ction

Par in ana e ent in o e t e e o ro ra an o icie t at a ect t e e rice an a ai a i it o ar in Par in ana e ent ran e ro i e ti e i it to o i ticate co ter a e te t at irect tra ic o to a ai a e ar in ation i e co nitie are in ar in ana e ent to ort t eir tran ortation en iron enta an co nit e e o ent o jecti e

ro i e o er ar in ace t ro o t t e re ion t o ore t an a o ri er in t e ea ercent reac tation tra e o e t at *do not* in o e ar in ar in i ti an i ortant art o er ice

ecent tren ca or a c o er oo at tation area ar in or o ic i e re ate to tran it oriente e e o ent en iron enta a it an c to er er ice are i ortant trate ic irection rt er ore ri er i i increa in an ne er ice t e ten ion i o en oon e e er ice a ition i a ect tation area t ro o t t e re ion or ne tation t ere i e ea connection to t e re ion a ne co nit oc an co nit e e o ent o ort nitie i tin tation area a e e ore inten i e a t eir tran ortation an an e oc increa e Par in ana e ent can en re t at t e a ai a e ar in i e in an e icient anner in ee in it t e oa o an t e co nit

recent a re e ar in an ot er acce i e it t e a o tion o a ne cce ana e ent an ro e ent Po ic ra e or . t ro i e i ance on t e trate ie a con i er on a te an tation eci ic a i it re ect to ar in t e o ic irect to recon i er e i tin ar in ana e ent trate ie an create ne trate ie t at a e tation area nctiona acce i e an attracti e

or oca co nitie tation area are i ortant e e ent o t eir co nit e e o ent an econo ic e e o ent an n a ition tation area a a art in i a e co nit an tra ic iti ation o jecti e

Loca co nitie a initiate t eir o n re ie o on an o treet ar in o ic an ro ra in tation area or a ariet o rea on i too it i ro i e to ort t o e e ort

o eti e a trate t at a e in ar in ro ra can e oca ta e o er a j t to a ne a roac an ro i e o ort nitie or re ine ent o e o icie a a rea e in ace an or in e c an e i e ecte o e er e e o ent o a re i inar con en a e nee e e ore t at c an e occ r it i e entation e e to act a c an e ti ot er on ter trate ie a e i c e in a conce t a a t not re ire nti a tation area reac e a certain at rit

an entitie contro ar in i re on i e or ar in at tation Loca j ri iction are re on i e or ana in on treet an nici a o treet ar in ettin e e o ent tan ar or ri ate e e o ent an aci itatin tra ic o ina ro ert o ner e o er an erc ant are re on i e or ana in t eir o n ri ate ar in

an eo e e nei or ine e an co ter a e a ta e in tation area ar in an t eir intere t an er ecti e a ar ite con i era t ie a e o n t at en t e ario ta e o er or to et er t e can ac ie e in in ar in o tion t at ro ote co nit e e o ent an co nit i a i it it t e re ea e o t i too it it i o e to enco ra e c co a orati e o tion

e Par in
ana e ent oo it

i too it ro i e i ea an e tion on o to ana e an re on to ar in i e in tation area t inc e ia ra an c ec i t to a i t ta e o er in in in t a ene icia o tion to ar in i e

o o n erta e c a t n ta e o er co initiate a tation area ar in t t t e e t a roac i co a oration et een t e cit an re e ant ta e o er i a t e ana i i ore in or e an conc ion can re on to t e i e o t e ri ar ta e o er

e ir t te i to n er tan t e ar in
i e a o t ine in i re e at en ere o o Par in ana e ent i o i ication o t e c a ic re orter a roac to ritin a ne a er tor i e or n er tan in ar in i e oo ar in trate ie e en on a o i n er tan in o e i tin con ition

e econ te i to con i er a ternati e
trate ie a e an a e an re ecti e i enti o i e trate ie a re in on treet an o treet ar in re ecti e en i inc e an er ion o t e e i re an ta e or e in or o acti itie

e t ir te i to e i n an i e ent
ro ra e a ice ro i e in t i ection e a i e t e i ortance o ainin ort ro a ta e o er an e ta i in t e ec ani to i e ent t e trate

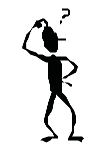
te n er tan t e Par in e

e e o in e ecti e ar in trate ie e en on a co ete n er tan in o t e nat re o t e ar in i e at an i i artic ar i ortant in tation area eca e t ere are an ro o eo e in t e area ar in re o rce ri er oca re i ent o er or er an ot er an t e attern o ar in e eac ro a e i erent

etai e in or ation a o t e i tin con ition i re ire i t e ar in t i to ort o t t e rioritie to e i en to eac ar in er ro

a t conc ion a o t ar in trate ie can e reac e i t e ca e o a ar in ro e are not n er too n e a e i en a eci ion i a e to i a itiona ar in en in act t e ro e te ro t e incon enience o in e i tin ar in ternati e a ar in trate co ina ertent i a anta e one ro o ar er i e tr in to o e t e ro e o anot er ro or e a e nre tricte ar in in re i entia area ro i e e i i it or a t can e ro e atic i too an ar er ro o t i e t e nei or oo e on treet ar in re cin ar in a ai a i it or re i ent an t eir e t

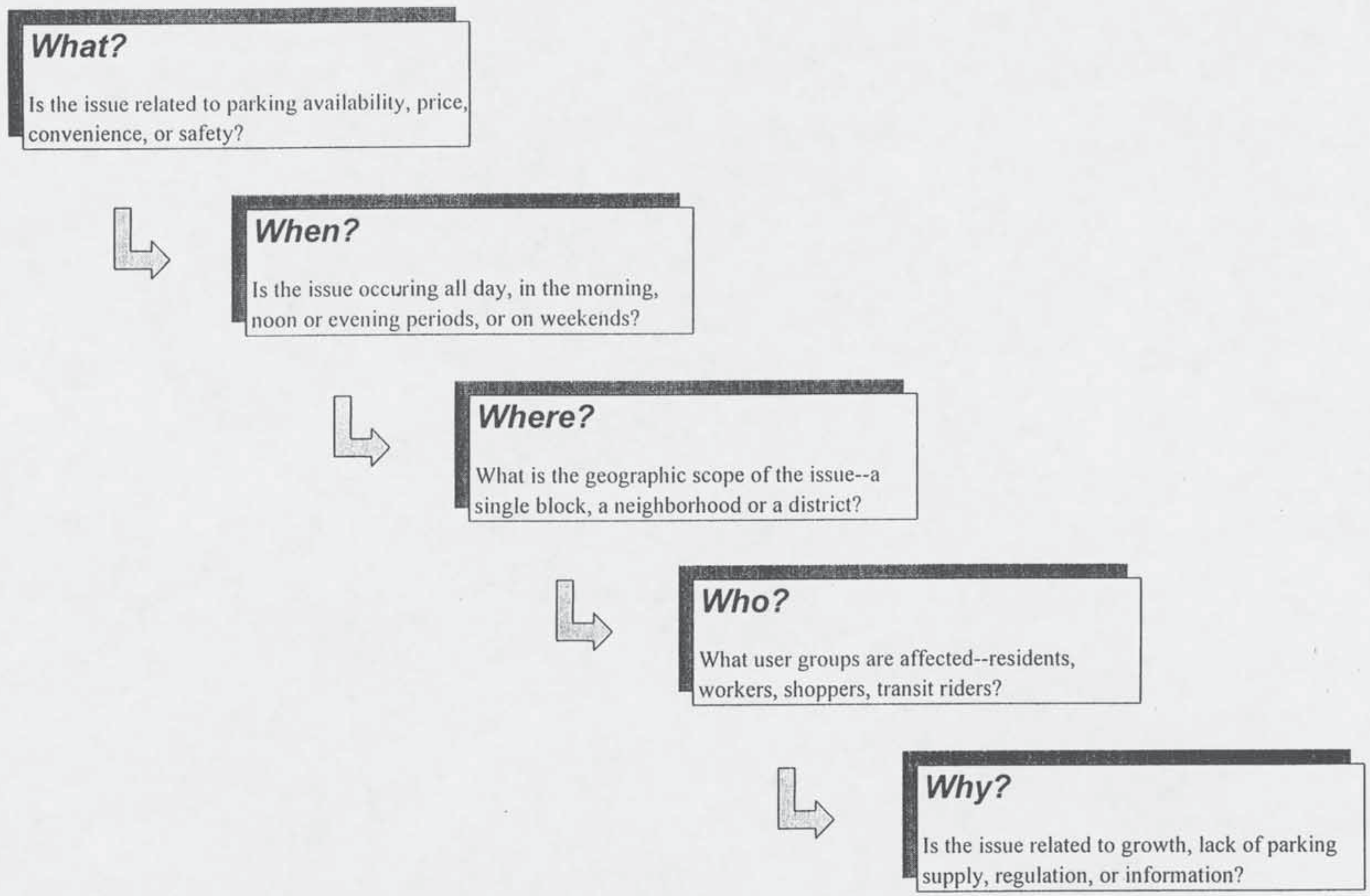
e o o in ara ra o t ine in reater etai at i eant t e at en ere o ra e or



What? at i t e i e Par in i e a concern t e a ai a i it rice con enience an or a et o ar in t er o i e i e inc e t e re icta i it o ace a ai a i it an tra ic con e tion i e re ate to ri er earc in or ar in ace ten t e otto ine or ar er i t at t e ace t e ant i not a ai a e en t e ant it or at a rice t e are i in to a

e at e tion i i ortant eca e t e e inition o t e ro e i c o e tie to t e t e o trate ie e ecte t i not n a to tart it one i e t arri e at a erie o ot er i e a ter ore etai e ana i or e a e en o er a e i ic t in in ar in t e a a e t at t ere are not eno

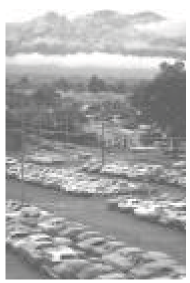
Figure 1: The What-When-Where-Who-Why of Parking Management



ace en in act t e i e i t e t rno er rate o t e o t con enient ace e o an car e eac ace er a

When? en oe t e ro e occ r Par in a a e a artic ar attern o e t ro o t t e a a on a o t e ee or e en a on i erent ea on or e a e an i e a e re ate to t e o i a o in erio or erc ant or ee a nc erio or re ta rant t ro o t t e a or or er or in t e e enin or o ie t eater e orter t e ration o a ar in ro e t e reater t e o i i it t at o e ort o are ar in arran e ent can e e e o e ear e a a e ace a ai a e en anot er e a a orta e

Where? ere i t e ar in i e occ rrin e eo ra ic ocation an t e e tent o t e area a ecte i a ect t e t e o trate ie t at a e e oe t e i e a ect a in e oc a co ercia i trict a nei or oo or t e entire co nit re t ere concern a o t t e i act o a co ercia area on a re i entia area or i a er a t i a oo ractice to a t e area a ecte t e ar in i e e an er to t e ere e tion



eter ine t e eo ra ic e tent o o icie an o i e e ect at t e o n ar o t e area a ecte a ne o ic

Who? o i in ar in in a a t at i creatin i act o i a ecte t e ne ar in e attern e nee o i erent er o ar in t e n er too a o t e a in ic i erent e a ect eac ot er acce to ar in Peo e o e tation area ar in inc e t e re i ent o t e tation area t o e o or in t e tation area i itor to oca ine e o er an tran it ri er on tran it ri er er inc e t o e o ar at tation or a a or tri orter i a tri an en t e ten ion o en o i air ort tra e er in to acce t e air ort

co re en i e ar in trate o a re an et rioritie or eac er ro con en o e i t a on t o e o o n or contro ar in a o t t e entit e ent o eac ro to e ar in ta in into acco nt t eir i torica c ai to t e ar in roa er cit oa i in ne to a an o c ar in eac ro o n c a i c ion o inc e con i eration o o a ternati e tran ortation o e co e e to i t ar in e an c aracteri tic or e a e o o i tin acce o e to tran it

a ect ar in or atron o oca erc ant ar in i i ar o can ri e are ro ra or tation area e o ee ree ace or o er

Why? a t e i e e er e an no a t ere een ro t in ine acti it t at a ro t ore i itor to t e area a re i entia o ation an a to o i e o ner i ro t o t ace ar in a t e ro t in atrona e increa e ar in tran it ri er a e ar in i e e er e i eca e o a ac o in or ation or a ac o coor ination et een ro ert o ner an acti itie e an er to t e e tion oint to t e t e o re on e t at are a ro riate an o o e re on i e or o in t e

How to Answer These Questions

e ra e or re ente in i re i a too to a i t ta e o er in ana in ar in i e n erin t e e e tion re ire oca re earc e en in on oca circ tance a con orti o tation area ine e ic a encie an re i ent ro co e or e to on or t e e t ie ariet o t tec ni e can ro i e t e nee e in or ation

Par in ti i ation t ie c
r e ro i e a a e ine o t e
con ition inc in a a t at o t e
ercenta e o ace occ ie at i erent
ti e o t e a e can an er
e tion a o t ere orta e or
r e e i t i i t are ar in
o ort nitie an ro i e a a i a ain t
ic c an e can e a e e
a ro riate t e o a o r e
ar in c ar e an rate t e re ence o
a i ation te an ot er ar in
contro ea re in ace

ie t ie o ar in con ition
ic can inc e o er ation o ar in
attern ar in co nt icen e ate
r e or ration r e o er ti e
ti e erio

r e o ar er a re in ar in
r o e tri ori in en t o ti e ar e
an attit e a o t ar in aci itie c
r e co a o ro e or rea on
ar er o not e ot er acce o e c
a tran it a in i in etc

t ie o co ara e tation area
e e t ie can re ea trate ie t at
a e een e ecti e in i i ar it ation

Par in ti i ation r e are o t e
in a re in t e at en an ere
e tion ie t ie ar in r e
an inter ie can a re t e o an
e tion

n an erin t e e e tion one nee to
n er tan tren an i e t re e ent
t at i t c an e t e conte t or tation
area ar in o ic at tren ana i i
nee e or t e tation area an t e roa er
re iona conte t

n i ortant e tion in a re in
ar in i e i eter inin t e e ree o
re on i i it o i erent an e or
acco o atin ar in e an or
e a e i co ence o eration
at a ne tation an a ne e e o ent
o en at t e a e ti e it i i ortant to
i tin i et een t e i act o eac o
t o e acti itie o arin t o e
con ition to t e re con ition i a
oo a o ea rin i act

ina t ere t e a i c ion an a
con en or e on t e roa er
co nit oa t at ar in ro ra
t er e or e a e o e
co nitie i t a e a to o i e
o i it t eir riorit i e ot er i t
i t t eir o icie to ro ote i a e
co nitie t at o not re on t e
a to o i e e e a ic irection
tron in ence ic a ternati e
ro ra o e c o en artic ar
it re ar to t e e tion o et er ne
ar in i to e a e in re on e to
e an

Notes:

te on i er ternati e trate ie

trate c ec i t a e een e e o e or on treet ar in a e an o treet ar in a e erie o co on ar in i e i i te on t e ertica a i e e i e are t ica o at i t re t ro a at en ere o ana i e ori onta a i i t ario trate ie or ar in ana e ent e c ec in t e atri re re ent trate ie t at are ort o in e ti ation or eac ar in i e

n treet Par in

n treet ar in re ation i n er t e r ie o eac cit cit can a re ar in i e in e ta i in an en orcin re ation ti e i it an ar in eter rate o i ication o on treet ar in re ation i o t e ecti e en one in coor ination it c an e in o icie or o treet aci itie

Issues

e o o in e ain o r t ica on treet ar in i e t at are ari e in a e e inc e

Residents and/or their guests cannot find on-street parking spaces in their neighborhood re i ent co ain o in icient ar in it i i ortant to ea re ar in ti i ation at ario ti e an a o t e ee e i entia nei or oo a ac a ai a e on treet ar in or a n er o rea on or e a e orta e can e i t i t e re i entia o ation an a to o i e o ner i e cee e e antici ate in oca o treet ar in re ation i i ar i nei or oo are ocate near ot er e t at a e i ar in e an c a co ercia area or tran it tation t en t o e ee in ar in a e in nei or oo ar in re o rce in in t e ca e o t e ro e a a earin on t e t e o trate to e i e ente

o eti e re i ent a e ent o nei or oo ar in t o not ant ot er to e it i c ion can e ore ro ra t at ro i e ene it to co nitie t at are t eir on treet ar in c a ret rnin ar in re en e to nei or oo i ro e ent roject

Convenient spaces are not available to shoppers in commercial areas. i i o ten an i e eca e t e e ira e ace are not e ro cti e n treet ace are o ten o er ir t c oice or ar in eac o t e e ace can er e an ort ter atron rin t e a n er tan in t e rea on or t e ac o a ai a i it i i ortant or e a e i an e o ee ar a a in a e ira e ace t en an otentia c to er are re ente ro in t at ace i i ar i ar er ro a jacent area in a e co ercia ar in t ere co e orta e or o er

It is difficult to find on-street parking anywhere in the station area. t ere i a ac o a ai a e on treet ar in in t e entire tation area it e t an i a ance et een acti it e e o e co nitie a a e re o e on treet ar in to ena e reater t ro tra ic o a re a et concern or ac ie e ae t etic oa a in o treet ar in in icient ternati e t e ac o on treet ace co e connecte to a orta e o o treet ar in or a ro e re ar in t e ana e ent o on treet ar in e on treet ar in i ein e or on ter ar in an e ic e tora e

e a roac ta en to t i it ation e en on t e o era c aracter t at i a ro riate or t e tation area in a r an conte t t ere a e an e ort to acco o ate ar in e an i e in an r an conte t t e tota e an o not e ie eca e o an con traint r an e i n rioritie an tran it an e e trian o jecti e t e en in r an area t e tota e an i t not e ie eca e o a co nit i ion to ort ic tran it an re ce a to o i e e or oca tri

Table 1: On-Street Parking Issues and Responses

Parking Issue	Permit parking programs	Enforcement	Merchant programs	Time limits and restrictions	Urban design/signage/traffic calming	Assignment of parking location	Parking charges	Parking Benefit Districts	Restriping for more spaces	Add off-street parking	Alternatives to driving
1. Residents cannot find spaces in their neighborhoods.	✓	✓		✓	✓			✓	✓	✓	✓
2. Convenient spaces are not available to shoppers in commercial areas.		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3. It is difficult to find on-street parking anywhere in the station area.		✓		✓		✓	✓	✓	✓	✓	✓
4. Traffic congestion problems occur as drivers search for on-street parking.		✓	✓		✓	✓	✓			✓	✓

✓ = a suitable response

. *Traffic congestion problems occur as drivers search for on-street parking spaces.* or e a e i ri er are circ in or e ten e erio o ti e or aitin or ace to eco e a ai a e t e create a itiona tra ic con e tion n certain ocation t e e ic ar ane erin i e ar in can e a o an i e i ent to tra ic o

Strategies

e ori onta a i o a e o a ariet o on treet ar in trate ie t at a re t e i e e cri e a o e e inc e

Permit parking programs. Per it ar in ro ra create a te ere a a or o erni t ar in i re er e or re i ent o o e ot er e i nate ro e e ro ra are e in an a rea co nitie e are a ro riate en ar in e an ro one an e a ect t e ar in ro i e or anot er

er it ar in ro ra or e a e can re ent atron ro ar in in re i entia nei or oo aro n a tation n er a er it ar in te oca re i ent an t eir e t o e a e to e on treet ar in t car ar e or ore t an a e ine n er o o r it o t er it o e cite en i ro i e etai on t e i e entation o er it ar in i trict o t o ten t e

er it ar in i trict i e ta i e t e cit at t e re e t o a oca nei or oo

Per it ar in can a o e a ie to on treet ar in in co ercia i trict aro n tation e conce t ro i e nre tricte acce to ar in or re i ent or e o ee o a e ine in a ar in i trict o e it o t er it o e tic ete an or to e i t e ar e on er t an t e er itte ti e e e i n o er it ro ra o con i er i e entation co t or t e cit

Enforcement of on-street parking regulations.

e en orce ent ro ra can increa e ar in a ai a i it i re ation a e not een en orce or not con i tent en orce a cit i a o t to ore trin ent en orce ti e i it o e er icient notice o e ro i e to t o e o i t e tic ete arnin tic et ootin e ic e an to in can increa e co iance e ic i ort en orce ent i it i con i tent a ie an tie to ene it c a increa in t e a ai a i it o con enient ace

Merchant programs.

erc ant can ro i e ro ra to re ce ar in e an c a incenti e or tore e o ee to e a ternati e tra e o e e o ee ri e an ar

erc ant ro ra can enco ra e t e to e n er ti i e o treet ar in aci itie

Time limits and time-based use restrictions. i e i it are er a t e i e t a to contro t e e o on treet ar in aci itie or e a e ar in e i e ecti e i ite to c to er ettin a t o o r i it in co ercia area en a o r o r ti e i it in a co ercia area o i co ra e or er ro in t o e ace et er ri in or or in oca e ti e i it or ace can e a j te to re ect t e artic ar r o e or t e ar in ran in ro a ro o to on er ter ar in e e ti e i it can e arie accor in to t e con enience o t e ace to irect a a ar er to n er ti i e ace ti e i it are co ine it ar in c ar e tate o t e art ar in eter te o er e i i it in ar in ti e i it an ro i e con enience to t e ar er

i e a e ar in re triction ro i it ar in or certain erio to re er e roa a ca acit rin ea co tin erio an to a e ar in re o rce or artic ar er ro or e a e ear ornin ar in ro i ition re er e ar in re o rce or i a ar er

Urban design/signage/traffic calming. r an e i n eat re can a e ore i tant on treet ar in ace no n to co ter an en ance e e trian connection to t o e ace oo i na e can irect ar er ic an e icient to a ai a e ace o eti e t e o tion i a i e a ro i in in or ation a o t ace ocation an a ai a i it ra ic ca in ic inc e trate ie t at o erate tra ic ee in or er to i ro e t e e e trian en iron ent can a o ort ar in ana e ent trate ie ra ic ca in a e t e e e trian en iron ent a er an ore ea ant an increa e ar er i in ne to a ro ore i tant ar in ace r or t o e i in or or in near a tation an i ro e e e trian en iron ent i t re ce t eir e o a car to acce

Assignment of parking location. i trate a i n artic ar ar in er to eci ic ocation to increa e t e e icienc it ic ace are e or e a e e o er o ic co re ire a a ar er to ar in in re ote aci itie to ree c o e in on treet ar in ternati e t e o t con enient ace co e e ote to ic an ro o nction

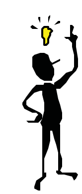
Charges for on-street parking te o i erentiate ar in eter rate i a e e e ent in enco ra in ri er to e ar in e icient irectin on ter ar in to e con enient ace an ainin t e o t ro cti it ro t e o t attracti e on treet ace ere are an a ternati e or co ectin on treet ar in c ar e ran in ro tra itiona ar in eter to centra i e ar in ac ine to e it car te ti ace ar in eter can e ro ra e to i e ent i erent ar in c ar e a o t e ee e can a o i e ent c ar e t at i erentiate et een ort an on ter e ti e o a an t e ocation o a artic ar ar in ace

i e ente or on an o treet aci itie ar in c ar e re ce a to e an increa e tran it an e e trian acce e ro i e ore e ecti e ca acit ro a i en n er o ace eca e t e enco ra e ic er t rno er o ace an increa e t e e o a ternati e o e o acce e tran it or car oo

Par in c ar e a e ace a ai a i it ore re icta e or o er e rate can e et o t at t ere are a a ace a ai a e ina ar in c ar e create a re en e trea t at can n ne ar in or area i ro e ent n ar in c ar e te can inc e a i ation ro ra t at re ce or e i inate ar in c ar e or re erre er ro c a o er

o e re i entia area i t a e e ce on treet ar in t ro i it non re i ent ro in it eca e no ene it o ac to t e co nit ro ettin ot er e t at ar in e ar in ene it i trict conce t i ettin a te in ic re i ent ar in ree in o e t e o re i entia er it te t non re i ent o e c ar e t e ar et rice or ar in e re en e o e e or a itiona ic er ice in t e nei or oo ere t e re en e a co ecte c a treet c eanin tree aintenance i e a aintenance or ot er i ro e ent e incenti e o t e e i ro e ent i t ca e nei or oo to o en ne on treet to ot er er

Parking benefit districts for on-street parking i conce t i a ariation o an on treet ar in c ar e c e e or re i entia area n tea o ro i itin non re i ent ar in in nei or oo a occ r it a re i entia er it ar in ro ra non re i ent ar in co e a o e it an a ro riate ar in c ar e e c ar e co e co ecte it eter a o e or ont a e e en e ro t e c ar e o o ac to t e co nit or nei or oo or tran ortation i ro e ent o e nei or oo i t re er to a o non re i ent ar in i it ene ite oca ar an ca in or tran ortation aci itie



Increasing on-street parking supply through restriping/redesigning spaces. itiona c r i e area can e tri e or on treet ar in inc in an e ar in i ri t o a an tra ic con ition a o n a ition on treet ar in a a tra ic ca in e ect an i ro e t e e e trian en iron ent ica rotectin e e trian ro o in tra ic it o icia can a o re ie t e i e o on treet ar in ace to ee i t eir i e co e re ce ace o not a e to e in i i a ar e in ocation t at e centra ar in ac ine ena in a reater en it o ar e car o e er t ere i a tra eo et een a er ar in ace an t e tra ic i act o car ane erin into ar in ace

Development of off-street parking facilities. e i tin ar in aci itie are ein e icient e e e o ee are ar in in o treet ot an on treet ace t rn o er re ent t en citie an ro ert o ner a con i er a in *off-street* ar in treet ar in can ta e t e re re o on treet ie co r e ro i ion o a itiona ar in t ta e into acco nt ot er otentia co nit oa c a re cin tra ic con e tion an a to e en enc i ro in en iron enta a it an ac ie in i a e co nitie

Initiate new or enhanced alternatives to driving. i too it oc e on ar in ana e ent trate ie not t e ar er ro o tran ortation e an ana e ent ea re o e er an on treet ar in i e can e a re e c an in ar in e an t ro incenti e t at con ince ar er to e ot er o e et er t at e ne tt e er ice ic c e oc er or inancia incenti e rt er ore trate ie t at ro i e a i o an e in an area a re ce a to o i e o ner i an e

Notes:

treet Par in

treet ar in re ation an o ic are n er t e r ie o ot ic an ri ate entitie P ic o ne aci itie are ject to o icie e ta i e t e o ern ent a enc it re on i i it i e t e cit or ot er o e er o t o treet ar in i o ne an o erate ri ate ro ert o ner n t o e in tance t e ro ert o ner or t e tenant e ta i e o icie or t e e o t e aci itie a e on t e o ner i or ea e arran e ent e act a o eration o c o treet ar in i contracte to ar in ana e ent co anie

e connection et een ic an ri ate ar in entitie i e ta i e in t e ini ar in re ire ent containe in t e cit onin or inance e e re ire ent co e e e o er to ro i e a certain a o nt o ar in en t e i a roject Par in i a o in ence en er re ire ent an tan ar e e o ent ractice o e er ini ar in re ire ent are not a re e ere eca e ar in re ire ent are ri ari an i e or ne e e o ent erea t e oc o t i too it i ana in e i tin ar in

Issues

a e ari e a erie o o treet ar in i e t at are e a orate rt er e o

Convenient spaces are not available to shoppers in commercial areas. i a e an i e i ace are not e ro cti e or e a e i an e o ee ar a a in a e ira e o treet ace an otentia c to er are re ente ro in t at ace i i ar t ere a e ar in orta e or o er or e o ee i ar er ro a jacent area in a e ree ncontro e co ercia or or ace ar in

Parking lots and structures are usually full. en t e o treet ar in i e t an t e e an e co ete or ar in on a ir t co e ir t er e a i i co occ r en a ne an e a increa e t e ar in e an it o t a co en rate increa e in ar in or a ne tenant a a i e o ee en it or a i e e o i itor en t e e con ition e i t ar et rice or ar in enera e er e to ration t e carce ar in re o rce an or ar in i o er to on treet an ot er o treet ar in

Parking patterns are uneven--some lots are full and others underused. ne en e o ar in a re ate to t e acce o icie o t e o ner o t o e aci itie i erence in attracti ene erce tion o a et te orar actor re atin to t e occ anc o t e i in an o on e o ort nit re ente c an ne en i tri tion i o icie t at i t ar in ocation to c an e t e ercei e a ai a i it o ar in

Parking "poaching" is occurring--parkers from one use occupy parking provided for another use. Par in oac in can occ r en o treet ar in oe not a e re ation en orce ent ro ra or ar in acce contro a e o oac in inc e circ tance ere e o ee ar in ace ro i e or retai e or ere tran it ri er ar in ace ro i e or e o ee

Cars are parked for long periods of time, thereby excluding daily parkers. ar ar e or ore t an o r ta e a a ace ro ore ro cti e ort ter e n t i in tance ro cti e i ea re in ter o en t o ti e ar e

Strategies

a e a o ari e otentia re on e to o treet ar in i e e ara ra t at o o e cri e t e in reater etai

Access control. i e ariet o e ice are a ai a e to contro t e e o o treet ar in e o o in e cri e o e e a e ran in ro i e to ore co e te

Table 2: Off-Street Parking Issues and Responses

Parking Issue	Access control (gate arms, validation systems)	Enforcement	Employer programs	Time limits and restrictions	Signage/ITS/design	Shared parking	Parking cash-out	Parking charges	Provide more parking	Alternatives to driving
1. Convenient spaces are not available to shoppers in commercial areas.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2. Parking lots and structures are usually full.			✓	✓		✓	✓	✓	✓	✓
3. Parking patterns are uneven.	✓	✓		✓	✓	✓	✓	✓		
4. Parking "poaching" is occurring-parkers from one use occupy parking provided for another use.	✓	✓	✓	✓	✓			✓	✓	
5. Cars are parked for long periods of time, excluding daily parkers.		✓		✓				✓		

✓ = a suitable response

1) or retai ocation ro ert o ner can

- o t i n t at i it o can e t e ar in aci it an or at r o e i tin ec rit er onne i e arnin o t notice an i nece ar arran e or to in o e circ it te e i ion an inte i ent tran ortation te can ort en orce ent acti itie
- c ain o ar in entrance nti tore o en in t e ater ornin erio i re ent o t jo rne to or tran it co ter ro oac in ar in
- e ate ar acce contro it a i ation te or c to er i ree ar in i ro i e c a te re ent non o er ro in t e aci it entire or c ar e t e a rice

2) or or ite e o ee can

- e ta i a an ta or tic er te or e o ee ar in i tin ec rit er onne i e arnin o t notice an i nece ar arran e or to in
- e a a i ation te t at en re t at ar er are t o e inten e to e aci it or e a e or er enter t eir ar in ace n er on a a i ation ac ine it in t eir or ace

- e ate ar acce contro an acce car te or e o ee c a te re ent non e o ee ro in t e aci it entire or a ternati e c ar e t e or ar in

Enforcement. i e in or ation an en orce ent ro ra can e r ri in e ecti e c re ation inc e ti e i it or re triction on o can e t e ar in ec rit an ar in contro o icer can a i t it en orce ent

Employer programs. o er can ro i e incenti e or e o ee to e ri e are tran it or non a to o i e tra e o e ncenti e inc e e o *Commuter Choice* ta ro i ion arantee ri e o e ro ra ro i in an oo tart co t etc i e are ro ra can a o ro i e in or ation on a ternati e tra e o e an ri e atc in a i tance t e e ro ra re ce t e n er o car ri en to or or eac e o ee t ere o erin ar in e an o er can a o create ro ra t at re ocate e o ee ar in to re ote ar in ocation t at a e e ce ca acit e e o ee o a o in a rin t e o i a ea o in erio

Time limits and time-based use restrictions. i e i it are a i e a to contro t e e o o treet ar in aci itie e ti e i it or ace can e a j te to re ect t e artic ar r o e

or t e ar in e e ti e i it can e e ta i e on a i erentia a i to irect a a ar er to n er ti i e ace e t e to e e o a ar in tr ct re

i e a e e re triction can ro i it ar in or certain erio to re er e ar in re o rce or a er ro or e a e ear ornin ar in ro i ition re er e ar in re o rce or i a ar er

Signage/ITS/Design. oo i na e irect ar er ic an e icient to a ai a e ace n t e ca e o ar in tr ct re t e c a en e i to et t e er torie o ar in tr ct re occ ie o eti e t e ro e i a i e a ro i in in or ation nte i ent ran ortation te o er o i ticate a o i in ri er to a ai a e ar in ina ar in tr ct re e i ne it oo a i e a et an o ica circ ation are ore i e to e e t an t o e t at a ear n a e

Shared parking. t e ti e o ea ar in e an arie a on e are ar in trate ie can e e i tin ar in it reater e icienc are ar in re ce t e nee to a ore ar in reco ni in t at eac an e a a i erent ea ar in ti i ation erio t o e ea erio o not o er a t en at ea t a ortion o t e ar in aci it can e are or e a e an o ice i in a o ar in e an in t e e enin ic i t e ea e an erio or a re ta rant e e t o e co are a ortion o t e ar in

are ar in i nor a t o t o or an in i i a i e e ite t e on e arate ite can are ar in or e a e a an arran e ent at t e o a tation ere er e a ortion o a o in a e ar in rin t e a e conce t can e rt er e an e to inc e t e arin o ar in on a tation area a i are ar in re ce t e co t o e e o ent an increa e con enience or ar er

are ar in i nor a e a a trate or ne e e o ent t e i tin e can e e o are ar in arran e ent it near ro ert o ner c arran e ent can e ri ate initiate an i e ente or carrie o t in coo eration it a cit

t o ar in re ire ent or ne e e o ent are not a oc o t i too it t e e o in ie ro ra ere a e e o er a e a ca a ent in tea o ro i in a ar in ace can aci itate are ar in conce t

Parking cash-out o er can ca o t ar in c ar e n er a ar in ca o t ro ra t e e o er o er or er t e ca a e o t e co t o t e ar in ace t at i ro i e an

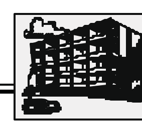
e o ee c oo e to tra e t eir ar in ace or t e ca an co te to or in anot er tra e o e e ca o t o er co t t e e o er not in eca e it re ce e en it re on e o ee ar in

Parking charges e earc o t at ar in c ar e at or ace are t e o t e ecti e too or enco ra in tra e er to e e icient tra e o e Par in c ar e increa e t e e e o tran it e an ri e arin reater tran it e an ri e arin in t rn re ce ar in e an

Par in c ar e at co ercia ocation increa e t e rate at ic ar in ace t rn o er i increa e t e e ecti e ca acit o a i e n er o ar in ace

Provide more off-street parking. ncrea in e icienc t ro re tri in tac e ar in an atten e ar in ro i e ore o treet ar in ace er acre o e er i o er co t ar in ana e ent o tion a e een i e ente an t ere are ti orta e o ar in con i eration a e i en to con tr ctin a itiona o treet ar in

on i eration o t i trate e en on t e roa er oa o t e cit concernin tra ic con e tion an a to e en enc i ro in en iron enta a it an ac ie in i a e co nitie



a in ar in i con i tent it co nit oa an t ere i a ai a e roa a ca acit to er e t e ar in aci it e i tin r ace ar in ot can e con erte to i er inten it e ec in an t e con tr ction o ti tor tr ct re o e er tantia ar in e an an a i i in ne to a t e re ent to enerate eno re en e to co er t e co t o ro i in a itiona ar in

Initiate new or enhanced alternatives to driving. i too it oc e on ar in ana e ent trate ie not t e ar er ro o tran ortation e an ana e ent ea re o e er an o treet ar in i e can e a re e c an in ar in e an t ro incenti e t at con ince ar er to e ot er o e et er t at e ne tt e er ice ic c e oc er inancia incenti e rt er ore trate ie t at ro i e a i o an e in an area a re ce a to o i e o ner i an e

te e i n an e ent Par in Pro ra

Par in i i ortant to an e er o a co nit t a ect t e con enience it ic t e e t e tran ortation te t e co t o tra e an ee in t e a e a o t t eir nei or oo an co nitie eca e ar in i o i ortant to an i erent eo e ar in o ic o e e e o e an i e ente in a co a orati e anner n a ition it o ort roa er co nit o jecti e ai o t in co nit i ion enera an eci ic an re e e o ent trate ie an ot er initiati e

ince ar in i n er t e contro o an ta e o er t e cit ri ate ro ert o ner erc ant an e o er it i i ortant to in o e e ta e o er an in o icie t at can e eac ro ac ie e t eir oa ta e o er inc e t o e o o n or contro ar in an co nit e er o are a ecte ar in o icie

an ro can ta e t e ea in rin in ta e o er to et er e cit co con ene c an e ort t e a co a nei or oo ro or erc ant ro an a rea citie a e i e ente ar in ana e ent trate ie o t ere i a tantia o o e erience t at can e are en i i t o e o t e a roac e e in tation area

e e te in e i nin an i e entin a ar in ro ra are a o o

o ect ac ro n in or ation on t e i e an co ete t e at en ere o ana i ee te a e on t e i tin ar in ti i ation t ie an con ct an ie t ie t at are re ire e e re e ant o ic tate ent ro enera an an ot er cit o icie

e ie a ternati e trate ie ro a e an ee te a e e t e o t ita e a roac e a e on t e tren t an ea ne e o eac a roac an t eir re ecti e it it oca con ition an oca o ic e e o ne a roac e i t o e i te o not re on to oca con ition

ne t e o t i ni icant e tion t at t e an ere i et er ar in i e i e a re e ana in e i tin ie in co ination er a it incenti e or a ternati e tra e o e or et er a ition to ar in i e con i ere e an er to t i e tion re t in t rn it t e co nit enera an o icie en iron enta o icie re o rce a ai a e or ne ro ra an it i o o a o t taina i it a it o i e an ot er e tion

nce t e enera irection o ar in o ic i e ta i e ore eci ic criteria can e e e o e inc in

- e ecti ene in a re in t e ar in ro e
- co nit acce ta i it
- co ati i it it oca an
- co t an inancin ea i i it
- ti e ra e or i e entation an
- i ication or con e tion an air a it

reate a roce to i enti an or it ta e o er e e o or a an in or a roce e to i c t e i e t e otentia a roac e an i e entation i e enti oca orter o t e roce o can e ain t e i e to t e co nit

a e a ternati e a roac e to t e co nit to ain rt er ee ac i con en on t e re erre a roac e

e e o i e entation an inc in e ti ate o co t an re en e a ociate it t e trate ie or roject ere t ere i joint re on i i it or t e ro e e e o a ree ent on co t

arin an i e entation re on i i it
Pre ent t e an to t e a ro riate o or
o ie or a o tion an i e entation

ec re n in an a i n or ani ationa
re on i i it or carr in o t ro ra
reate in tit tiona tr ct re e ar in
a t oritie o er i t o ie an ire or
a i n ta to or on t e roject

e e o ar etin an ic in or ation
ro ra to in or re i ent t e ine
co nit an co ter o t e c an e
t at are anne

e ent t e trate an
onitor it cce

con i erin con ition e ore
an a ter it i e entation
a e a j t ent a ter t e initia erio o
i e entation to a e re t at t e
ro ra are or in a inten e

Notes:

Par in e o rce

arr *Downtown Parking Made Easy* e or o nto n e earc an e e o ent enter

re t it an *Parking Structures.* e or a an an a

e era i a ini tration *Parking Management Tactics, Volume IIIA Reference Guide* a in ton e art ent o ran ortation

o a a i on an ranci *Using Demand-Based Parking Strategies to Meet Community Goals* Lo n e e o i e o rce e ction o ittee

nternationa Par in ontro n *ITS International.* o e er ece er

o a in in on r Par in *Access.*

o n Lie o e ire Par in *Journal of Planning Education and Research.*

eant an Le in on *Parking.* e t ort onnectic t no o n ation or ran ortation

i on Par in Pricin it o t ear ri e ction Pro ra *Transportation Quarterly,*

i on " ea in et een t e e ation Par in e ire ent P anner Per ecti e an ran it *Journal of Public Transit*

ri t a e Project in t Pa an ance Par in n or ation te n *ITE Journal* e te er

en i
or eet

e an or eet t at o o are or e in co nit eetin an or o P ic o icia an co nit e er can e ore i e an trate ie i in t e a ro riate o e

e or eet can e e in a n er o a e can e i e o t in i i a an t en ta ie or t e ro to in icate area o co ona it ternati e a ro can i c t e i e rai e in t e or eet an e e o a con en aro n t e i e an trate ie

e or eet inc e t e o o in

- e at en ere o o Par in ana e ent
- n treet Par in e an e on e
- treet Par in e an e on e

Notes:

Analysis Worksheet: The What-When-Where-Who-Why of Parking Management

What?

Is the issue related to parking availability, price, convenience, or safety?

When?

Is the issue occurring all day, in the morning, noon or evening periods, or on weekends?

Where?

What is the geographic scope of the issue--a single block, a neighborhood or a district?

Who?

What user groups are affected--residents, workers, shoppers, transit riders?

Why?

Is the issue related to growth, lack of parking supply, regulation, or information?

Analysis Worksheet: On-Street Parking Issues and Responses

Write in parking issues below:	Permit parking programs	Enforcement	Merchant programs	Time limits and restrictions	Urban design/signage/traffic calming	Assigment of parking location	Parking charges	Parking Benefit Districts	Restriping for more spaces	Add off-street parking	Alternatives to driving	Other:

Note: Add a check or a rating (1 - 3) for those strategies that are appropriate for the issues you have identified.

Notes: ______________________________

____

Analysis Worksheet: Off-Street Parking Issues and Responses

Write in parking issues below:	Access control (gate arms, validation systems)	Enforcement	Employer programs	Time limits and restrictions	Signage/ITS/design	Shared parking	Parking cash-out	Parking charges	Alternatives to driving	Other. ______	Other. ______

Note: Add a check or a rating (1 - 3) for those that are appropriate strategies for the issues you have identified.

Notes: ______________________________

____

en i Per it Par in Pro ra

e i entia ar in er it ar in ro ra are e i ne to ro i e rea ona a ai a e an con enient on treet ar in or re i ent en ar in e an ro near e o ot er i e occ t at ar in itie enera e ta i er it ar in i trict t at are e i nate on a a an or ic eci ic ar in re ation a an o t e co nitie aro n tation a e i e ente re i entia er it ar in ro ra ee en i

Per it ar in i trict re ate ti e a ect o ar in or non re i ent or e a e a i trict a re trict ar in or non re i ent to o r a o in or i itor t not a a ar in e i ent o t e i trict are entit e to a er it t at re ea e t e ro t e artic ar ar in re triction e i ent a a o re e t e t er it or i itor e i ent t ro i e roo o re i enc co ete an a ication an in o t ca e a a a ee ic a or t e a ini trati e co t o o eratin t e ro ra e or inance e ta i in c a ro ra o inc e ro i ion or a ea

itie a et t re o or t e creation o a er it ar in ro ra or e a e t e e ta i ent o a ro ra co re ire a etition i ne a certain ercenta e o re i ent re i in it in t e one or co e a e on t e initiati e o t e cit o t citie t en re ire a t t e it tra ic en ineer or anner o o e a reco en ation to t e it o nci

an ro ra inc e o icie re ar in t e n er o ar in er it to e i e to e t e r e ro i it t e a e rent or ea e o an er it to an ot er in i i a enera er it are not tran era e et een area

n t e ca e o it o e r ent to in o e t e co nit in t e annin roce e ore ten ion e in re en e er ice Per it ar in i a tantia c an e ro nor a ar in o icie o co nit in i a t

ecti e en orce ent an a ro riate ine t acco an er it ar in ro ra at i a e to aintainin t e cre i i it o t e ro ra Po ice ort i a t

ina t e ar in i trict t e i e o t at i o er e ect on ot er nei or oo are i ite oo a an area i i ace ar er oo ar e an area i n er ine t e nee or t e ro ra re o criteria o e e ta i e or eter inin area t at are e i i e

Notes:

en i a rea erience it ran it e ate Par in ana e ent

e ta e ont e o o in a e ari e t e e erience o a erie o an a train tation area in t e a rea ere ar in ana e ent a een an i e a co i e ta e e tation ten to e t o e it i ar in e an ince ar in o icie are ject to c an e ea e contact t e re e ant oca j ri iction or t e o t c rrent in or ation

e o o in are o e eci ic e a e o inno ati e ar in ro ra in t e a rea

- e it o La a ette a e e o e a ro ra to c ar e er or a ai a e on treet ar in on t ree treet in t e icinit o t e tation Par in on t e t o treet c o e t to t e tation i er a i n in icate t e re triction on ar in ac ace i n ere an a ent o e are ro i e at t e entrance to t e tation e e are ace t at ere not re io e re i ent e ro ra ene it ri er an ro i e a o t in re en e to t e cit
- Pri ate o treet ot are ro i in ar in or er on a ai a i in t e e t a an an errito e orte tation atron a to er a or t i ar in
- are ar in i e or o er o ar in at t e o a tation n t i ca e a ran a t e ro ert o ner or t e ri t o to e a ortion o t e ierra o ar in ot e ar in i ro i e ree to ri er
- i o er ar in ro t e a an o i e i a o e to e tation ar in on a ai a i
- an citie in tit te ario or o on treet ar in contro te in t e icinit o tation ran in ro ar in eter to ti e i it to er it ro ra a e tation it er it ar in ro ra inc e a it a oa Par oncor P ea ant i oc ri e e t a an errito e orte errito P a a ort er e e o nto n er e e an
- a train e a er a ar in c ar e in an o it co ter rai tation
- ero o ner o ri ate ar in ot e ar in i na e a i ation ro ra ana e ent an en orce ent to en re t at ar in i a ai a e or t eir c to er trate ie ran e ro o tin i n to c ainin o t e ar in aci it e ore t e tore o en to en orce ent acti itie a e inc e t e i a e o in enter a train t e errito P a a t e a ite in P ea ant i an ot er

Appendix Table C-1: Example Bay Area Parking Management Strategies

	i na e or ri ate o treet ot	Par in eter	n treet ar in ti e i itation	n orce ent	e i entia ar in er it ro ra	a i ation te
an ranci co tation	e	e	e arie	it o ice	e	arie
a air tation	e		e o r o r i it	o ice o in center ec rit cit o ice		
o a tation	e		e o r o r i it	o ice cit o ice		
La a ette		e or er	e	o ice cit o ice		
oncor tation			e o r o r i it	o ice cit o ice		
a it tation			e o r o r i it	o ice cit o ice	e	
errito P a a tation	e		e o r o r i it	o ice o in center ec rit cit o ice		
P ea ant i tation	e		e t o o r i it	o ice cit o ice		a ite
oc ri e tation		e	e o r o r i it	o ice cit o ice		
e t a an tation			e o r o r i it	o ice a tran er onne cit o ice	e	
a train i a e tation				Par in ot er onne cit o ice		e
a train i rae tation			e ario			

Appendix C
Historic Architectural Survey Report

Historic Architectural Survey Report

BART – OAKLAND AIRPORT CONNECTOR
Oakland, Alameda County, California

Prepared for:

EIP Associates
601 Monterey Street, Suite 500
San Francisco, California 94111

Prepared by:

JRP Historical Consulting Services
1490 Drew Avenue
Davis, California 95616

September 2000

SUMMARY OF FINDINGS

JRP Historical Consulting Services prepared this Historic Architectural Survey Report (HASR) to evaluate buildings and structures potentially eligible for listing in the National Register of Historic Places (NRHP) that may be affected by the Bay Area Rapid Transit (BART) Oakland Airport Connector project. JRP evaluated the buildings and structures in accordance with applicable sections of the National Historic Preservation Act (NHPA) and the implementing regulations of the Advisory Council on Historic Preservation (ACHP) as these pertain to federally-funded undertakings and their impacts on historic properties as well as Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. The purpose of this document is to provide information so that BART may comply with NHPA and CEQA as these laws and regulations pertain to historic architectural resources.

The BART Oakland Airport Connector is proposed to upgrade transit service between the Oakland Coliseum BART Station and the Oakland International Airport. The central proposal is to build an elevated Automated Guideway Transit along Hegenberger Road and Airport Drive. There are also bus and "no project" alternatives. The project location is shown in **Figure 1**, and the project vicinity is shown in **Figure 2**. The Area of Potential Effect (APE) is shown in **Figure 3**. The APE maps include map reference numbers for all buildings and structures existing within the boundaries of the APE. The Figures are located in Appendix B. Listed below are the historic resources that constitute the survey population for this project. These eleven properties within the APE were found to be constructed in or before 1955. They include nine properties with one or more buildings on them and two engineering structures.[1] An additional sixty-nine properties exist within the APE built after 1955. These buildings and structures are not considered historic

1.1.1.1.

[1] The survey population for this report does not included buildings or structures on Oakland Airport property as they have been covered by previous reports. Those reports include: Port of Oakland, "Airport Development Program Final EIR," December 1997 (including Environmental Science Associates and Archaeological/Historical Consultants cultural resources studies); Archaeological / Historical Consultants, "Archaeological and Historical Properties Reconnaissance of the Airport Roadway Project, Alameda County, California," submitted to Woodward-Clyde Consultants; Environmental Science Associates, Inc., "Cultural Resources: Existing Environmental Conditions, Metropolitan Oakland International Airport, Technical Memorandum #10 (draft)," prepared for the Port of Oakland, April 1991; and Port of Oakland, "Oakland Airport Transit Connector, Environmental Impact Statement (draft)," March 1981. No historic resources were found by these previous reports within the BART Connector project APE.

because they were constructed within the past 45 years and do not meet the National Register's standard of exceptional importance for buildings constructed in the recent past. The survey population properties are evaluated on Department of Parks and Recreation (DPR) 523 Forms, located in Appendix C. A description of these resources can also be found in Section 4. Those buildings and structures less than 45 years old are listed in Appendix A.

This report concludes that none of the properties within the APE appear to meet the criteria for listing in the National Register of Historic Places nor do they appear to meet the criteria of significance for historic resources for the purposes of CEQA.

Survey Population Buildings and Structures

(Constructed in or before 1955)

Map Ref#	APN	Address		Year Built	Eligibility
4	044-5020-003-47	72	98th Avenue	early 1950s	Does not appear eligible
39	044-5076-001-00	410	Hegenberger Road	early 1950s	Does not appear eligible
61	None	Elmhurst Creek Bridge at Baldwin Creek		ca. 1950	Does not appear eligible
62	042-4318-003-00	690 / 692	Hegenberger Road	1941 / 1970s	Does not appear eligible
63	042-4318-001-01	698	Hegenberger Road	1951	Does not appear eligible
66	041-4162-030-00	807	75th Avenue	ca. 1939 / 1944	Does not appear eligible
68	041-4162-023-01	867	75th Avenue	1925	Does not appear eligible
71	041-4173-002-02 041-4173-002-03	728	73rd Avenue	ca. 1908 / 1913	Does not appear eligible

Map Ref#	APN	Address		Year Built	Eligibility
72	None	Arroyo Viejo Creek Bridge at San Leandro Street		late 1940s	Does not appear eligible
77	041-4170-001-02	7001	San Leandro Street	1949 / 1952	Does not appear eligible
78	041-4060-010-03	6925	San Leandro Street	1949 – 1955	Does not appear eligible

TABLE OF CONTENTS

ATTACHEMENTS

1. PROJECT DESCRIPTION

The proposed BART-Oakland Airport Connector (the "Connector") would offer transit service between the Oakland Coliseum BART Station and the Oakland International Airport (OIA). An Environmental Impact Report/Environmental Impact Statement (EIR/EIS) is being prepared on the Connector project. The Federal Transit Administration (FTA) is the lead agency for the EIS, and BART is the lead agency for the EIR. The EIR/EIS is evaluates three transportation alternatives:

- No Action Alternative, consisting of continued use of the existing AirBART shuttle buses.
- Automated Guideway Transit (AGT) Alternative, consisting of automated, driverless transit vehicles traveling in an exclusive guideway that would be separate from vehicular traffic along the route.
- Quality Bus Alternative, which would consist of low-floor, 60-foot articulated buses that would include a pre-paid fare collection system and priority right-of-way at key intersections.

Proposed AGT and Quality Bus Alignment. The alignment for the AGT and Quality Bus alternatives would generally follow Hegenberger Road and Airport Drive. The AGT station at the Coliseum end of the alignment would be located west of and along the Hegenberger Road overcrossing and straddle San Leandro Street. The AGT would travel toward the airport its own guideway located in the median of Hegenberger Road, over Doolittle Drive, along the east side of Airport Drive, and straight through the current airport parking area to the airport terminal (see APE map). The AGT guideway would be approximately 16 feet above street level. The only segment where the AGT alignment it is expected to be below grade is adjacent at the Doolittle interchange where it would be in tunnel and then transition to an at-grade configuration along the Lew Galbraith Golf Course. This change in the vertical alignment is necessary for the system to be below a runway approach glide path defined by the Federal Aviation Administration for aircraft safety.

The Quality Bus Alternative would introduce expanded and improved bus service within the existing Hegenberger Road and Airport Drive right-of-way. A street-level station stop at the Coliseum BART Station under the Hegenberger overcrossing would be integrated with the BART paid area and a covered walkway would extend to the curb where the bus loading and unloading would occur. The quality bus service would make use of signal preemption at intersections along Hegenberger Road. In addition, a dedicated lane would be constructed in front of the airport terminal leading to the airport station within the proposed parking garage.

Alignment Design Options. In addition to the proposed median alignment, the environmental evaluation will serve several design options for the AGT Alternative:

1) Alignment West of Hegenberger Road Median. In order to avoid the transitions from the median of Hegenberger Road to its western side (necessary at the Union Pacific Railroad crossing and the I-880 crossing), an AGT alignment located entirely along the west side of Hegenberger Road between San Leandro Street and Doolittle Drive is proposed. Between the Union Pacific Railroad overcrossing and I-880, this alignment would place the guideway columns at the curbside along Hegenberger Road. South of I-880, this alignment would be located west of Hegenberger Road's curb, sidewalk, and landscaped area.
2) Intermediate Stations. Two intermediate stations will also be evaluated. The locations of these stations are the intersection of Hegenberger Road and Edgewater Drive and the intersection of Hegenberger Road and Doolittle Drive.

2. RESEARCH AND FIELD METHODS

The Area of Potential Effect (APE) for this project was developed by EIP Associates and JRP Historical Consulting Services and was approved by the California Office of Historic Preservation. Consistent with general cultural resource practices for transportation projects the architectural APE includes the Area of Direct Impact (ADI) as well as parcels immediately adjacent to the ADI. The APE typically extends one parcel deep on either side of the ADI or 200 feet from the ADI on large parcels that are either vacant or that do not have buildings near the ADI. The APE, shown in **Figure 3** in Appendix B, is extended further out in places – up to roughly 600 feet – to accommodate various alignment design options and project alternatives.

Once the APE was defined, JRP staff conducted a reconnaissance survey of the area to account for all the buildings and structures found within the APE. This determined, in part, which buildings would be studied in more detail as buildings potentially over 45 years of age.[2] Additional background research was done through First American Real Estate Solutions database (formerly Experian and TRW Redi-Data), and through review of area maps and other documents. In addition, EIP Associates established which previous reports were relevant to the current project. All buildings and structures on the Oakland International Airport property, for example, were previously studied and thus not re-evaluated for this report. Properties (outside the airport) determined to have been built after 1955 were listed and are included in Appendix A. The remaining properties, potentially over 45 years of age, became the survey population.

The survey population is comprised of eleven properties. These properties were inspected in the field, photographed, and described in detail on DPR-523 forms (located in Appendix C), in keeping with the standards of the California Office of Historic Preservation. Research for this project was conducted at Shields Library at U.C. Davis, the City of Oakland Cultural Heritage

1.1.1.1.

[2] The Secretary of Interior sets the standard guideline for review of potential National Register eligible buildings at 50 or more years of age. The California State Historic Preservation Office (OHP), however, prefers to use a 45 year cut-off to provide an adequate period for project planning.

Survey office, the California State Library, and the California Historic Resources Northwest Information Center at Sonoma State University.

This project was conducted under general direction of Stephen Wee (M.A. in History, U. C. Davis), a principal at JRP with more than 20 years experience conducting these types of studies. The architectural historian for this project was Christopher McMorris. Mr. McMorris holds a M.S. in Historic Preservation from Columbia University. He joined JRP in 1998 and has experience in various elements of cultural resource management including historic property survey and evaluation, architectural historic research, and historic preservation planning. Mr. McMorris conducted the field survey and research for this project. Mr. B. Joseph De Lallo provided research assistance on this project.

3. HISTORICAL OVERVIEW

3.1. Early history of the East Bay and the south end of Oakland

The BART Oakland Airport Connector (the "Connector") project area and Area of Potential Effect is located at the southern end of the City of Oakland adjacent to San Leandro Bay including the area southwest of Doolittle Drive located on mostly reclaimed or infilled land. The pre-Spanish inhabitants of this area may have been part of the Jalquin aboriginal people who likely spoke one of the Costanon languages. Descendents of the Costanoans – a Spanish description for "coast people" – prefer the term Ohlone. The East Bay was first explored by the Spanish in the 1770s, and in 1820 Don Luis Maria Peralta was granted Rancho San Antonio covering much of what is now Alameda County. In 1842, Peralta divided his rancho between his sons with the area just adjacent to San Leandro Bay going to Antonio Maria Peralta. In the 1840s, other European settlers began arriving in the East Bay, and in 1850 Colonel Henry S. Fitch attempted to make the first purchase of land that would become Oakland. While this attempt failed, H.W. Carpentier and A. Moon were successful in pressuring Peralta into the sale. Fitch later became one of the founders of the town of Alameda. In 1852 Oakland was incorporated, and in 1853 the county of Alameda was carved out of Contra Costa and Santa Clara counties. In the same year Nathaniel Damon established a landing along San Leandro Bay at the slough now referred to as Lion's Creek (just outside of the project APE).[3]

As the City of Oakland developed to the north, the area adjacent to San Leandro Bay was farmed or remained undeveloped mudflats and tidal wetlands for much of the 19th century. While parcels in the project area were sold to various owners, the Peralta family did retain some property into the late 19th century. Rail transit first arrived in the area in 1865 when Alfred A. Cohen established the San Francisco and Alameda Railroad running from Alameda south to

1.1.1.1.

[3] Michael Smith, Suzanne Baker, and Mark Brack, "Archaeological and Historical Properties Reconnaissance of the Airport Roadway Project, Alameda County, California," submitted to Woodward-Clyde Consultants, 2-4; Oakland Public Library, "An Oakland Chronology," 2nd edition, 1952; Thompson & West, *New Historical Atlas of Alameda County, California, 1878*, (Fresno: Valley Publishers reprint, 1976), 17-18, 22-23, and 32; Lois Rather, *Oakland's Image: A History of Oakland, California*, (Oakland: Rather Press, 1972), 34; Mel Scott, *The San Francisco Bay Area: A Metropolis in Perspective*, (Berkley: University of California Press, 1985, 2nd edition), 33, 35; and David L. Durham, *California's Geographic Names*, (Clovis, CA: Word Dancer Press, 1998), 629, 632, and 634.

Hayward. This line passed through the project area to the southwest of San Leandro Street along roughly the same corridor as the current Union Pacific Railroad tracks at that location. This line became part of the Central Pacific Railroad, the transcontinental railroad line terminating in Oakland in 1869. The line was later purchased by the Southern Pacific Railroad. By the 1890s the area roughly bound today by San Leandro Bay to the west, East 14th Street to the east, 66th Avenue to the north, and 77th Avenue to the south was referred to as Fitchburg, named for Colonel Fitch. First established around a short-lived railroad stop called Fitch's Station, the area was located between the more established villages around the railroad stations at Fruitvale to the north and Elmhurst to the south. Fitchburg was officially platted in 1908 with a post office briefly established there until 1911. The grid pattern of streets was officially established at this time, but the roads were initially given names rather than numbers. George and Charles Streets, for example, are now 73rd and 75th Avenues respectively. In 1909, the City of Oakland annexed Fitchburg, along with Claremont, Fruitvale, Melrose, Elmhurst, and other outlying territory, in 1909 increasing the city from nearly twenty-three square miles to over sixty square miles. This annexation was Oakland's last major land acquisition. A year later a second rail line was completed through the Connector project area by the Western Pacific Railroad. This line followed the path currently located northeast of San Leandro Street, generally along same route as BART takes in this area.[4]

3.2. Development of Fitchburg, the Oakland Airport, and the Eastshore Freeway

Fitchburg was subdivided into homestead lots in 1908, but did not develop quickly as a residential neighborhood partly because it was not well serviced by local street cars, i.e. the Key System trolleys. Residential development occurred mostly to the northeast of San Leandro Street, outside of this project's APE, closer to the trolley lines. Two properties within the APE representative of early 20th century residential development in Fitchburg are located at 728 73rd Avenue (Map Reference #71) and at 867 75th Avenue (Map Reference #68). The first house built at 728 73rd Avenue was constructed around 1908 prior to Oakland's annexation of

1.1.1.1.

[4] Thompson & West, *New Historical Atlas of Alameda County, California 1878*, 32; Scott, *San Francisco Bay Area*, 46; City of Oakland Community & Economic Development Agency, Fitchburg Sanitary District Records; Durham, *California's Geographic Names*, 632; and Oakland Public Library, "An Oakland Chronology," 2nd edition, 1952.

Fitchburg and may pre-date the area's official subdivision. A second building was added to the property around 1913. The house at 867 75th Avenue, built in 1925, is the last remaining example of a whole line of small houses built along 75th Avenue in the 1920s across the street from the Boiler Tank and Pipe Company Plant. These small houses may have been built for workers at the plant. The small bungalow-style house at 867 75th Avenue represents the type of residential development that continued into the mid-20th century in the area (mostly outside the APE). Postal authorities reestablished a Fitchburg post office in 1954 signaling that the historic nomenclature for the area persisted well into the post-World War II period.[5]

Rather than residential development, manufacturing and commercial establishments took hold in the southwest end of Fitchburg adjacent to the railroad lines. The Sanborn Fire Insurance map of the area around San Leandro Street, from 1925 (updated in 1951), shows some small dwellings in the area along with McDonough Steel Company, a former brass and aluminum foundry, a welding and metal manufacturing plant, porcelain enameling works, and the Blackman-Anderson Lumber Co. While all of these businesses are now gone – many of which sat where the BART parking lot is today – this type of development continued in this area throughout the 20th century.

At the other end of the Connector project area, the Oakland Port Commission (precursor to the Port of Oakland) developed 600 acres of former farming land on Bay Farm Island for the Oakland airport in 1927 with 225 acres added later. Dedicated by Charles Lindbergh in September 1927, the airport – what is now North Airport located north of the current project APE – was the starting point for many historic flights prior to World War II. In the first year of service, the airport was the origin of the first trans-Pacific flight from the United States to Hawaii flown by Lester Maitland and Albert F. Hegenberger (for whom Hegenberger Road is named). The following year Oakland was the point of origin for the infamous doomed air race promoted by pineapple magnate James Dole where all but two of the sixteen planes were lost at sea between California and Hawaii. Oakland Municipal Airport was also the starting and ending point for the 1928 to 1930 first air circumnavigation of the globe, several of Amelia Earhart's

1.1.1.1.

[5] City of Oakland Community & Economic Development Agency, Fitchburg Sanitary District Records; City of Oakland building permit records; First American Real Estate Solutions database; Sanborn Fire Insurance maps 1951; Oakland city building records; and Durham, *California's Geographic Names*, 632.

important flights, and it became the western terminus for the first transcontinental passenger and mail service. Immediately recognized at the time by the War Department for its military potential, the airport was almost exclusively used for military aviation during World War II. Following the war, the Oakland Board of Port Commissioners set out a massive expansion of airport facilities including one of the largest land reclamation programs in the Bay Area and new passenger and cargo facilities that became known as South Airport (terminus of the proposed BART connector). The initial phase of the South Airport development was completed in 1961.[6]

The war time importance of the Oakland airport did provide some impetus for development in the area. At least two properties within the Connector project area were constructed just before or during the war. The wood sided warehouse at 692 Hegenberger Road (Map Reference #62) was built in 1941, and the buildings at 807 75th Avenue (Map Reference #66) were built in 1939 and 1944 (approximately). In the immediate post-war period, at least one aircraft related business located in the project area. California Airframe Parts Company purchased the property at 72 98th Avenue (Map Reference #4), near the corner of Doolittle Drive and Airport Drive, in 1957 using the large warehouse on the property – which had previously been likely used to store farming machinery – for their business. Other airport related development along Hegenberger Road, such as hotels, parking lots, and restaurants, did not occur until after construction of the new South Airport in 1961.[7]

During the early 20th century, particularly after the 1906 San Francisco earthquake, civic-minded Bay Area residents and civic leaders became interested in rational city and regional planning. Oakland hired the prominent planner Charles Mumford Robinson to prepare a plan for the city in 1905 that was carried out on a very limited basis. City and regional planning caught wider attention during the 1920s. While the most prominent group in the Bay Area promoting such efforts was the Regional Plan Association of San Francisco, Oakland had its own organization

1.1.1.1.

[6] G.A. Cummings and E.S. Pladwell, *Oakland, A History*, (Oakland: Grant D. Miller Mortuaries, Inc., 1942), 105; Rather, *Oakland's Image*, 90-91; and Environmental Science Associates, "Cultural Resources: Existing Environmental Conditions, Metropolitan Oakland International Airport," Technical Memorandum #10 (draft), April 1991, 1-3 which references the following documents: Board of Port Commissioners, *Oakland Municipal Airport*, 1925; Oakland Tribune Special Edition, "Dedication of New Airport Facilities," September 14, 1962; Oakland Tribune Yearbook, "Oakland Municipal Airport – Pioneer in Aviation," 1936; and Oakland Tribune Yearbook, "Oakland Municipal Airport, Famous Starting Point of World Flights Add to International Renown," 1932.

[7] Personal interviews with Margaret Vales and Mary Ann Holgerson regarding 72 98th Avenue on June 6, 2000.

called the East Bay Regional Plan Association. The San Francisco group naturally saw their city as the center of the bay region, but the Oakland group sought to promote projects that would benefit East Bay residents and businesses. One of their main aims was to promote street and highway improvements including Harland Bartholomew's plan for the Major Highway and Traffic Committee of One Hundred published in 1927. Included in the plan was a superhighway from San Leandro to Richmond. Following World War II, this highway idea came to fruition – essentially along the original proposed route passing through the Connector project area – in what was first called the Eastshore freeway, later named the Nimitz freeway, now I-880. The initial section of the freeway was opened in July 1949. Originally, the six-lane freeway passed under Hegenberger Road (itself in existence since before 1926). The first clover-leaf style interchange was built at that location in the 1950s, and Caltrans lists the current Hegenberger Road overpass at I-880 as built in 1976, upgraded in 1996.[8]

3.3. Development along San Leandro Street and Hegenberger Road during World War II and the immediate post-war period

Besides the vast airport land reclamation following World War II, industrial and commercial development pressures in the area led to piecemeal channeling of the many creeks flowing towards San Leandro Bay and upgrading bridges along area roads over those creeks. Industrial operations such as those at 807 75th Avenue (1939/1944) and 692 Hegenberger Road (1941) were built in the area in response to war time development going on city-wide. Fitchburg Sanitary District records indicate that plans were drawn up for channeling the Arroyo Viejo Creek and Lion's Creek (outside the APE) in the late 1940s. Sanborn Fire Insurance maps of the area along San Leandro Street show that Arroyo Viejo Creek followed along the path of 74th Avenue in the 1930s and was dry in summer. The Western Pacific Railroad had a wooden trestle across the creek along Snell Street that was likely built when the line first went through in 1910.

1.1.1.1.

[8] Scott, *The San Francisco Bay Area*, 199; United State Geological Survey, San Leandro 7.5' Quandrangle maps, 1947 and 1959; Oakland Public Library, *An Oakland Chronology*, 16; and the Caltrans Division of Structure Maintenance and Investigations, "Log of Bridges on State Highways," available online at http://www.dot.ca.gov/hq/structur/strmaint/, accessed June 2000. The date for Hegenberger Road was mentioned in Smith, Baker, and Brack, "Archaeological and Historical Properties Reconnaissance of the Airport Roadway Project," p.5 citing the U.S. Coast and Geodetic Survey 1926.

The bridge taking San Leandro Street over the Arroyo Viejo Creek (Map Reference #72) was in place by 1951. The wooden trestle next to Snell Street is now replaced with a concrete structure, but a similar wood structure passing over Arroyo Viejo Creek does remain outside the project APE along the former Southern Pacific Railroad line just southwest of San Leandro Street.

Industrial-style development continued along both San Leandro Street and Hegenberger Road in the late 1940s and 1950s leading and was facilitated by construction of the Arroyo Viejo Creek bridge and a concrete bridge over Elmhurst Creek (Map Reference #61) built in the 1950s. Now listed as taking Baldwin Street over the creek, it originally took the old Hegenberger Road alignment over the creek. This was before the Hegenberger Road overpass, which crosses over the adjacent the Southern Pacific Railroad line, was constructed in the 1960s. Properties that benefited from these road upgrades and creek channeling included the businesses at 6925 and 7001 San Leandro Street (Map References #78 and 77) which were both initially constructed around 1949. One other property that likely benefited was the warehouse at 698 Hegenberger Road (now Baldwin Street) (Map Reference #63) constructed in 1951.

As stated above, Hegenberger Road dates back into the 1920s connecting the Fitchburg area with Bay Farm Island and the (North) airport. During the 1940s and 1950s little construction occurred between the Southern Pacific Railroad line and Doolittle Drive. USGS maps from the period show a few large buildings along Hegenberger Road and a drive-in movie theater, for example, nearby (outside of APE). One remaining building that is known to have been constructed along Hegenberger Road in the 1950s is number 410 (Map Reference #39). This one story bowstring roof building housed restaurants that likely served passing Eastshore freeway drivers and employees and travelers using the Oakland Municipal Airport.

3.4. 1960s and beyond: the Oakland Airport and the Oakland Coliseum

Dramatic change came to Hegenberger Road after the Port of Oakland opened the South Airport in 1961. During the 1960s hotels, restaurants, and other businesses sprang up along Hegenberger Road. The Edgewater Hotel at 10 Hegenberger Road was constructed in 1960 in anticipation of the airport's opening, the Park Plaza Hotel at 150 Hegenberger Road was built in 1969, and the

Hilton Hotel at 1 Hegenberger Road was built around 1970. Throughout the 1960s, the area drew assorted commercial businesses and office building construction as well as two union headquarters. The Teamsters built their local headquarters at 70 Hegenberger Road and the Warehouse Union Local GILWU located theirs at 99 Hegenberger Road. During that decade, commercial buildings were constructed at 240 and 290 Hegenberger Road and restaurants were built at 296 Hegenberger and 8520 Pardee Drive. In 1967, the office building at 333 Hegenberger Road was complete. To serve the needs of this expanding commercial area the bridge taking Hegenberger Road over San Leandro Creek (near Leet Drive) was improved in 1968. During the 1970s and 1980s bank and other office buildings appeared including 460 Hegenberger Road (next to I-880) in 1976, the United Labor Bank at 100 Hegenberger Road in 1979, 60 98th Avenue in 1980, and the Northern California Carpenter's Trust Fund building at 444 Hegenberger Road in 1986. In the 1990s, the area saw the addition of more parking lots, restaurants, gas stations, and hotels as development continued at the Oakland airport.[9]

The other major impetus for development in this area was construction of the Oakland-Alameda County Coliseum. The City chose the site for the Coliseum by San Leandro Bay in 1960 and its construction began in 1962. Designed by Skidmore, Ownings, and Merrill, the complex was completed in 1966 first housing the Oakland Raiders football team and then the Oakland A's baseball team two years later. Development around the Coliseum during the 1960s and 1970s included restaurants, large scale commercial buildings, and office building, and a movie theater. Chubby Freeze at 600 Hegenberger opened in the 1960s along with Sam's Hof Brau at 595 Hegenberger Road in 1969. The large scale commercial complex at 659 Hegenberger was built in the 1960s and new businesses located along San Leandro Street as well. Connection between San Leandro Street and Hegenberger Road – over the Southern Pacific Railroad lines – was improved in 1966 when the Hegenberger Road overpass was completed. This altered the alignment of the road locating it north of where it had originally met up with 77th Avenue. Around 1970 both the office building at 675 Hegenberger Road was completed as well as the

1.1.1.1.

[9] USGS San Leandro Quadrangle maps: 1947, 1959, 1968, and 1973; and First American Real Estates Solutions database. Also, in 1980 the Oakland City Council passed Resolution 1979-8 and City Ordinance 9872 designating the Oakland International Airport's North Field a Historic Landmark District. While the council recognized its historic importance, it allowed for the airport to alter structures and facilities therein. This designated area is outside the APE for BART-Airport Connector project.

Century Dome Theater at 8201 Oakport Street just southwest of Nimitz freeway (now closed). In the 1980s, further development along Hegenberger Road included the Coliseum Center at 640 Hegenberger Road and the Oakland Truck Center at 8099 South Coliseum Way.[10]

The Oakland Coliseum BART station served the first BART line opened in 1972. The effect of the new BART station and its adjacent parking lot meant destruction of buildings constructed from as far back as the late 19th century, but the new station did not instigate much new development in the area surrounding it. One business that appears to have been constructed to serve BART passengers going to the Coliseum is the restaurant building constructed during the 1980s across the street from the station at 7127 San Leandro Street, now called Coliseum Burger. The area around the BART station, within the APE, saw little new development during the 1990s.

1.1.1.1.

[10] For information on the Oakland Coliseum see: "Guide to Oakland History – the Sites – Before the Oakland Coliseum and Building a Stadium," online at http://info.berkeley.edu/courses/is290-2/f98/oaklandkids/sites/coliseum/, accessed June 2000; USGS San Leandro Quadrangle maps: 1947 and 1959; First American Real Estate Solutions database.

4. DESCRIPTION OF RESOURCES

This report addresses an Area of Potential Effect (APE) for the BART Oakland Airport Connector project that includes eighty properties. Sixty-nine of the properties were built after 1955 and are not considered historic. These properties are listed in Table 2 in Appendix A. The remaining eleven properties in the APE, constructed in or before 1955, are considered the survey population, i.e. the historic resources. The survey population are described below, evaluated in Section 5, and listed in Table 1 in Appendix A. A DPR523 form was prepared for each of the survey properties. The DPR523 forms are located in Appendix C.

4.1. Discussion of Resource Types

The survey population properties for this report consist of mostly light industrial / commercial buildings, plus two residential properties, and two creek bridges. The APE for this project proceeds from the airport property southwest of Doolittle Drive up Hegenberger Road to the Coliseum BART Station and the area around it along San Leandro Street. All but two of the survey properties are located at the northern end of the APE, while roughly sixty percent of the APE properties are located around and to the southwest of I-880. This indicates the relatively recent development of the area adjacent to the Oakland airport while, as discussed in Section 3, the area around the Coliseum BART Station developed much earlier.

All of the survey population properties were constructed in the 20^{th} century. The oldest properties within the APE are residential. Described below, one house was built around 1908 (with an additional house built on the property in 1913), and the other house was built in 1925. Two warehouse properties were built just before or during World War II, with several more built in the period immediately following the war and into the 1950s. As discussed in Section 3, development of APE's northern end also meant development to control creeks flowing into San Leandro Bay and construction of bridges for area roads over those creek. Two such engineering structures were built in the APE during the late 1940s and early 1950s. The survey population buildings include steel framed warehouses with corrugated metal siding, bowstring roof warehouses, and wood framed warehouses and houses with either wood or stucco siding. Each property is described below individually. Evaluations of these properties are located in Section 5.

4.2. Descriptions of Properties

72 98th Avenue *Map Reference #4*

Located north of the Oakland airport and Doolittle Drive, California Airframe Parts is a two building complex. Both buildings appear to have been constructed in the 1950s. The older of the two buildings is a dual gable steel frame two story warehouse with corrugated metal siding and corrugated metal roofing. Double sliding doors are located along both the northwest and southwest sides, and there are steel framed windows with four pane awning style sashes located at the top of the southwest side. There are single personnel doors with glass panels at various locations around the building. The warehouse's expansive interior is not subdivided and features vintage hanging light fixtures and fiberglass skylights. There is also a two story rectangular wood frame addition on the building's northeast side. Its entrance faces northwest and has large pane windows, a single door, and brick facing. It appears to be unused office space.

The other building is a two story concrete tilt-up warehouse with large roll-up doors facing northeast and an office at the northern corner marked by brick facing, steel frame windows, and an awning.

410 Hegenberger Road *Map Reference #39*

Set at the southeast corner of Hegenberger Road and Hegenberger Court, 410 Hegenberger Road is a one story former restaurant building now occupied by the Society for Prevention of Cruelty to Animals. The rectangular building has a bowstring roof with composite roofing. Its perimeter wall is finished in stucco with the main entrances through two sets of double doors on the south side covered by triangular hoods. At the northwest corner of the building, there is brick facing around large fixed pane windows. Along the north side are small fix pane windows with rounded applied ornament above them. The east side of the building is largely covered by a concrete masonry unit enclosure with a staff entrance in the middle. The interior and most of the exterior appear to have been altered in remodeling that has occurred within the past two years. In addition, there are two vintage-style light fixtures flanking the driveway of the building.

Elmhurst Creek Bridge at Baldwin Street *Map Reference #61*

The Elmhurst Creek flows west under Baldwin Street and Hegenberger Road, past the southeast end of the Oakland Coliseum complex, and under Edgewater Road into San Leandro Bay. The bridge recorded on this form passes over the Elmhurst Creek at Baldwin Street and is immediately next to a bridge created by the Hegenberger Road overpass built to send traffic over the near-by railroad tracks. The road now labeled as Baldwin Street at this location formerly was Hegenberger Road before the overpass was constructed. (Adjacent properties still retain Hegenberger Road street addresses.) Both bridges at this location are of similar construction with the road bed resting on concrete piers in corrugated metal casings. The bridge over Baldwin Street – Caltrans Local Agency Bridge Log number 33C0041 – has steel tube railings, a parallel steel pipe on the east side, and concrete pipes feeding into the creek under the bridge. The Hegenberger Road overpass bridge has galvanized steel railings with thin balusters.

690 and 692 Hegenberger Road *Map Reference #62*

The Oakland Loyal Order of Moose Lodge 324 is located in two buildings adjacent to one another on Hegenberger Road. The buildings at 690 and 692 Hegenberger Road are located on what appears to be the end of Baldwin Street, however, the property received its street address before the roads were reconfigured in the 1960s when the Hegenberger Road overpass was built over the nearby railroad tracks.

The older of the two buildings is at 692 Hegenberger Road. This side gable raised one story building has vertical wood siding, a corrugated metal roof, and wooden steps / porch on the south end at the building's entrance. The windows, covered by large metal screens, appear to all be aluminum sliders. There is a large double window near the top of the gable on the south side. Part of the fascia is missing on the west side.

The building at 690 Hegenberger Road is a tall one story pre-engineered metal building with vertically seamed siding, a gable roof, and a large bay facing north housing large double wood doors as its main entrance. There are two sheet metal doors facing both west and north, and five geometrically shaped boxes at the building's roof line.

698 Hegenberger Road *Map Reference #63*

The building at 698 Hegenberger Road is one story, has an irregular footprint, and consists of three units, each with their own entrance. Sided in stucco, the building has a flat roof, wood trim, steel frame divided windows, and a vintage light fixture over the door of the most western unit. All windows have security bars over them, and the south end of the building is enclosed by a fence.

807 75th Avenue *Map Reference #66*

The property at 807 75th Avenue has two buildings, one of which was previously recorded for the City of Oakland's unreinforced masonry building study completed in September 1994. This building's primary record prepared for that study is attached.[11]

The main building at 807 75th Avenue (not previously recorded) is a one story wood frame gable roof warehouse / office. Sided in corrugated metal, it has a concrete perimeter foundation, steel frame six pane windows, and a corrugated metal roof. The building's main entrance is on the east side. This single wooden door is under a gable roof awning up a few steps. There are also two single windows and two pairs of windows, each with security gates over them, an opening to the crawl space beneath the building, and a set of wood steps to a boarded-up opening near the north corner. There are four windows on the southwest side of the building, two windows on the northeast side, and two pairs of windows on the northwest side.

1.1.1.1.

[11] Betty Marvin, "Unreinforced Masonry Buildings in Oakland, 1850-1948," Oakland Cultural Heritage Survey, 1995.

The property's other building (previously recorded) is one story constructed of brick with a shallow wood frame gable roof and set of parapet walls. Corrugated metal siding faces southwest with a metal door inset in it. The building's side window openings are filled with fiberglass sheeting. There is a metal roll-up garage door and a steel frame divided window on the building's north side. There are also two other small temporary buildings located on the property.

867 75th Avenue *Map Reference #68*

The house at 867 75th Avenue is a raised one story front gable building with stucco siding, composite shingle roofing with two stove pipes and a vent, and a mix of replacement aluminum slider and original wood windows. Facing southeast, the recessed front door is up a few concrete steps next to two pairs of aluminum slider windows with security bars. On the house's north side there are three double hung one over one wood windows each with a small three pane transom at the top. There is also one small aluminum slider window near the east corner. The southwest side of the house are two more wood double hung windows as well as three more aluminum sliders. There is also a small wood gate at the entrance to the crawl space beneath the house. The northeast side of the house backs up to the Hegenberger Road Expressway.

728 73rd Avenue *Map Reference #71*

Located adjacent to the on-ramp to Hegenberger Road from San Leandro Street, and backing up to Arroyo Viejo Creek, the property at 728 73rd Avenue has two houses originally constructed in the early part of the 20th century. Access to this property is very limited and heavy vegetation and high covered fences make it difficult to see from the surrounding streets. The front (westerly) unit is a one story clapboard clad hipped and gable roof house with its main entrance facing northeast. The single door is under a gable roof porch supported by square Doric style piers, and it sits next to the chimney. The main part of the house is located at the west end of the property and has a hipped scale-cut composite shingle roof. To the east is a gable roof element.

The house has an assortment of one over one double hung wood windows and aluminum slider windows.

The secondary, rear, unit – originally built as a one story cottage – is located along the eastern property line. It is a two story wood frame building with wood and corrugated metal siding and composite sheet roofing. A vintage light fixture sits above a singular southeast facing opening on the second floor. The rest of that side of the building is obscured by corrugated metal sheeting set between the house and the side fence. On the first floor, there is a shed roof extension to the northeast which has a door and windows facing northwest. The northwest side of the building is largely covered by clapboard siding, and there is a large trim at the gable. There appear to be two sheds between the houses, one which may be a detached shed roof garage.

Arroyo Viejo Creek bridge at San Leandro Street   Map Reference #72

Flowing west towards San Leandro Bay, the Arroyo Viejo Creek emerges from underground at the eastern access road of the Coliseum BART Station, just north of Snell Street. The creek flows between two concrete retaining walls, approximately twelve feet tall, under Snell Street, the old Western Pacific Railroad lines, San Leandro Street, and the on-ramp from San Leandro Street to Hegenberger Road. The bridge number, according to the Caltrans Local Agency Bridge Log, is 33C0167. The bridges are designed with the roads resting on a pairs of rectangular concrete culverts.

7001 San Leandro Street   Map Reference #77

The property at 7001 San Leandro Street in Oakland is a complex of three buildings for a light industrial steel products company. The property is dominated by a two story steel frame corrugated metal warehouse building with a gable roof. This build has a corrugated metal roof over wood sheathing with large purlin ends visible on the north side of the building. Attached to the north side, there is a one story gable roof wood frame wing with stucco and corrugated metal siding. This front wing has a shed roof extension on its west side adjacent to the main north facing roll-up garage door of the main warehouse. The main warehouse has metal double sliding doors on both its east and west side as well as corrugated fiberglass sheeting for windows. The front wing has divided steel frame windows and a single door facing west and a corrugated metal roof. Its corrugated metal siding is only on the east side which also has a double sliding door and two windows. At the very north end of the property, there are two semi-permanent modified trailers used as offices. These relatively new buildings have battened wood siding and are connected by a raised wood deck between them. The front unit has brick facing and covered windows facing the street and a shallow gable roof. The rear unit has a flat roof. Both have aluminum slider windows.

6925 San Leandro Street *Map Reference #78*

The property at 6925 San Leandro Street is a one story bowstring composite roof building with flat roof extensions on its east and west sides. At the front, north, end is a rectangular parapet wall unifying the building's façade. Prominently perched on top of the bowstring roof, there is a tall flat roof wood frame monitor with large pane windows facing east and west. The central portion of the building is constructed of concrete. It has two large single pane windows on the west side of the central front door. On the other side of the door is a set of three divided windows and a large roll-up garage door. The western extension has a wood frame structure open to the west and its north face has wood siding and a recessed area for fire protection pipes. The east extension has a wood framed area with wood siding on the north side and concrete masonry unit along the entire east side.

5. EVALUATION OF RESOURCES

5.1. Summary of National Register and CEQA Eligibility Status

This report addresses an area of potential effect that includes eighty properties, eleven of which were constructed in or before 1955. These eleven properties make up the survey population for this report. None of them appear to meet the criteria for listing in the National Register of Historic Places or appear to meet the criteria to be considered historical resources for the purposes of CEQA.

There is a historic district near, but outside of, the APE for this project. The North Field of Oakland International Airport is a designated City of Oakland Historic Landmark District, exclusive of its structures and facilities. In February 1980, the Oakland City Council passed Resolution 1979-8 and City Ordinance 9872, which allowed alterations to the structures and facilities of the Airport while establishing the North Field as a whole to be a Historic Landmark District. The Airport Development Program Environmental Impact Report analyzed potential footprint and operational effects of the Airport BART Connector as a related project. In a letter of February 21, 1997, the California Office of Historic Preservation concluded that none of the structures identified within the Airport Development Program APE are of the quality or character to be considered historic properties. Further, the revised project APE for the Connector does not include any portion of North Field.

Listed below are four tables showing the status of the properties within the BART-Airport Connector project APE constructed in or before 1955. Each property is individually evaluated in Section 5.4.

TABLE 5.1: Properties Listed in the National Register or California Register

None

TABLE 5.2: Properties Previously Determined Eligible for listing in the National Register or California Register

None

TABLE 5.3: Properties that Appear to Meet the Criteria for listing in the National Register or California Register

None

TABLE 5.4: Properties that Do Not Appear to Meet the Criteria for Listing in the National Register or California Register

(Properties with two dates of construction refer to separate buildings on single parcels constructed at different times. A range of dates refers to the time frame that a single building originally took shape.)

BUILDINGS

Map Ref#	**APN**	**Address**		**Year Built**
4	044-5020-003-47	72	98th Avenue	1950s
39	044-5076-001-00	410	Hegenberger Road	1950s
62	042-4318-003-00	690 / 692	Hegenberger Road	1941 / 1970s
63	042-4318-001-01	698	Hegenberger Road	1951
66	041-4162-030-00	807	75th Avenue	1939 / 1944
68	041-4162-023-01	867	75th Avenue	1925
71	041-4173-002-02 041-4173-002-03	728	73rd Avenue	1908 / 1913
77	041-4170-001-02	7001	San Leandro Street	1949 - 1952
78	041-4060-010-03	6925	San Leandro Street	1949 - 1955

STRUCTURES

Map Ref#	Resource	Address	Year Built
61	Elmhurst Creek Bridge	Baldwin Street / Hegenberger Road	early 1950s
72	Arroyo Viejo Creek	San Leandro Street	late 1940s

5.2. Evaluation Criteria

The eligibility criteria for listing properties in the National Register of Historic Places (NHRP) are codified in Code of Federal Regulations 36 Part 60. They are further expanded upon in numerous guidelines published by the Keeper of the National Register.[12] Eligibility for listing in the National Register of Historic Places rests on twin factors of significance and integrity. A property must have both significance and integrity to be considered eligible. Loss of integrity, if sufficiently great, will overwhelm historical significance a resource may possess and render it ineligible. Likewise, a resource can have complete integrity, but if it lacks significance, it must also be considered ineligible.

Historic significance is judged by applying the NRHP criteria. Identified as Criteria A through D, the NRHP guidelines states that a historic resource's "quality of significance in American history, architecture, archeology, engineering, and culture" be determined by meeting at least one of the four main criteria. Properties may be significant at the local, state, or national level:

> Criterion A: association with "events that have made a significant contribution to the broad patterns of our history"
>
> Criterion B: association with "the lives of persons significant in our past"
>
> Criterion C: resources "that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that

1.1.1.1.

[12]The most widely accepted guidelines are contained in U.S. Department of the Interior, National Park Service, "Guidelines for Applying the National Register Criteria for Evaluation," *National Register Bulletin 15.* (Washington DC: U.S. Government Printing, 1991, revised 1995).

possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction"

Criterion D: resources "that have yielded, or may be likely to yield, information important to history or prehistory." (This category is largely applied to archeological sites and, therefore, is not used in the evaluation of most historic architectural resources.)

Certain property types are usually excluded from consideration for listing in the National Register, but can be considered if they meet special requirements in addition to meeting the regular criteria. The following are the seven Criteria Consideration that deal with properties usually excluded from listing in the National Register: [13]

- Consideration A: Religious Properties
- Consideration B: Moved Properties
- Consideration C: Birthplaces and Graves
- Consideration D: Cemeteries
- Consideration E: Reconstructed Properties
- Consideration F: Commemorative Properties
- Consideration G: Properties that have Achieved Significance within the Past Fifty Years

Integrity is determined through application of seven factors: location, design, setting, workmanship, materials, feeling, and association. These seven can be roughly grouped into three types of integrity considerations. Location and setting relate to the relationship between the property and its environment. Design, materials, and workmanship, as they apply to historic buildings, relate to construction methods and architectural details. Feeling and association are

1.1.1.1.

[13] United States Department of the Interior, National Park Service, "How to Apply the National Register Criteria for Evaluation," *National Register Bulletin 15*, 25, 41-43; USDI, National Park Service, "Guidelines for Evaluating and Nominating Properties that have Achieved Significance within the Last Fifty Years," *National Register Bulletin No. 22* (Washington, D.C.: Government Printing Officer, 1979, revised 1990 and 1996).

the least objective of the seven criteria, pertaining to the overall ability of the property to convey a sense of the historical time and place in which it was constructed.

The eligibility criteria for listing a property in the California Register closely parallels that of the National Register of Historic Places. CEQA requires consideration of the possible impacts to and the evaluation of historic resources using the criteria set forth by the California Register of Historic Resources (CRHR). Each resource must be determined to be *significant* under the local, state, or national level under one of four criteria, paraphrased below, in order to be determined eligible:

> Criterion 1: Resources associated with important events that have made a significant contribution to the broad patterns of our history.
>
> Criterion 2: Resources that are associated with the lives of persons important to our past.
>
> Criterion 3: Resources that embody the distinctive characteristics of a type, period, or method of construction, or represents the work of a master.
>
> Criterion 4: Resources that have yielded, or may be likely to yield, information important in prehistory or history. (This category is largely applied to archeological sites and, therefore, is not used in the evaluation of most historic architectural resources.)[14]

1.1.1.1.

[14] California Public Resources Code, Sections 4850 through 4858; California Office of Historic Preservation, "Instructions for Nominating Historical Resources to the California Register of Historical Resources," August 1997.

5.3. General Discussion of Historical Significance of Properties within the APE

The survey population for the BART Connector project consists of properties built from around 1908 through the early 1950s.[15] The two oldest properties are associated with the limited residential development of Fitchburg (roughly San Leandro Bay to East 14th Street, from 66th to 77th Avenue) in the early part of the 20th century. The other properties in the northern end of the APE are commercial and industrial establishments that emerged along San Leandro Street and the north end of Hegenberger Road before, during, and following World War II. As part of the area's development, creeks flowing to San Leandro Bay were channeled and bridges for area roads were constructed over those creeks. Other survey population properties within the APE represent post-war development closer to the Oakland airport and what was then the new Eastshore Freeway (now I-880). Most of the survey properties retain aspects of their historic integrity, but they are not associated with significant events (Criterion A or 1) or the lives of historical persons (Criterion B or 2). They also do not embody distinctive architectural or engineering qualities (Criterion C or 3). Therefore, none of the properties in the BART Connector project area appear to meet the criteria for listing in the National Register of Historic Places and do not appear to meet the criteria to be considered historical resources for the purposes of CEQA. The following section discusses each property's history and significance evaluation.

5.4. Individual Historic Property Significance Evaluations

72 98th Avenue *Map Reference #4*

California Airframe Parts Company began in 1957. When it purchased the property at 72 98th Street the older corrugated metal warehouse was already on-site. The company added the other

1.1.1.1. ______________________

[15] As stated above, the survey population for this report does not included buildings or structures on Oakland Airport property as they have been covered by previous reports, most significantly: Port of Oakland, "Airport Development Program Final EIR," December 1997 (including Environmental Science Associates and Archaeological/Historical Consultants cultural resources studies); and Archaeological / Historical Consultants, "Archaeological and Historical Properties Reconnaissance of the Airport Roadway Project, Alameda County, California," submitted to Woodward-Clyde Consultants.

concrete warehouse in 1957. A second similar concrete warehouse is situated to the west of these two buildings. It now houses other businesses, but according to the 1959 Sanborn Fire Insurance map, both were part of the California Airframe Parts Company. The older warehouse was likely used to store agricultural equipment before California Airframe purchased the property. The building does not appear on the United States Geological Survey Quadrangle San Leandro map from 1949, but is present on the map from 1959. It is likely, therefore, that the warehouse was built prior to 1955.

The original Oakland Airport opened in 1927 at what later became North Airport. Immediately recognized at the time by the War Department for its military potential, the airport was almost exclusively used for military aviation during World War II. Following the war, the Oakland Board of Port Commissioners set out a massive expansion of airport facilities including one of the largest land reclamation programs in the Bay Area and new passenger and cargo facilities that became known as South Airport. Various aircraft businesses emerged because of and to serve the facility, such as California Airframe Parts. Other airport related development along Hegenberger Road – such as hotels, parking lots, and restaurants – did not occur until after construction of the new South Airport in 1961.

While the buildings of the California Airframe Parts Company retain historic integrity, they are not associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B). The buildings also do not embody distinctive architectural or engineering qualities (Criterion C). Therefore, the California Airframe Parts Company buildings at 72 98th Avenue in Oakland do not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

410 Hegenberger Road *Map Reference #39*

Located along Hegenberger Road, which dates back into the 1920s connecting the Fitchburg area with Bay Farm Island and the (North) airport, the building at number 410 was one of the few buildings in the area when constructed. During the 1940s and 1950s little construction occurred between the Southern Pacific Railroad line and Doolittle Drive. USGS maps from the period show a few large buildings along Hegenberger Road and a drive-in movie theater, for example. It is unclear when the building at 410 Hegenberger Road was originally constructed. It appears on the 1959 Sanborn Fire Insurance map and is labeled as a copper tube warehouse. It does not, however, appear on the 1947 USGS San Leandro Quadrangle map. Therefore, the property was likely constructed in the 1950s. More recently the building served as a restaurant, and two years ago the Society for Prevention of Cruelty to Animals inhabited the building creating an animal spay/neuter clinic in it.

While the building at 410 Hegenberger Road retains its overall form and some features of its original construction, it has been altered and thus has lost much of its historic integrity. The building is also not associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B), and does not embody distinctive architectural or engineering qualities (Criterion C). Therefore, the SPCA building at 410 Hegenberger Road in Oakland does not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

Elmhurst Creek Bridge at Baldwin Street *Map Reference #61*

Industrial and commercial development pressures in south Oakland following World War II led to piecemeal channeling of the many creeks flowing towards San Leandro Bay as well as construction of bridges along area road over those creeks. Among the bridges built was the one at Hegenberger Road just southwest of the Southern Pacific Railroad. Built around 1950, the bridge served along an ever increasingly busy road. During the 1960s, the route of Hegenberger Road was altered as a likely result of the Oakland Coliseum's construction. The Hegenberger overpass was built over the nearby railroad tracks and Baldwin Street was extended to the cul-de-sac created where Hegenberger formerly ran. The construction date of the Elmhurst Creek Bridge at Baldwin Street comes from the Alameda County local agency bridge log maintained by Caltrans.

The Elmhurst Creek Bridge at Baldwin Street retains much of its overall form and some features of its original construction. While Hegenberger Road's modifications have altered the bridge's original setting, the bridge retains most of its historic integrity. The structure, however, is not associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B). It also does not embody distinctive architectural or engineering qualities (Criterion C). Therefore, the Elmhurst Creek Bridge at Baldwin Street in Oakland does not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

690 and 692 Hegenberger Road *Map Reference #62*

According to Alameda County records, 692 Hegenberger Road was constructed in 1941. The building at 690 Hegenberger Road was added later and appears to have been constructed in the 1970s. The property is located near an area that was called Fitchburg (roughly San Leandro Bay to East 14^{th} Street, 66^{th} to 77^{th} Avenue). Originally established in the late 19^{th} century and subdivided in 1908 for residential development, the west end of Fitchburg near the Southern Pacific and Western Pacific Railroad lines instead developed with industrial and manufacturing uses. The 1951 and 1969 Sanborn Fire Insurance maps label the building at 692 Hegenberger

Road similarly. In 1951 the building is called an "auto freight depot." In 1969, it is called a "motor freight station."

While the buildings at 690 / 692 Hegenberger Road retain historic integrity, they are not associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B). They also do not embody distinctive architectural or engineering qualities (Criterion C). In addition, the building at 690 Hegenberger was constructed in the past fifty years and would need to be of “exceptional importance” to be eligible for listing in the National Register. It is not. Therefore, 690 and 692 Hegenberger Road do not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

698 Hegenberger Road *Map Reference #63*

According to Alameda County Records the warehouse at 698 Hegenberger Road was constructed in 1951. Built near what was then referred to as Fitchburg (roughly San Leandro Bay to East 14^{th} Street, 66^{th} to 77^{th} Avenues), it is labeled on the 1951 Sanborn Fire Insurance map as an office/war and on the 1969 as “paints,” possibly operating as paint storage for a nearby business or the adjacent Southern Pacific Railroad. While Fitchburg had been subdivided early in the 20^{th} century for residential development, industrial and commercial ventures dominated development in the southwest end of the area. These development pressures led to creek channeling and bridge construction over area creeks, such as the bridge over Elmhurst Creek just south of 698 Hegenberger Road constructed in the 1950s. When constructed this property was situated directly on Hegenberger Road. In the 1960s Hegenberger Road overpass was constructed over the Southern Pacific Railroad lines, likely in response to increase traffic due to the newly built Oakland Coliseum. The warehouse building at 698 Hegenberger seems to have had some recent modifications, such as the stucco siding, but its windows, for example, appear to be original.

While the building at 698 Hegenberger Road may retain aspects of its historic integrity, it is not associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B). It also does not embody distinctive architectural or engineering qualities (Criterion C). Therefore, 698 Hegenberger Road in Oakland does not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

807 75th Avenue *Map Reference #66*

When the City of Oakland studied this property in 1994, it reviewed records pertaining to both buildings on this property. The older of the two is the metal sided warehouse. It appears to have been constructed in 1939 (permit issued April 4, 1939) and built by T.G. Silviera for B.B. Maynard & Company. The brick building on this property was permitted for construction around 1944 as a shop building for the Underground Construction Company. This building was originally thirty by sixty feet in plan and is now half as long. According to Sanborn Fire Insurance maps, its partial demolition appears to have occurred in the 1950s or 1960s. Built in an area called Fitchburg at the time (roughly San Leandro Bay to East 14th Street, 66th to 77th Avenues), these buildings are representative of localized industrial development as well as the building industry business in Oakland during World War II.

While the buildings at 807 75th Avenue retain some aspects of their historic integrity, neither are associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B). They also do not embody distinctive architectural or engineering qualities (Criterion C). Therefore, the property at 807 75th Avenue in Oakland does not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

867 75th Avenue *Map Reference #68*

Located in an area once called Fitchburg (roughly San Leandro Bay to East 14th Street, 66th to 77th Avenue), the house at 867 75th Avenue is the last remaining example of a whole line of small houses constructed in the 1920s across the street from the Boiler Tank and Pipe Company Plant. These small houses may have been built for workers at the plant. The small bungalow-style house at 867 75th Avenue, built in 1925, represents the type of residential development that continued in Fitchburg – alongside the manufacturing, industrial, and commercial enterprises – into the mid-20th century.

While the house at 867 75th Avenue retains some aspects of its historic integrity, it is not associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B). It also does not embody distinctive architectural or engineering qualities (Criterion C). Therefore, 867 75th Avenue in Oakland does not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

728 73rd Avenue *Map Reference #71*

By the 1890s the area roughly bound today by San Leandro Bay to the west, East 14th Street to the east, 66th Avenue to the north, and 77th Avenue to the south was referred to as Fitchburg, named for one Alameda's founders Colonel Henry S. Fitch. First established around a short-lived railroad stop called Fitch's Station, the area was located between the more established villages around the railroad stations at Fruitvale to the north and Elmhurst to the south. Fitchburg was subdivided into homestead lots in 1908, but did not develop quickly as a residential neighborhood partly because it was not well serviced by local street cars, i.e. the Key System trolleys. Residential development occurred mostly to the northeast of San Leandro Street.

Of the scattered dwellings in the southwest end of Fitchburg adjacent to the railroad lines, the first house built at 728 73rd Avenue was constructed around 1908 prior to Oakland's annexation of Fitchburg in 1909 and maybe before the area's official subdivision. The second building – described at the time as a one story cottage – was permitted for construction in 1913. The property owner was Matilta Beckwith, but according to city directories she did not resided at this location. When the Public Works Administration conducted an Oakland building study in 1936, 728 73rd Avenue had only had minor repairs done to it. It had running water, but no refrigeration, and its white occupants, one of which was over 65, had lived there for twenty-four years. It is unclear when specific alterations were made to this property. Most recently, the property was used as dog kennel. It is now owned by the city redevelopment agency.

While the buildings at 728 73rd Avenue retain some aspects of their historic integrity, neither are associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B). They also do not embody distinctive architectural or engineering qualities (Criterion C). Therefore, the buildings at 728 73rd Avenue in Oakland do not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

Arroyo Viejo Creek bridge at San Leandro Street   Map Reference #72

Industrial and commercial development pressures in south Oakland following World War II led to piecemeal channeling of the many creeks flowing towards San Leandro Bay and to building and upgrading bridges along area roads over those creeks. Among those water ways channeled during this period was the Arroyo Viejo Creek in the area referred to as Fitchburg (roughly San Leandro Bay to East 14^{th} Street, from 66^{th} to 77^{th} Avenue). Fitchburg Sanitary District records indicate that plans were drawn up for channeling the Arroyo Viejo Creek and Lion's Creek in the late 1940s. Sanborn Fire Insurance maps of the area along San Leandro Street show that the Arroyo Viejo Creek followed along the path of 74^{th} Avenue in the 1930s and was dry in summer. The Western Pacific Railroad had a wooden trestle across the creek along Snell Street that was likely built when the line first went through in 1910. The bridge taking San Leandro Street over the Arroyo Viejo Creek was in place by 1951.

While Arroyo Viejo Creek channel and bridge at San Leandro Street retain some aspects of historic integrity, they are not associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B). They also do not embody distinctive architectural or engineering qualities (Criterion C). Therefore, the Arroyo Viejo Creek Bridge at San Leandro Street in Oakland does not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

7001 San Leandro Street   Map Reference #77

The permanent buildings at 7001 San Leandro Street were constructed roughly between 1949 and 1952 in an area that was then still called Fitchburg. Labeled as such back into the late 19^{th} century, Fitchburg was officially subdivided in 1908 a year before the City of Oakland annexed this area of Alameda County. Rather than developing for residential purposes, manufacturing and commercial development took hold in the southwest end of Fitchburg. The Sanborn Fire Insurance map of the area around San Leandro Street, from 1925 updated in 1951, shows some small dwellings in the area along with various manufacturing business, metal works, and other commercial/industrial type development. This type of development continued along both San Leandro Street and Hegenberger Road in the late 1940s and 1950s.

The front unit at 7001 San Leandro Street was permitted for construction in 1949 with the large two story warehouse permitted for construction in 1952. During the 1950s the property was used by a new and second hand pipe valve and machine company. By 1969, the property was occupied by the Beall Trailer Company. Currently, the property is occupied by steel products company called Coliseum Steel. Its manager stated that Coliseum Steel's predecessor, Cypress Steel (note the old name on the side of the two story warehouse), inhabited the property from the 1970s into the 1990s. The semi-permanent office buildings on the property were added much after the other buildings, likely in the 1980s or 1990s.

While the building at 7001 San Leandro Street retains some aspects of its historic integrity, it is not associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B), and it does not embody distinctive architectural or engineering qualities (Criterion C). Therefore, 7001 San Leandro Street in Oakland does not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

6925 San Leandro Street *Map Reference #78*

The windows frame manufacturing plant at 6925 San Leandro Street was constructed roughly between 1949 and 1955 in an area that was then still called Fitchburg. Labeled as such back into the late 19th century, Fitchburg was officially subdivided in 1908 a year before the City of Oakland annexed this area of Alameda County. Rather than developing for residential purposes, manufacturing and commercial development took hold in the southwest end of Fitchburg. The Sanborn Fire Insurance map of the area around San Leandro Street, from 1925 updated in 1951, shows some small dwellings in the area along with various manufacturing business, metal works, and other commercial/industrial type development. This type of development continued along both San Leandro Street and Hegenberger Road in the late 1940s and 1950s. The central core of the building at 6925 San Leandro Street, with its tall monitor, was first permitted for construction in 1949. The western wings were added in 1950 and 1953, and the eastern addition was added in 1955.

While the building at 6925 San Leandro Street retains much of its historic integrity, it is not associated with significant historical events (Criterion A) or the lives of any known significant historical persons (Criterion B), and it does not embody distinctive architectural or engineering qualities (Criterion C). Therefore, 6925 San Leandro Street in Oakland does not appear to meet the criteria for listing in the National Register of Historic Places.

This resource was also evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. This historic property does not appear to meet the significance criteria as outlined in these guidelines.

6. FINDINGS AND CONCLUSIONS

JRP Historical Consulting Services prepared this Historic Architectural Survey Report (HASR) to evaluate the potential of the BART Oakland Airport Connector project to affect buildings and structures that are eligible for listing on the National Register of Historic Places and the California Register of Historical Resources. The purpose of this document is to comply with applicable sections of the National Historic Preservation Act and the implementing regulations of the Advisory Council on Historic Preservation as these pertain to federally-funded undertakings and their impacts on historic properties as well as CEQA regulations.

While most of the eleven survey population properties retain aspects of historic integrity, none of them appear to meet the criteria of significance for listing in the National Register of Historic Places. They also do not appear to meet the criteria to be considered historical resources for the purposes of CEQA as outlined in Section 15064.5(1)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code.

All of the buildings and structures within the APE for this study have been recorded and evaluated using the standards outlined by the OHP in its pamphlet *Instructions for Recording Historical Resources* (March 1995). The eleven buildings or structures built in or before 1955 are recorded and evaluated on the attached DPR 523 forms found in Appendix C. The two tables in Appendix A list the properties within the APE constructed in or before 1955 and after 1955.

7. REFERENCES

Published Sources

Board of Port Commissioners. *Oakland Municipal Airport*. 1925.

California Office of Historic Preservation. "Instructions for Nominating Historical Resources to the California Register of Historical Resources." August 1997.

California Public Resources Code. Sections 4850 through 4858.

Conmy, Peter Thomas. *The Beginnings of Oakland, California, A.U.C.*, Oakland: Oakland Public Library, 1961.

Cummings, G.A. and E.S. Pladwell. *Oakland, A History.* Oakland: Grant D. Miller Mortuaries, Inc., 1942.

Durham, David L. *California's Geographic Names*. Clovis, CA: Word Dancer Press, 1998.

Johnson, Marilynn S. *The Second Gold Rush: Oakland and the East Bay in World War II.* Berkeley: University of California Press, 1993.

Oakland City Directories: 1910, 1943, and 1967.

Oakland Public Library. "An Oakland Chronology." 2nd edition, 1952.

Oakland Telephone Books: 1910, 1914, 1926, 1945, and 1955.

Oakland Tribune Special Edition. "Dedication of New Airport Facilities." September 14, 1962.

Oakland Tribune Yearbook. "Oakland Municipal Airport, Famous Starting Point of World Flights Add to International Renown." 1932.

Oakland Tribune Yearbook. "Oakland Municipal Airport – Pioneer in Aviation." 1936.

Rather, Lois. *Oakland's Image: A History of Oakland, California*. Oakland: Rather Press, 1972.

Scott, Mel. *The San Francisco Bay Area: A Metropolis in Perspective*. Berkley: University of California Press, 2nd edition, 1985.

Thompson & West. *New Historical Atlas of Alameda County, California, 1878*. Fresno: Valley Publishers reprint, 1976.

U.S. Department of the Interior, National Park Service. "Guidelines for Evaluating and Nominating Properties that have Achieved Significance within the Last Fifty Years." *National Register Bulletin No. 22*. Washington, DC: US Government Printing Office, 1979, revised 1990 and 1996.

______________________________. "How to Apply the National Register Criteria for Evaluation." *National Register Bulletin 15.* Washington DC: US Government Printing, 1991, revised 1995.

Maps

Sanborn Fire Insurance Maps of Oakland, 1925 revised 1951; 1930s; 1952 revised 1969; and 1959

United States Geological Survey. Concord, California 15' Quadrangle map, 1941.

__________________________. East Oakland, California 7.5' Quandrangle maps, 1959, 1959 photorevised 1968, and 1959 photorevised 1980.

__________________________. San Leandro, California 7.5' Quandrangle maps, 1947, 1959, 1959 photorevised 1968, 1959 photorevised 1968 and 1973, and 1959 photorevised 1980.

Unpublished Sources

Archaeological / Historical Consultants, "Archaeological and Historical Properties Reconnaissance of the Airport Roadway Project, Alameda County, California," submitted to Woodward-Clyde Consultants.

California Historic Resources Information Service. Northwest Information Center Records. Sonoma State University, Rohnert Park, California.

Caltrans Division of Structure Maintenance and Investigations. "Log of Bridges on State Highways." Available online at http://www.dot.ca.gov/hq/structur/strmaint/, accessed June 2000.

City of Oakland, building permit records.

City of Oakland Community & Economic Development Agency. Fitchburg Sanitary District Records.

____. Oakland Cultural Heritage Survey Records.

Environmental Science Associates, Inc., "Cultural Resources: Existing Environmental Conditions, Metropolitan Oakland International Airport, Technical Memorandum #10 (draft)," prepared for the Port of Oakland, April 1991.

First American Real Estate Solutions database.

"Guide to Oakland History – the Sites – Before the Oakland Coliseum" and "Building a Stadium," online at http://info.berkeley.edu/courses/is290-2/f98/oaklandkids/sites/coliseum/, accessed June 2000.

Marvin, Betty. "Unreinforced Masonry Buildings in Oakland, 1850-1948." Oakland Cultural Heritage Survey, 1995.

Personal interviews by Christopher McMorris with Margret Vales and Mary Ann Holgerson regarding 72 98th Avenue on June 6, 2000.

Port of Oakland, "Airport Development Program Final EIR," December 1997 (including Environmental Science Associates and Archaeological/Historical Consultants cultural resources studies).

Port of Oakland, "Oakland Airport Transit Connector, Environmental Impact Statement (draft)," March 1981.

Attachments

Appendix A:

Tables

Table 1: List of Survey Population Buildings and Structures Built in or before 1955

Map Ref#	APN	Address		Year Built
4	044-5020-003-47	72	98th Avenue	early 1950s
39	044-5076-001-00	410	Hegenberger Road	early 1950s
61	None	Elmhurst Creek Bridge at Baldwin Creek		ca. 1950
62	042-4318-003-00	690 / 692	Hegenberger Road	1941 / 1970s
63	042-4318-001-01	698	Hegenberger Road	1951
66	041-4162-030-00	807	75th Avenue	ca. 1939 / 1944
68	041-4162-023-01	867	75th Avenue	1925
71	041-4173-002-02 041-4173-002-03	728	73rd Avenue	ca. 1908 / 1913
72	None	Arroyo Viejo Creek Bridge at San Leandro Street		late 1940s
77	041-4170-001-02	7001	San Leandro Street	1949 / 1952
78	041-4060-010-03	6925	San Leandro Street	1949 - 1955

TOTAL SURVEY POPULATION: 11

Table 2: List of APE Properties Constructed after 1955

[Assessor Parcel Numbers (APN) were collected by EIP through the City of Oakland's Geological Information System and by JRP using the First American Real Estate Solutions database. Some APNs could not be located through these methods. Dates of construction were determined or approximated by use of City of Oakland Assessor records, historic maps, and visual evaluation in the field.]

Map Ref#	APN	Address		Year Built
1	042-4520-002-19	10019	Dolittle Drive	1980s
2	042-4520-002-23	10001	Dolittle Drive	1980s
3		66	Airport Access Road	1999
5	044-5020-003-65	82	98th Avenue	1977
6	044-5020-003-55	60	98th Avenue	1980
7		50	98th Avenue	1980
8	044-5020-004-02	2	Hegenberger Road	1988
9	044-5020-005-44	111	98th Avenue	1990s
10	044-5020-004-01	10	Hegenberger Road	1960
11	042-4410-001-09	1	Hegenberger Road	ca. 1970
12	044-5020-005-49	70	Hegenberger Road	1960s
13	044-5020-005-47	100	Hegenberger Road	1979
14	042-4410-002-02	99	Hegenberger Road	1960s
15	042-4410-001-09	8501	Pardee Drive	1980s
16	044-5020-005-42	145	98th Avenue	1990s
17	044-5020-005-42	110	Hegenberger Road	1969
18	042-4420-004-00	8520	Pardee Drive	1960s
19	044-5020-005-43	150	Hegenberger Road	1969
20		101	Hegenberger Road	1960s
21	044-5020-005-23	200	Hegenberger Road	1960
22	042-4420-005-00	201	Hegenberger Road	1960s
23	044-5020-005-12	240	Hegenberger Road	1960s
24	044-5020-001-12	250	Hegenberger Road	1990s
25		San Leandro Creek Bridge on Hegenberger Road at Leet Drive		1968
26	044-5077-005-01	280	Hegenberger Road	1980s
27	044-5077-004-03/ 044-5077-004-10	290	Hegenberger Road	1962
28		285	Hegenberger Road	1960s / 1990s
29	044-5077-004-04	294	Hegenberger Road	1990s
30		295	Hegenberger Road	1960s
31		300-350	Leet Drive	1990s
32	044-5077-004-08	296	Hegenberger Road	1960
33		301	Hegenberger Road	1990s
34		303	Hegenberger Road	1980s

Map Ref#	APN	Address		Year Built
35	044-5076-008-00	330	Hegenberger Road	2000
36	042-4425-013-03	333	Hegenberger Road	1967
37	044-5076-003-01	444	Hegenberger Road	1986
38	042-4425-012-07	405	Hegenberger Road	1980
40	042-4425-012-04	449	Hegenberger Road	1996 / 1960s
41	044-5078-001-01	460	Hegenberger Road	1976
42		451	Hegenberger Road	1960s / 1990s
43		Nimitz Freeway overpass, Hegenberger Road		1976 / 1996
44		8201	Oakport Street	ca.1970
45	042-4435-005-00	8001	Oakport Street	1980s
46	042-4323-007-05	500	Hegenberger Road	1960s
47	042-4323-008-06	8350	Edes Avenue	1975
48	042-4323-001-07	532	Hegenberger Road	1990s
49	042-4323-001-07	540	Hegenberger Road	1983
50	042-4328-008-01	8099	South Coliseum Way	1980s
51	042-4318-040-11	566	Hegenberger Road	1993 / 1960s
52	042-4318-041-05	580	Hegenberger Road	1969
53	042-4328-001-14	595	Hegenberger Road	1969
54	042-4328-001-14	601	Hegenberger Road	1980s
55	042-4318-041-02	600	Hegenberger Road	1960s
56	042-4318-046-01	640	Hegenberger Road	1980s
57	042-4318-013-04	646	Hegenberger Road	1970s
58	042-4328-001-16	659	Hegenberger Road	1960s
59	042-4318-004-02	678-680	Hegenberger Road	1980s
60	042-4328-001-20	675	Hegenberger Road	ca. 1970
64		Hegenberger Road Overpass		1966
65	041-4175-003-02	7531	San Leandro Street	1970s
67	041-4162-029-00	821	75th Avenue	1960s
69	041-4162-032-03	875	75th Avenue	1970s
70	041-4173-003-06	710	73rd Avenue	1960s
73	041-4172-001-03	7217	San Leandro Street	1970s
74	041-4164-024-03	7200	San Leandro Street	1968 - 1972
75 and 76	041-4172-002-02	7127	San Leandro Street	1970s / 1980s
79	041-4060-008-00	6905	San Leandro Street	1960s
80	041-4170-005-00	7001	Snell Street	1960s

TOTAL NON-SURVEY POPULATION PROPERTIES: 69

Appendix B:

Figures

Figure 1: Project Location

Figure 2: Project Vicinity

Figure 3-1: Area of Potential Effect

Figure 3-2: Area of Potential Effect

Figure 3-3: Area of Potential Effect

Figure 3-4: Area of Potential Effect

Appendix C:

DPR 523 Forms

DPR 523 Forms

Appendix D
Archaeological Survey Report

ARCHAEOLOGICAL SURVEY REPORT
BART CONNECTOR PROJECT
ALAMEDA COUNTY, CALIFORNIA

Prepared for:

Public Affairs Management
101 The Embarcadero, Suite 210
San Francisco, CA 94105

On Behalf of:

BART/FTA

Prepared by:

William Self Associates
P.O. Box 2192
Orinda, CA 94563
(925) 253-9070

September 2000

SUMMARY OF FINDINGS

This report identifies and evaluates archaeological resources in the Area of Potential Effect (APE) for the Bay Area Rapid Transit Oakland Airport Connector (BART Connector) Project (see Map Pocket). The project is intended to provide a dedicated transportation link between the BART Oakland Coliseum station and the Oakland Airport. The alternatives suggested for this project are discussed below *(text to be provided by EIP Associates).*

In compliance with Section 106 of the National Historic Preservation Act (as amended; 16 U.S.C. 470) and regulations contained in 36 CFR 800, this report identifies and evaluates archaeological resources in the APE according to criteria established for the National Register of Historic Places.

During February 2000, William Self Associates of Orinda, California conducted focused archival and records searches and a reconnaissance level field assessment of the project area. Three prehistoric archaeological sites are known to exist within or adjacent to the proposed APE for the project. Numerous previous cultural resource surveys have been conducted within or adjacent to the APE. Figures showing site locations and previous surveys are included in Appendix A; photographs of the existing site locations are included in Appendix B.

In lieu of definitive subsurface information on the three recorded prehistoric archaeological sites in the area, it is presumed that they are eligible to meet the criteria for the National Register. Avoidance of these resources is the preferred mitigation. Should avoidance not be possible, it will be necessary to conduct sufficient subsurface characterization of each potentially impacted site to make a formal National Register determination, and to develop an approach for subsequent data recovery, should characterization not prove to be acceptable mitigation on its own. Data recovery would focus on gathering enough information on a site to address research questions on the site's prehistory (such questions would be developed prior to data recovery.) Recovered artifacts would be analyzed, cataloged and curated, and a technical report of findings prepared for submittal to the various approving agencies. Native American consultation – through the Native American Heritage Commission in Sacramento is also advisable given the proximity of known prehistoric resources to the proposed project alignment.

If subsurface cultural materials are encountered during construction, CEQA Section 15064.5 requires that work in the immediate area must be halted until a qualified archaeologist can evaluate the nature and significance of the find and make mitigation recommendations if warranted.

TABLE OF CONTENTS

FIGURES
(attached)

PHOTOGRAPHS
(attached)

1.0 INTRODUCTION

During February 2000, William Self Associates of Orinda, California conducted focused archival and records searches and a reconnaissance level field assessment of the BART Connector project area (Figure 1). Three prehistoric archaeological sites are known to exist within or adjacent to the proposed APE for the project. Numerous previous cultural resource surveys have been conducted within or adjacent to the APE. Historic Resources Inventory forms for the known cultural resources are included in Appendix A; photographs of the existing site locations are included in Appendix B.

2.0 PROJECT LOCATION AND DESCRIPTION

The proposed BART Connector would offer transit service between the Oakland Coliseum BART Station and Oakland International Airport (OIA). An Environmental Impact Report/Environmental Impact Statement (EIR/EIS) is being prepared on the Connector project. The Federal Transit Administration (FTA) is the lead agency for the EIS, and BART is the lead agency for the EIR. The EIR/EIS is evaluating three transportation alternatives:

- No Action Alternative, consisting of continued use of the existing AirBART shuttle buses.
- Automated Guideway Transit (AGT) Alternative, consisting of automated, driverless transit vehicles traveling in an exclusive guideway that would be separate from vehicular traffic along the route.
- Quality Bus Alternative, which would consist of low-floor, 60-foot articulated buses that would include a pre-paid fare collection system and priority right-of-way at key intersections.

Proposed AGT and Quality Bus Alignment. The alignment for the AGT and Quality Bus alternatives would generally follow Hegenberger Road and Airport Drive. The AGT station at the Coliseum end of the alignment would be located west of and along the Hegenberger Road overcrossing and straddle San Leandro Street. The AGT would travel toward the airport on its own guideway located in the median of Hegenberger Road, over Doolittle Drive, along the east side of Airport Drive, and straight through the current airport parking area to the airport terminal (see APR map). The AGT guideway would be approximately 16 feet above street level. The only segment where the AGT alignment is expected to be below grade is adjacent to the Doolittle interchange where it would be in-tunnel and then transition to an at-grade configuration along the Lew Galbraith Golf Course. This change in the vehicle alignment is necessary for the system to be below a runway approach glide path defined by the Federal Aviation Administration for aircraft safety.

The Quality Bus Alternative would introduce expanded and improved bus service within the existing Hegenberger Road and Airport Drive right-of-way. A street-level station stop at the Coliseum BART Station under the Hegenberger overcrossing would be integrated with the Bart paid area and a covered walkway would extend to the curb where the bus loading and unloading would occur. The quality bus service would make use of signal preemption at intersections along Hegenberger Road. In addition, a dedicated lane would be constructed in front of the airport terminal leading to the airport station within the proposed parking garage.

Alignment Design Options. In addition to the proposed median alignment, the environmental evaluation will consider several design options for the AGT Alternative:

1) Alignment West of Hegenberger Road Median. In order to avoid the transitions from the median of Hegenberger Road to its western side (necessary at the Union Pacific Railroad crossing and the I-880 crossing), an AGT alignment located entirely along the west side of Hegenberger Road between San Leandro Street and Doolittle Drive is proposed. Between the Union Pacific Railroad overcrossing and I-880, this alignment would place the guideway columns at the curbside along Hegenberger Road. South of I-880, this alignment would be located west of Hegenberger Road's curb, sidewalk, and landscaped area.

2) Intermediate Stations. Two intermediate stations were evaluated. The locations of these stations are the intersection of Hegenberger Road and Edgewater Drive and the intersection of Hegenberger Road and Doolittle Drive.

3.0 SOURCES CONSULTED

A record search was conducted at the California Historic Resources Information System, Northwest Information Center, Sonoma State University on February 18, 2000 (File #00-116). All recorded archaeological sites and previous cultural resource surveys within one-quarter mile either side of the linear APE were identified on topographic maps of the area (Figure 2). Additional sources consulted for this report include the United States Department of Interior's National Register of Historic Places (1966-1991), California Inventory of Historic Places (California State Office of Historic Preservation 1976), and the California Historical Landmarks (California State Office of Historic Preservation 1982). Materials were also gathered at the University of California at Berkeley's Historic Map Center. Early historic land plats (1857; 1871), Thompson & West Atlas Maps of Alameda County (1878), U.S. Geological Survey topographic maps (1899; 1915; 1942; 1942) provided limited additional historic information on the land uses within the project area (Figures 3-5).

Eleven cultural resource surveys have been conducted within one-quarter mile of the APE. Five of these were conducted either by Caltrans or for highway-related or roadway improvement projects. The remainder is associated with airport or municipal projects. References to the work includes the following: Baker (1993), Baker and Shoup (1990a, b), Chavez (1977; 1979a, b; 1985; 1990), Melandry (1977), Smith (1993), and Sutton (1978).

Three previously known archaeological sites (Nelson #321, 322 and 323) were identified within or adjoining the APE (Figure 3). The Northwest Information Center has no site records or other information of any kind on file in association with these sites. Nels Nelson, a researcher from UC Berkeley, recorded the sites in the early 20th Century.

4.0 BACKGROUND

4.1 Environment The BART Connector Project, which lies generally within the geomorphic province of the Coastal Range, is situated in a biotic zone known as the Coastal Prairie. Once dominated by coastal live oak and grasses, most vegetation within the urban landscape are recent imports into the community. The immediate project area is principally an alluvial plain created by the Oakland Hills to the east, and the low-lying lands that were once adjacent to the San Francisco Bay. The western portions of the project area were intertidal lands, some of which have been subject to filling to their modern-day grade. The elevation of the project area varies from near sea level to about 30 feet at the eastern project limits. The project area receives 20-25 inches of rain per year, most of it occurring between October and March. December, January, and February are generally the rainiest months. Temperatures range from a January mean minimum temperature of 40° F to a July mean maximum temperature of 76° F. Although the project area lies in the ancestral home of Tule Elk, pronghorn antelope, and grizzly bear, few, if any, larger mammals still inhabit the area (Beck and Haase 1974: Maps 3 through 10). Light industry and commercial uses dominate the landscape at present, and the area is crossed by several large transportation routes, including Interstate 880.

Figures 4-6 show the proposed alignment on maps dating from 1878, 1899 and 1942. The historic marshland in the project area is readily visible on the southwestern portions of the project alignment.

4.2 Ethnography At the time of historic contact, the project area was occupied by the Costanoan or Ohlone Indians of the Penutian language stock. There is a considerable body of ethnographic literature about these people; what follows is a brief summary of the ethnography of the area and is intended to provide a general background only. For a more extensive review see Bocek (1986), Kroeber (1925), Levy (1978), and Milliken (1983).

The terms Costanoan and Ohlone are used interchangeably in much of the ethnographic literature. Modern descendants of the Costanoan prefer to be known as Ohlone, a name derived from the *Oljón* tribelet which occupied the San Gregorio watershed in San Mateo County (Bocek 1986:8). In the following discussion the term "Costanoan" is used to describe the linguistic associations of the Ohlone and "Ohlone" is used to describe the people themselves and their lifeways.

Although the term Costanoan is derived from the Spanish word Costaños, or "coast people," its application as a means of identifying this population is based in linguistics. The Costanoans spoke a language now considered one of the major subdivisions of the Miwok-Costanoan, which belonged to the Utian family within the Penutian language stock (Shipley 1978:82-84). Costanoan actually designates a family of eight languages. These languages were spoken by groups in the area from the Pacific Coast to the Diablo Range and from San Francisco to Point Sur. Although linguistically linked as a "family," the eight Costanoan languages actually comprised a continuum in which neighboring groups could understand each other. Beyond neighborhood boundaries, however, a group's language was unrecognizable to the others (Levy 1978:485-486).

On the basis of linguistic evidence, it has been suggested that the ancestors of the Ohlone arrived in the San Francisco Bay area about 500 A.D., having moved south and west from the Sacramento-San

Joaquin Delta region. The ancestral Costanoan displaced speakers of a Hokan language and were probably the producers of the artifact assemblages that constitute the *Augustine Pattern* described below (Levy 1978:486).

The eight Costanoan language groups were subdivided into smaller village complexes or tribal entities. Each tribal entity was an independent political group, occupying specific territories defined by physiographic features. Although each tribal group had one or more permanent villages, their territory contained numerous smaller camp sites used as needed during a seasonal round of resource exploitation (Levy 1978: 487). The people who occupied the project area in 1770 belonged to a tribal group called *lisyan*. The *lisyan*, who spoke a language of the same name, were a group with a population of approximately 2,000 people (Levy 1978:485).

Within the tribal group, extended families lived in domed structures thatched with grass, tule, wild alfalfa, ferns or carrizo (Levy 1978:492). Semi-subterranean sweat houses were built into pits excavated in stream banks and covered with a structure supported by the bank. Tule rafts, propelled by double-bladed paddles similar to those that were used in the Santa Barbara Island region, were used to navigate across San Francisco Bay (Kroeber 1925:468).

Tribal group leadership was provided by a chief, who inherited the position patrilineally and who could be either a man or a woman. The chief and a council of elders served mainly as community advisers. Specific responsibility for feeding visitors, providing for the impoverished, and directing ceremonies, hunting, fishing and gathering activities fell to the chief. Only in times of warfare was the chief's role as absolute leader recognized by tribal group members (Levy 1978:487). Warfare was quite common in Ohlone culture and usually centered around territorial disputes. Battles were waged with other Ohlone groups as well as with the Esselen and the Salinan tribes to the south, and the Northern Valley Yokuts to the east (Levy 1978).

Music, ritual and myth were extensive in Ohlone life. Song was employed in the telling of myths, in hunting and courtship rituals, and in other ceremonial activities. Musical instruments were typically whistles made of bird bone and flutes made of alder wood; rattles of split alder and cocoons were also used (Levy 1978:490).

Mussels were an important staple in the Ohlone diet as were the acorns of the coast live oak, valley oak, tanbark oak and California black oak. Seeds, berries, roots, grasses, as well as the meat of deer, elk, grizzly, sea lion, rabbit, and squirrel also contributed to the diet. Careful land management through controlled burning served to insure a plentiful and reliable source of all grasses, seeds, and berries (Kroeber 1925; Levy 1978).

The arrival of the Spanish in the San Francisco Bay Area in 1775 led to the rapid demise of Native California populations. Diseases, declining birth rates, and the effects of the mission system served to eradicate the aboriginal lifeways. Brought into the missions, the surviving Ohlone, along with former neighboring groups of Esselen, Yokuts, and Miwok, were transformed from hunters and gatherers into agricultural laborers (Levy 1978; Garaventa 1983). With abandonment of the mission system and the Mexican takeover in the 1840s, numerous ranchos were established. What few Native Californians remained were then forced, by necessity, to work for the ranchos. Although the native lifestyle declined during this period in the 1800s, considerable interest in recent years has seen a resurgence in some aspects of traditional cultural Ohlone lifestyle among tribal descendants (see Cambra, et al. 1996).

4.3 Archaeology There is much debate as to the niche of the San Francisco Bay Area in regional cultural schemes. Historically, the debate centers on whether Bay Area prehistoric cultural patterns are totally separate from, parallel to, or convergent with the cultural evolutions of the Lower Sacramento region. Bickel (1981:6-11) presents a detailed historical analysis of the changes in thinking about the Bay Area's place in regional culture history over the years. Further analysis of the various cultural interrelationships can be found in Hughes (1994), Fredrickson (1993) and Elsasser (1986).

The chronological sequence for central California and the Lower Sacramento Valley begins with the *Windmiller Pattern* (Fredrickson 1973). Sites from this period date from about 4,500 to 3,500 before present (B.P.). Although earlier sites no doubt exist, sites from the "Paleo-Indian Period," dating from about 12,000 to 8,000 B.P., and sites from an unnamed phase dating from about 8,000 to 4,500 B.P., are thought to be buried under Holocene alluvial deposits and are not well documented in this part of California (Ragir 1972). Scholars have suggested that *Windmiller* sites are associated with an influx of peoples from outside of California who brought with them an adaptation to river-wetland environments (Moratto 1984:207).

Windmiller sites are often situated in riverine, marshland and valley floor settings on small knolls above prehistoric seasonal floodplains. The variety of plant and animal resources in the immediate area would have attracted populations intent on making efficient use of such resources. Most *Windmiller* sites have contained burials in what may be cemeteries. Typically, the remains are extended ventrally, oriented towards the west, and contain copious amounts of mortuary artifacts. These artifacts often include large projectile points (spear or dart points) and a variety of fishing paraphernalia such as net weights, bone hooks, and spear points, as well as the vertebrate faunal remains of large and small mammals. Seed-grinding implements at the sites show that gathering and processing of seed resources was also common. Other artifacts such as charmstones, ochre, quartz crystals, *Olivella* and *Haliotis* shell beads in association with burial patterning and grave-good distribution suggest trade and a degree of ceremonialism may have been practiced.

The subsequent *Berkeley Pattern* (previously part of the "Middle Horizon") covers a period from about 3,500 to 1,500 B.P. in the San Francisco Bay region. This pattern overlaps somewhat with *Windmiller* attributes at the beginning and with Late Prehistoric attributes at the end. *Berkeley Pattern* sites are much more common and well documented, and therefore better understood, than *Windmiller* sites. The sites are distributed in more diverse environmental settings, although a riverine focus is common.

Deeply stratified midden deposits (resulting from generations of occupation) are common to *Berkeley Pattern* sites, as are an abundance of milling and grinding stones for processing vegetal resources. Projectile points are progressively smaller and lighter over time, culminating in the introduction of the bow-and-arrow during the late prehistoric period. As mentioned above, although there are shared traits with *Windmiller* manifestations, artifacts unique to *Berkeley Pattern* sites include slate pendants, steatite beads, stone tubes and ear ornaments, and burial techniques

utilizing variable directional orientation, flexed body positioning, and a general reduction of mortuary goods (Fredrickson 1973; Moratto 1984).

The late prehistoric period (formerly the "Late Horizon") ranges from about 950 to 150 B.P. This period, characterized as the *Augustine Pattern* (Fredrickson 1973), is typified by intensive fishing, hunting and gathering (particularly acorns), a large population increase, increased trade and exchange networks, increases in ceremonial and social attributes, and the practice of cremation (in addition to flexed burial). Certain artifact types also typify the pattern: bone awls for use in basketry manufacture, small notched and serrated projectile points indicative of use of the bow-and-arrow, occasional pottery, clay effigies, bone whistles, and stone pipes. The *Augustine Pattern* and the late prehistoric period can be characterized as the apex of Native American cultural development in this part of California.

4.4 History Additional information on the history of the area can be found in the Historic Architectural Survey Report appended to the HPSR for the BART CONNECTOR Project.

4.4.1 The Spanish and Mexican Periods: 1777-1848 During the Spanish period, the general project area would have been under the auspices of Mission San Jose. Founded in 1797, Mission San Jose was a considerable distance from the project site, approximately 30 miles south of the present-day City of Oakland.

The project region was originally part of Rancho San Antonio, which stretched from San Leandro to El Cerrito on the San Francisco Bay, and inland to the hills. The land was granted to Luis Maria Peralta in 1820, although Don Luis never made his home on the Rancho, but resided in San Jose. The four sons of Don Luis lived on the Rancho, building one of the first adobe structures in the East Bay in what is now the Fruitvale District of Oakland (at 2511 34th Avenue at Paxton Ave). None of the original structure remains, however, several adobe bricks from the building have been incorporated into a home built by one of the Peralta descendants living in San Leandro (Hoover, et al.990:9).

The bulk of the immense land grant was carved into smaller pieces and allocated to Anglo squatters during the post Gold-Rush years, as all of the Rancho lands in California were contested in American courts of law. Don Luis Peralta died in 1851, and the Peralta descendants were allocated small tracts of land in what was once perhaps the most valuable piece of real estate in northern California.

4.4.2 The American Period: 1848-1900 In 1848, California became a United States territory as a result of the Treaty of Guadalupe Hidalgo, which ended the war with Mexico. California was not formally admitted to the Union until 1850. Shortly after California was admitted as a state, in 1853, Alameda County was created from the western and southern sections of adjoining Contra Costa County.

The year 1848 also marked the beginning of the California Gold Rush, which brought a massive influx of immigrants to California from all parts of the world. California's 1848 population of less than 14,000 (exclusive of Native Californians) increased to 224,000 in four years.

4.4.3 The American Period: Twentieth Century

See the Historic Property Survey Report and Historic Architecture Survey Report for descriptive information on the development of the project region during the 20th Century.

5.0 FIELD METHODS

On February 28, 2000 WSA Principal William Self conducted a reconnaissance-level survey of the BART Connector Project alignment. No pedestrian archaeological survey of the area was undertaken, as the entire project route is either contained within a built environment, is covered with man-made fill, or similarly impacted by previous land uses. The purpose of the reconnaissance was to verify the setting of each of the three known archaeological sites in or near the APE and their relationship to the project alignment.

6.0 FINDINGS AND CONCLUSIONS

Three cultural resource properties are recorded within or adjoining the project APE (refer to Figure 3). These sites are referred to as “Nelson” sites and do not have permanent, assigned trinomials, nor are there any Primary or Archaeological Site Records on file at the Sonoma State clearinghouse for these sites. The plotted location (as shown on NWIC maps) was visited and the information on each site is presented below. Note that these sites were once in a near-shore environment, as much of the land west of the sites is man-made fill in what was once an intertidal or marsh setting.

6.1 FINDINGS

6.1.1: Site N-321 This site, recorded during Nels Nelson’s 1908-1910 survey of the San Francisco Bay region, is believed to be a shell midden. It is located at the intersection of San Leandro Street and 81st Avenue. The setting now comprises heavy industry (the Mother’s Cookie factory), city streets, and the elevated BART tracks. No portion of the site is visible, as the area has been completely modified from its original setting. The site is adjacent to the project APE, located about 1100 feet southeast of the Coliseum BART station.

6.1.2: Site N-322 This Nelson site is also believed to be a shell midden. No additional information or site record is available for the site. It is situated east of Hegenberger Avenue south of Baldwin Street and across from Collins Drive. It lies completely beneath the parking lot of a small commercial mall. No portion of the site is visible. As it is covered with an asphalt parking lot, there remains a strong potential for buried resources. Hegenberger Avenue passes either through or immediately adjacent to the plotted site location.

6.1.3: Site N-323 This site is also a Nelson shell midden, for which no record or other data are available. The current location is at the intersection of Hegenberger Avenue and Edes Ave, beneath a Shell gasoline filling station. Given the presence of numerous underground gasoline storage tanks on the filling station property, it is unclear how much of the original soil may be present in the site area. There is no doubt a potential for site components beneath Hegenberger and Edes Avenues and some parts of the filling station that do not contain underground tanks.

6.2 CONCLUSIONS

Typical archaeological survey methodology is of no value for assessment of resources on the BART Connector Project. The entire proposed project alignment is covered in asphalt roadway, concrete walkways, structures, landscaping, or similar uses. Those areas not 'built' (e.g., south of the Oakland Airport north field runways) are covered in historic or recent man-made fill. The three recorded Nelson prehistoric sites within or adjoining the APE are similarly covered with modern land uses, making verification or assessment of the resource impossible without subsurface exploration. Without the benefit of such subsurface data, it should be presumed that potentially significant components of the three sites remain within or near the recorded location. Given that the easternmost segments of the APE were once suitable for prehistoric (and historic) habitation (refer to Figures 4-6), there remains a possibility that potentially significant resources are intact beneath area roadways, structures, etc.

6.3 RECOMMENDATIONS

Of the three potentially significant archaeological sites that exist within or near the APE, one (N-321) is outside the proposed alignment at a sufficient distance to preclude direct impacts. Assuming the proposed alignment does not move within 500 feet of this site (requiring a relocation of nearly 600 feet to the east), there should be no impact on this property.

Sites N-322 and N-323, however, are within the APE and, depending upon final design of the alignment, could be in the path of construction. It is recommended that these sites be avoided during design of the BART Connector alignment. A qualified archaeologist should review the preliminary and final design to ensure that the sites are avoided to the extent possible. If it is necessary to construct the alignment within or immediately adjacent to either site area, then it is recommended that some suitable form of subsurface exploration be conducted either by a qualified archaeologist or with archaeological coordination (should, for example, geotechnical borings be made), so that subsurface characterization of the site(s) can be made in those areas where construction will occur. Should potentially significant cultural deposits be found during exploration, a Historic Properties Treatment Plan should be prepared, for submittal and approval by the State Historic Preservation Office, to address recovery of important data within the site prior to and during construction. The plan will describe the approach to the work, including a Research Design, methodology to be employed, artifact analysis and curation procedures, technical reporting requirements, and other pertinent aspects of the work. A Native American coordination plan should also be incorporated within the Treatment Plan should prehistoric human remains be discovered as part of the work.

If subsurface cultural materials are encountered during construction, CEQA Section 15064.5

requires that work in the immediate area must be halted until a qualified archaeologist can evaluate the nature and significance of the find and make mitigation recommendations if warranted.

7.0 BIBLIOGRAPHY

Baker, Suzanne

1993 Archaeological Survey of Portions of the Metropolitan Oakland International Airport 2002 Airport Development Program, Alameda County, California". Report no. S-15786 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, CA.

Baker, Suzanne and L. H. Shoup

1990a "Historic Properties Survey Report and Archaeological Survey of the 98th Avenue-Highway 880 Interchange Project, Oakland, Alameda County, California." Report no. S-12172 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, Ca.

1990b "Archaeological Survey of the 98th Avenue-Highway 880 Interchange Project, Oakland,, Alameda County, California." Report no. S-11843 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, CA.

Beck, Warren A. and Ynez D. Haase

1974 *Historical Atlas of California*. University of Oklahoma Press, Norman, Oklahoma.

Bickel, Polly M.

1981 San Francisco Bay Archaeology: Sites ALA-328, ALA-13 and ALA-12. Berkeley: *Contributions of the University of California Archaeological Research Facility*, 43.

Bocek, Barbara Rose

1986 *Hunter-Gatherer Ecology and Settlement Mobility Along San Francisquito Creek.* Ph.D. Dissertation, Stanford University, Stanford, CA.

California Department of Transportation, Division of Project Development

1992 *Environmental Handbook.* Volume II Cultural Resources. Caltrans, Sacramento, CA.

California State Office of Historic Preservation

1976 *California Inventory of Historic Places.* California Department of Parks and Recreation.

California State Office of Historic Preservation

1982 *California Historical Landmarks.* California Department of Parks and Recreation.

Cambra, R., A. Leventhal, L. Jones, L. Field, and N. Sanchez

1996 Archaeological Investigations at *Kaphan Umux* (Three Wolves) Site, CA-SCL-732: A Middle Period Prehistoric Cemetery on Coyote Creek in Southern San Jose, Santa Clara County, California. Report on file at Caltrans District 4

Offices, Oakland, CA.

Chavez, David
1977 "Preliminary Cultural Resources Assessment of the East Bay Municipal Utility District West Weather Facilities Overflow Project Facility Sites, Alameda and Contra Costa Counties, California." Report no. S-00779 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, Ca.

1979a "Cultural Resources Evaluation for the Oakland Airport Transit Connector EIS/EIR, Alameda County, California." Report no. S-01786 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, CA.

1979b "Supplement to Preliminary Cultural Resources Assessment of the East Bay Municipal Utility District West Weather Facilities Overflow Project Facility Sites, Alameda and Contra Costa Counties, California." Report no. S-12958 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, CA.

1985 "Cultural Resources Evaluation for the East Bay Municipal Utility District Infiltration/Inflow Project." Report no. S-07903 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, CA.

1990 "Cultural Resources Investigations for the Port of Oakland Phase I Dredging Cultural Resources Evaluation." Report no. S-12439 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, CA.

Elsasser, Albert B.
1986 *Part I: Review of the Prehistory of the Santa Clara Valley Region, California.* Coyote Press Archives of California Prehistory, 7:1-85.

Fredrickson, David
1993 *Cultures of the North Coast Ranges, California.* Ph.D. Dissertation. Davis: Department of Anthropology, University of California Davis.

1993 Archaeological Taxonomy in Central California Reconsidered. In R.E. Hughes, ed., *Toward A New Taxonomic Framework for Central California*. Berkeley: Contributions of the University of California Archaeological Research Facility.

Garaventa, Donna
1983 *Cultural Resources Survey Report: San Francisquito Creek Bridge Replacement Project. Located on Junipero Serra Boulevard, Santa Clara County - San Mateo,*

California. Basin Research Associates, Hayward, California.

Hoover, Mildred, Eugene Rensch, Ethel Rensch and William Abeloe
1990 *Historic Spots of California.* Stanford University Press, Stanford, CA. Revised edition by Douglas E. Kyle.

Hughes, Richard E.
1994 Toward a New Taxonomic Framework for Central California Archaeology. Essays by James A. Bennyhoff and David A. Fredrickson. Berkeley: *Contributions of the University of California Archaeological Research Facility, 15.*

Kroeber, Alfred L.
1925 *Handbook of the Indians of California*. California Book Company, Ltd. Berkeley, CA.

Levy, Richard
1978 Costanoan. In *Handbook of North American Indians*, Volume 8, California, Robert F. Heizer, ed., pp. 485-495. Smithsonian Institution, Washington.

Melandry, Mara
1977 "An Archaeological Survey Report for Widening on Route 61 in the City of Alameda, Post Miles 15.9/16.4." Report no. S-00490 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, CA.

Milliken, Randall
1983 *The Spatial Organization of Human Population on Central California's San Francisco Peninsula at the Spanish Arrival.* M.A. Thesis (Cultural Resources Management), Sonoma State University, Rohnert Park, CA.

Moratto, M. J.
1984 *California Archaeology*. Academic Press, Orlando.

Ragir, S.R.
1972 The Early Horizon in Central California Prehistory. Berkeley: *Contributions of the University of California Archaeological Research Facility* 15.

Smith, Michael, Suzanne Baker and Mark Brack
1993 "Archaeological Reconnaissance of the Airport Roadway Project, Alameda County, California." Report no. S-12439 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, CA.

Sutton, Carol and Cindy Desgrandchamp
1978 "An Archaeological Survey Report of a Proposed Road Widening, 04-ALA-61, P.M.

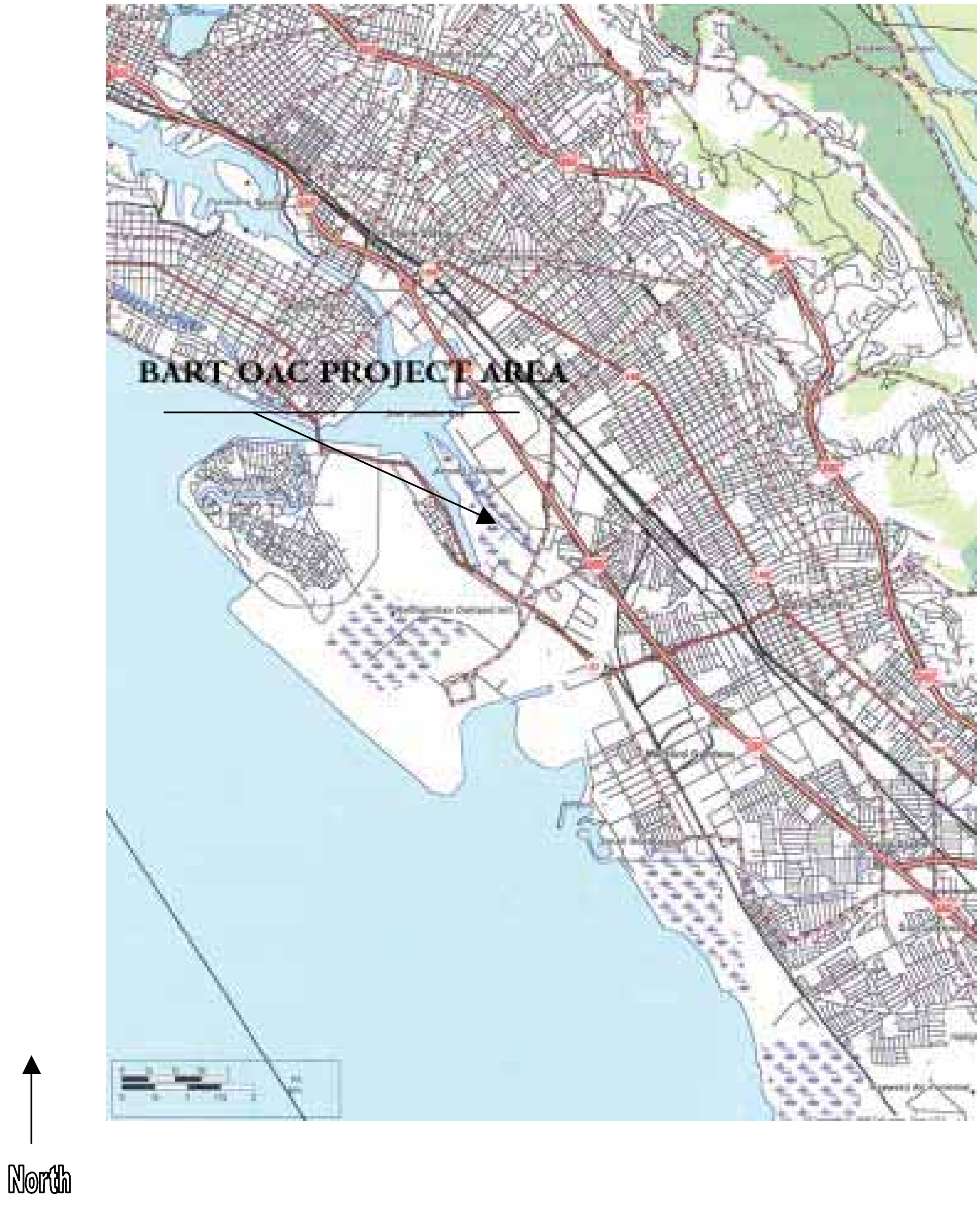
14.8/15.9." Report no. S-01308 on file at California Historical Resources Information System, Northwest Information Center at Sonoma State University, Rohnert Park, CA.

United States Department of Interior
1991 *National Register of Historic Places: 1966 - 1991.* California Historic Resources File System, Northwest Information Center, Sonoma State University.

United States Geological Survey
1899 Hayward Quadrangle California. 15 Minute Series (Topographic) Map

1942 Hayward Quadrangle California. 7.5 Minute Series (Topographic) Map

FIGURES

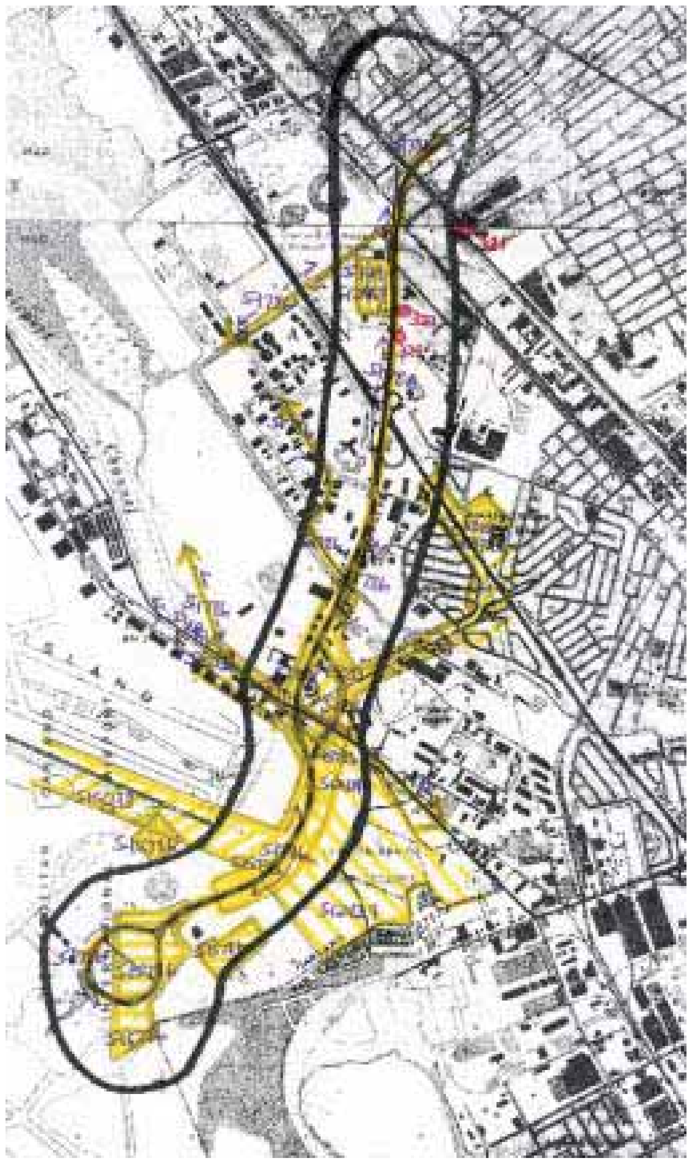


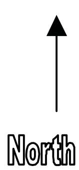
BART OAC Project Vicinity Map

BART OAC PROJECT

Figure 1

William Self Associates



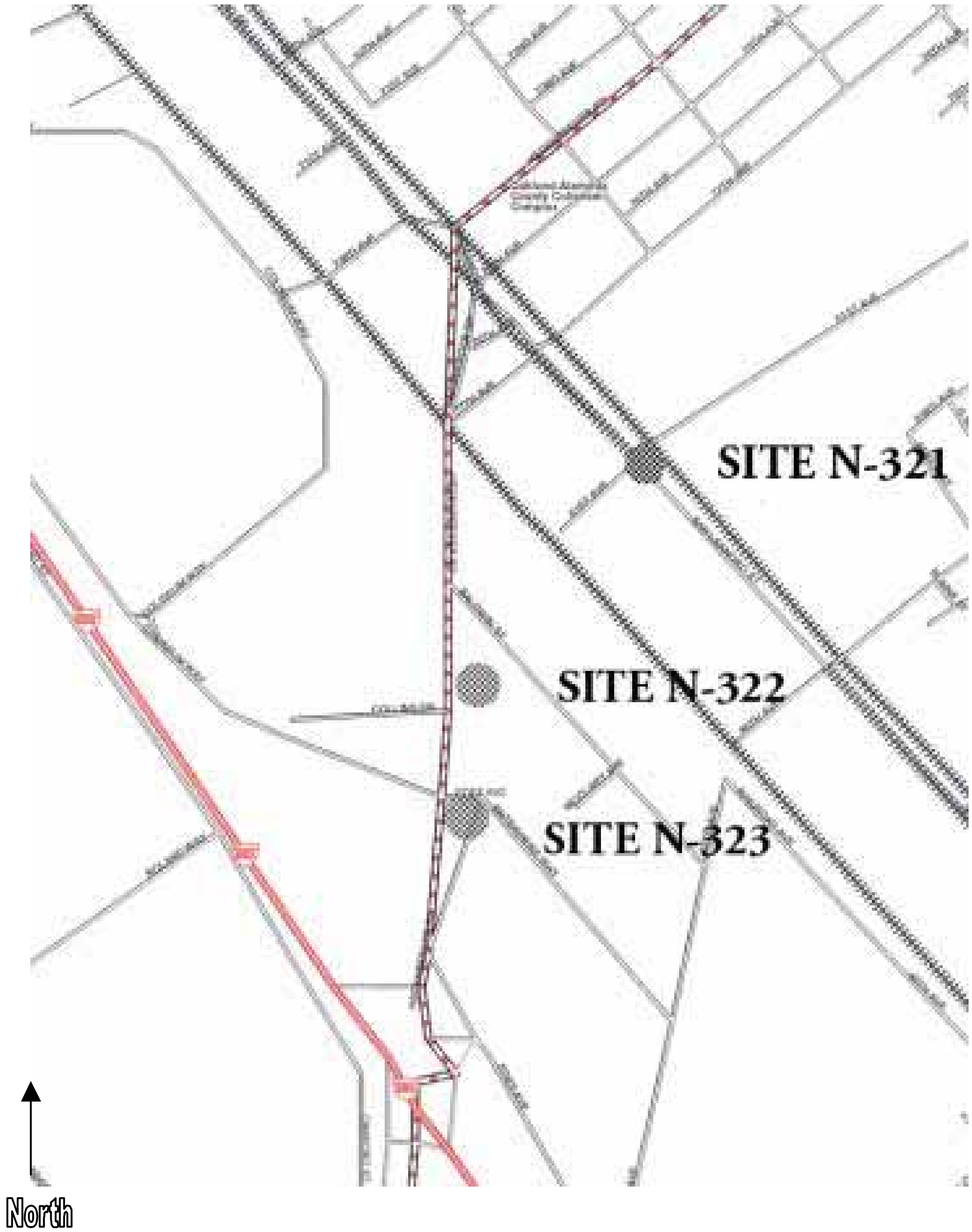


Record Search Results from NWIC
Surveys in yellow – number indicated; sites in red. Scale 1:2000.

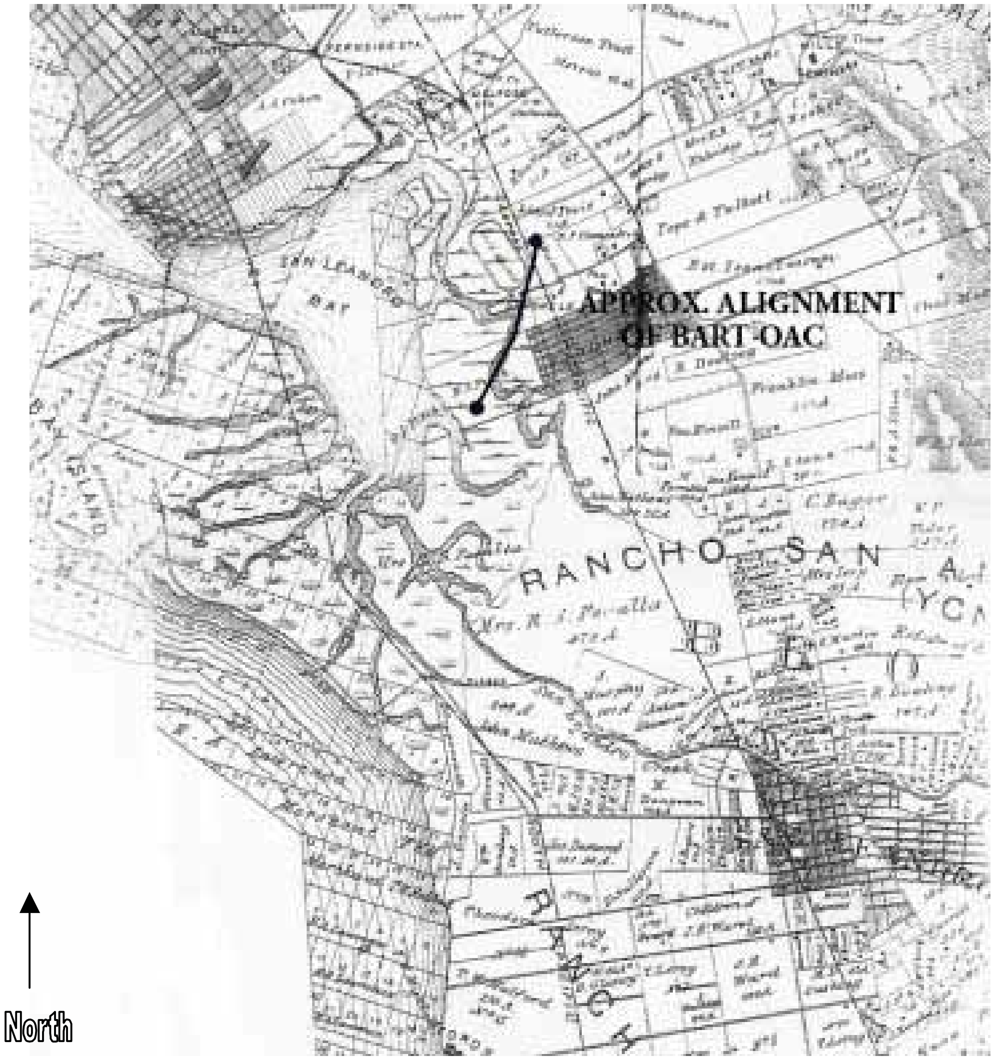
BART OAC PROJECT

Figure 2

William Self Associates

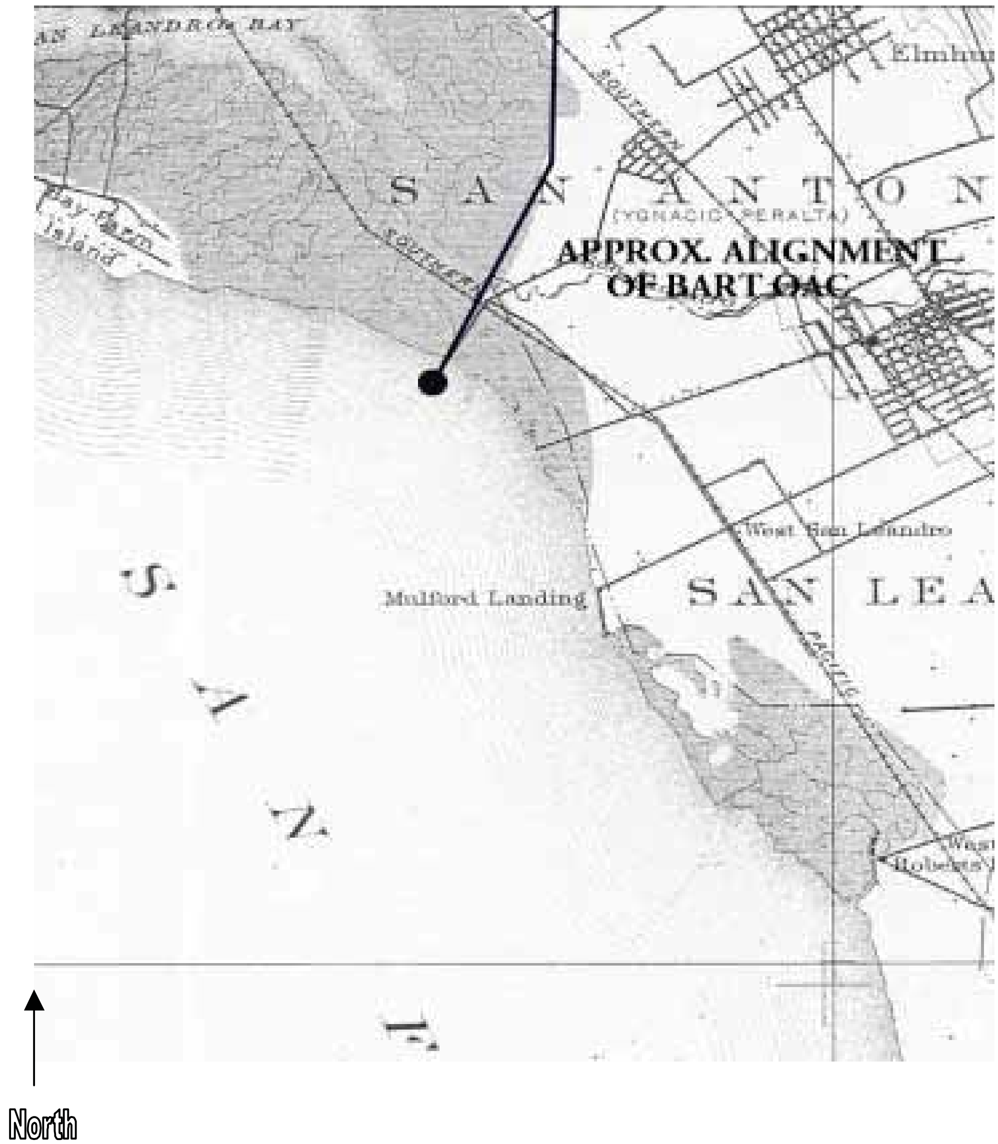


Archaeological site locations Locations based on NWIC data; Scale 1:600	**BART OAC PROJECT** **Figure 3** William Self Associates



Source: Thompson & West 1878

1878 Map of Project Region not to scale	**BART OAC PROJECT** **Figure 4** William Self Associates

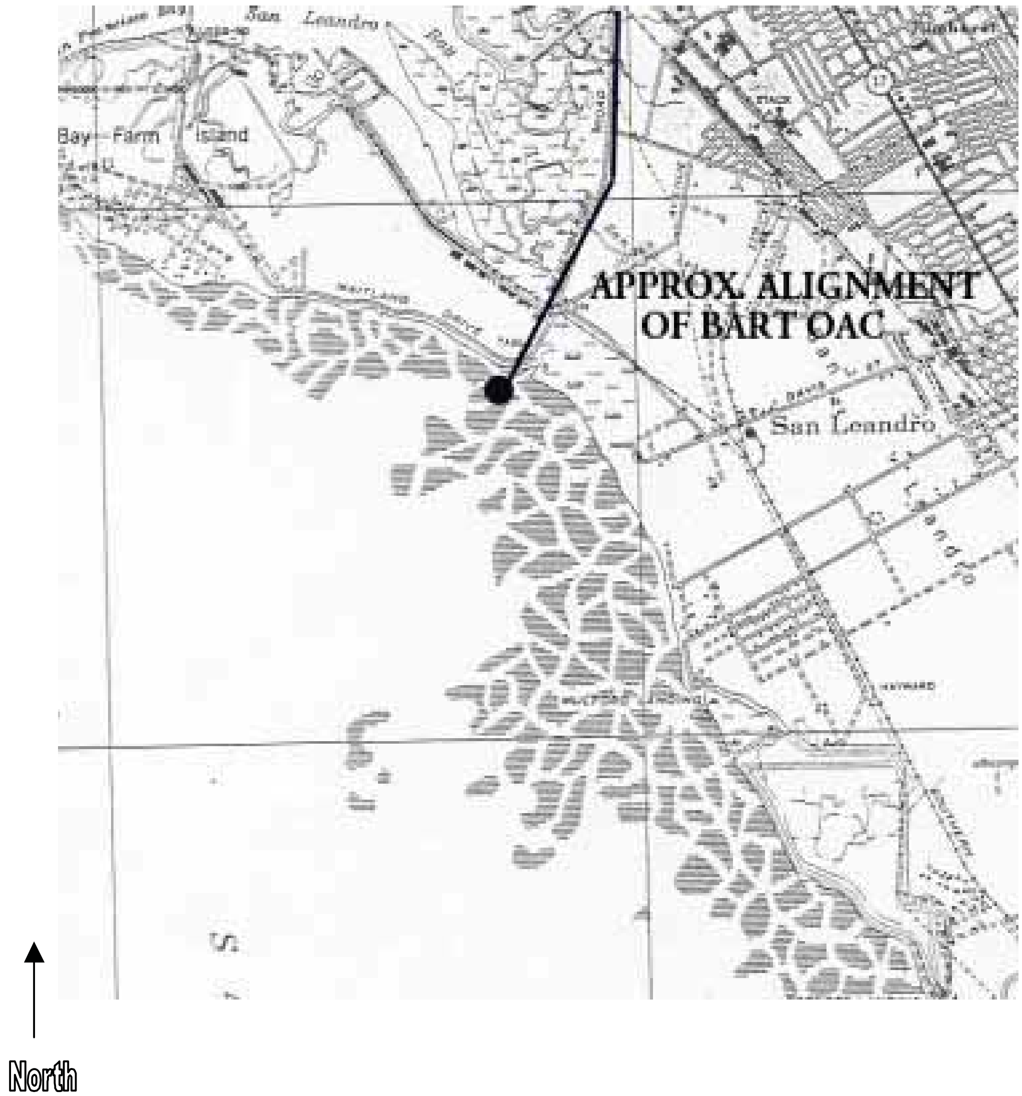


1899 Map of Project Region
not to scale

BART OAC PROJECT

Figure 5

William Self Associates



1942 Map of Project Region
not to scale

BART OAC PROJECT

Figure 6

William Self Associates

PHOTOGRAPHS

Photo 1. Area of Site N-321 looking west at rail and BART tracks toward intersection of San Leandro Street and 81st Ave.

Photo 2. Area of Site N-322 looking east through mall parking lot. NWIC plot of site indicates it is beneath asphalt parking area in foreground. Hegenberger Ave. is behind photographer.

1

Photo 3. Area of Site N-323 looking west across Edes Ave. toward Shell station, beneath which the site is believed to exist. Hegenberger Ave. is to the right of the station.

Appendix E
Biological Resources

For each of the biotic habitats, the vegetation is described first, followed by a description of wildlife. Vegetation types are defined by substrate, hydrologic regime, and the composition of plant species adapted to these environmental conditions. In contrast, wildlife habitats may be composed of one or more vegetation types that support different animal needs, such as foraging, nesting, or shelter from predators. Vertebrates are not as restricted to certain vegetation types as are invertebrates, which often require specific plants and assemblages for various stages of their life cycles.

Sources of information used in the preparation of this section include a reconnaissance level site survey conducted by EIP biologists on February 11, 2000, and incorporation of previous biological studies conducted at OIA including Biotic Habitats and Wetlands Report, Airport Roadways Project (Harvey, 1993); Biological Assessment, Airport Roadways Project; the Final EIR/EIS Oakland Harbor Deep-draft Navigation Improvements (Harvey, 1994); Airport Development Program, Final EIR (the Port of Oakland, 1997); Airport Roadway Project, Draft EIR (the Port of Oakland, 1993); the Burrowing Owl Management Plan (the Port of Oakland, 1999); and the most recent jurisdictional wetland delineation by Huffman and Chow (Port of Oakland, 2000).

Ruderal Upland (Weedy Vegetation)

Vegetation. Ruderal vegetation is characteristic of highly disturbed areas with altered and compacted surface soils and is dominated by invasive non-native annual and perennial weedy plant species such as fennel (*Foeniculum vulgare*), pampas grass (*Cortaderia jubata*), iceplant (*Carpobrotus edulis*), Russian thistle (*Salsola kali*), ripgut brome (*Bromus diandrus*), black mustard (*Brassica nigra*), and bur clover (*Medicago polymorpha*).

Wildlife. Several resident bird species that typically occur in ruderal habitat include mourning dove (*Zenaida macroura*), loggerhead shrike (*Lanius ludovicianus*), European starling (*Sturnus vulgaris*), savannah sparrow (*Passerulus sandwichensis*), red-winged (*Agelaius phoeniceus*) and brewer's (*Euphagus cyanocephalus*) blackbirds, western meadowlark (*Sturnella neglecta*), brown-headed cowbird (*Molothrus ater*), house finch (*Carpodacus mexicanus*), and American (*Carduelis tristis*) and lesser goldfinches (*Carduelis psaltria*). Winter visitors include white-crowned (*Zonotrichia leucophrys*) and golden-crowned (*Zonotrichia atricapilla*) sparrows. Raptors such as the northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), and American kestrel (*Falco sparverius*) forage over grasslands on the site.

Several species of mammals occasionally forage in this habitat. These include red fox (*Vulpes vulpes*), Virginia opossum (*Didelphis virginiana*), black-tailed hare (*Lepus californicus*), California ground squirrel (*Spermophilus beecheyi*), and Botta's pocket gopher (*Thomomys bottae*) (Harvey, 1994).

Urban Areas (Industrial/Residential/Landscape Vegetation)

Vegetation. Urban habitat is largely composed of homes, businesses, roadways, sidewalks, and parking lots, with non-native horticultural plant species used in landscaping and non-native annual grasses and forbs. Plantings include street trees such as Russian olive (*Olea europa*), eucalyptus (*Eucalyptus* spp.), and pine (*Pinus* spp.). The urban habitat makes up most of the project site.

Wildlife. Most wildlife species found in urban habitats in the project corridor are common and widespread in the region. Some of the most common species are introduced. Typical resident urban birds include rock dove ("pigeon") (*Columba livia*), mourning dove, Anna's hummingbird (*Calypte anna*), western scrub jay (*Aphelocoma coerulescens*), bushtit (*Psaltriparus minimus*), American robin (*Turdus migratorius*), European starling, spotted towhee (*Pipilo erythrophthalmus*), California towhee (*Pipilo crissalis*), song sparrow (*Melospiza melodia*), brewer's blackbird, house and lesser goldfinches, northern flicker (*Colaptes auratus*), ruby-crowned kinglet (*Regulus calendula*), hermit thrush (*Catharus guttatus*), cedar waxwing (*Bombycilla cedrorum*), yellow-rumped warbler (*Dendroica coronata*), and dark-eyed junco (*Junco hyemalis*). Summer visitors include Allen's hummingbird (*Selasphorus sasin*) and cliff swallow (*Hirundo pyrrhonota*) and winter residents include white, golden-crowned, and fox (*Passerella iliaca*) sparrows.

Only a few species of mammals occur in the urban habitat within the project corridor, all of which are common and widespread in the region. These species include the Virginia opossum, California ground squirrel, Botta's pocket gopher, Norway rat (*Rattus norvegicus*), and raccoon (*Procyon lotor*) (Harvey, 1994).

Tidal Creeks and Drainages (Coastal Salt Marsh Vegetation)

Vegetation. The proposed project alignment crosses several tidal creeks and drainages. San Leandro Creek, the largest drainage traversing the study area, drains a portion of Anthony Chabot Regional Park and empties into the southern end of San Leandro Bay. It crosses the project corridor at the median strip of the Hegenberger Road bridge. Arroyo Viejo Creek, which empties into Damon Slough, is parallel to and west of the southbound on-ramp from San Leandro Street to Hegenberger Road. Elmhurst Channel crosses the project corridor just west of the intersection of Baldwin Street and Hegenberger Road. Portions of two smaller drainages north of Interstate 880 and west of Hegenberger Road lie within the project corridor.

These creeks and drainages are brackish to saline and have unvegetated mud bottoms. The banks are lined with typical coastal salt marsh vegetation that exhibits a vertical zonation of species. Cordgrass (*Spartina foliosa*) and pickleweed (*Salicornia virginica*) dominate the lower portions of the banks. Salt grass (*Distichilis spicata*), marsh gumplant (*Grindelia stricta* var. *angustifolia*), and alkali heath (*Frankenia salina*) dominate the upper portions of the banks. Where the creeks and drainages pass under roadways, the vegetation is greatly reduced because of lack of sunlight. In addition, the northern end of Arroyo Viejo Creek, between the southbound ramp to Hegenberger Road and San Leandro Road, is lined with concrete and is unvegetated.

Wildlife. These tidal areas support several species of birds, but abundance and species diversity is limited by the relatively small extent of suitable habitat. Species described as occurring in San Leandro Creek (Harvey, 1994) that would also be expected to occur in the other tidal creeks and drainages in the project corridor include pied-billed grebe (*Podilymbus podiceps*), great blue heron (*Ardea herodias*), great (*Casmerodius albus*) and snowy (*Egretta thula*) egrets, black-crowned night heron (*Nycticorax nycticorax*), mallard (*Anas platyrhynchos*), American coot (*Fulica americana*), killdeer (*Charadrius vociferus*), greater yellowlegs (*Tringa melanoleuca*), least sandpiper (*Calidris minutilla*), black phoebe (*Sayornis nigricans*), various swallows, American pipit (*Anthus rubescens*) and song sparrow.

Mammals expected to occur in this habitat include the California vole (*Microtus californicus*), house mouse (*Mus musculus*), and Norway rat. Raccoons and Virginia opossums may forage along and in the creeks and drainages. The Yuma myotis (*Myotis yumanensis*) and big brown bat (*Eptesicus fuscus*) may occasionally forage for insects over the creeks and drainages.

Non-tidal Seasonal Drainages (Salt Marsh Vegetation)

Vegetation. Non-tidal drainages occur in two areas on the project corridor; a small ditch that ends at the east side of Hegenberger Road just north of San Leandro Creek, and a narrow ditch along the east side of Airport Drive extending south from Doolittle Drive almost to Air Cargo Road. This habitat supports plant species typical of non-tidal salt marsh vegetation. The ditch along the east side of Airport Drive is highly disturbed and is dominated primarily by saltgrass. The drainage just north of San Leandro Creek is dominated by pickleweed and marsh gumplant, a sensitive plant species (CNPS List 4).

Wildlife. Avian species associated with this habitat include a variety of water birds which frequent the ditches and a number of landbirds that utilize the emergent vegetation and habitat along the ditch banks. Resident species typically found in and along the channels in the project corridor include great blue heron, great and snowy egrets, green-backed heron (*Butorides striatus*), black-crowned night, green-winged teal (*Anas crecca*), mallard, cinnamon teal (*Anas cyanoptera*), northern shoveler (*Anas clypeata*), gadwall (*Anas strepera*), American coot, killdeer, black phoebe, marsh wren (*Cistothorus palustris*), northern mockingbird (*Mimus polyglottos*), loggerhead shrike, savannah , song, white-crowned and golden-crowned sparrows, red-winged blackbird, and house finch. Migrants and/or winter visitors include sora (*Porzana carolina*) and Virginia rails (*Rallus limicola*), greater yellowlegs, least sandpiper, short- (*Limnodromus griseus*) and long-billed (*Limnodromus scolopaceus*) dowitchers, common snipe (*Gallinago gallinago)*, American pipit, orange-crowned (*Vermivora celata*), yellow, yellow-rumped, and Wilson's (*Wilsonia pusilla*) warblers, common yellowthroat (*Geothlypis trichas*)(various races), and Lincoln's sparrow (*Melospiza lincolnii*) (Harvey, 1994).

Non-tidal Permanent Wetland (Drained Salt and Brackish Marsh Vegetation)

Vegetation. Non-tidal permanent wetlands occur on the Lew Galbraith Golf Course just south of Doolittle Drive and along the east side of Airport Drive at the fuel farm marsh. Permanent wetland is dominated by salt marsh vegetation such as pickleweed, salt grass, and alkali heather occur within the project corridor. These areas may not have been covered with salt marsh originally, as they appear to be a salt marsh that has been drained. This habitat is typically dominated by pickleweed, salt grass, and alkali heather. Brackish marsh species such as brassbuttons (*Cotula coronopifolia*), Mediterranean barley (*Hordium marium* ssp. *gussoneanum*), and alkali bulrush (*Scirpus robustus*) occur where ponded runoff reduces surface salinity (Port of Oakland, 1997).

Wildlife. Permanent wetland habitats support a relatively diverse avifauna. Typical resident species associated with this habitat include great blue heron, great and snowy egrets, green-backed heron, black-crowned night heron, Canada goose (*Branta canadensis*), mallard, northern pintail (*Anas acuta*), cinnamon teal, northern shoveler, gadwall, northern harrier, American coot, killdeer, black-necked stilt (*HiHimantopus mexicanus*), American avocet (*Recurvirostra americana*), sora, Virginia rail, California (*Larus californicus*) and western (*Larus occidentalis*) gulls, marsh wren, savannah and song sparrows, common yellowthroat, and red-winged blackbird. Summer visitors include cliff, rough-winged (*Stelgidopteryx serripennis*), and barn (*Hirundo rustica*) swallows that often forage over these wetlands or use mud from them for nest construction. Migrant and/or winter-resident species include black-bellied plover (*Pluvialis squatarola*), greater and lesser yellowlegs, willet (*Catoptrophorus semipalmatus*), whimbrel (*Numenius phaeopus*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), western (*Calidris mauri*) and least (*Calidris minutilla*) sandpipers, dunlin (*Calidris alpina*), short- and long-billed dowitchers, common snipe, ring-billed (*Larus delawarensis*), herring (*Larus argentatus*), Thayer's (*Larus thayeri*) and glaucous-winged (*Larus glaucescens*) gulls, tree (*Tachycineta bicolor*) and violet-green (*Tachycineta thalassina*) swallows, American pipit, and Lincoln's sparrow.

Mammals that have the potential to occur in permanent wetland on the project site include herbivores such as the California vole, house mouse, and Norway rat, and carnivores such as raccoon (Harvey, 1994).

Table E-1
Plant Species Observed in the Vicinity* of the Connector Project Corridor

Scientific Name	***Common Name***
Acacia melanoxylon	blackwood acacia
Ambrosia acanthocarpa	sand bur
Arundo donax	giant reed
Atriplex semibaccata	Australian salt bush
Atriplex triangularis	fat hen
Avena barbata	hairy wild oat
Baccharis douglasii	Douglas' false willow
Baccharis pilularis	coyote brush
Brassica campestris	field mustard
Brassica nigra	black mustard
Bromus carinatus	California brome
Bromus diandrus	ripgut grass
Bromus mollis	soft chess
Bromus rubens	foxtail brome grass
Cammissonia cheiranthifolia	breach primrose
Carduus pycnocephalus	Italian thistle
Carpobrotus chilensis	ice plant
Cuscuta sp.	dodder
Centaurea solstitialis	yellow star-thistle
Chenopodium sp.	goosefoot
Cirsium vulgare	bull thistle
Conyza canadensis	horseweed
Cortaderia selloana	pampasgrass
Cotula coronopifolia	brassbuttons
Convolvulus sp.	bindweed
Cynodon dactylon	Bermuda grass
Cyperus eragrostis	tall umbrella sedge
Distichlis spicata	salt grass
Epilobium ciliatum	willow herb
Erodium cicutarium	red-leaf filaree
Erodium moschatum	white-leaf filaree
Eschscholzia californica	California poppy
Eucalyptus globulus	blue gum
Foeniculum vulgare	sweet fennel
Frankenia salina	alkali heath
Genista monspessilanus	French broom

Table E-1 ***Plant Species Observed in the Vicinity* of the Connector Project Corridor***	
Scientific Name	***Common Name***
Geranium dissectum	cutleaf
Geranium molle	soft geranium
Gnaphalium chilense	conttonbatting cudweed
Grindelia stricta var angustifolia	marsh gumplant
Hedera helix	English ivy
Heliotropium curassavicum	seaside heliotrope
Hemizonia luzulaefolia	rush-leaved tarweed
Hemizonia pungens	common spike weed
Heterotheca grandiflora	telegraph weed
Hordeum marinum ssp. *gussonianum*	Mediterranean barley
Hordeum marinum ssp. *leporinum*	farmer's foxtail
Jaumea carnosa	jaumea
Juncus balticus	baltic rush
Juniperus sp.	juniper
Lactuca serriola	prickly lettuce
Lastenia chrysostoma	goldfields
Leptochloa fascicularis	sprangletop
Lolium perenne	perennial ryegrass
Lotus corniculatus	birdsfoot trefoil
Lupinus sp.	lupine
Lythrum hyssopifolia	hyssop loosestrife
Malva sp.	mallow
Medicago polymorpha	burr clover
Melilotus albus	white sweet clover
Melilotus indica	Indian sweet clover
Myoporum laetum	lollypop tree
Olea sp.	Russian olive
Parapholis incurva	sicklegrass
Picris echioides	bristly ox-tongue
Pinus sp.	pine
Piptantherum millacea	smilo grass
Plantago lanceolata	English plantain
Poa annua	annual bluegrass
Polygonum aviculare	common knotweed
Polypogon monspeliensis	rabbitfoot grass
Pyracantha sp.	pyracantha
Raphanus sativa	wild radish
Rubus discolor	Himalayan blackberry
Rumex crispus	curley dock
Salicornia virginica	common pickleweed

Table E-1 ***Plant Species Observed in the Vicinity* of the Connector Project Corridor***	
Scientific Name	***Common Name***
Salix sp.	willow
Salsola tragus	Russian thistle
Scirpus robustus	alkali bulrush
Senecio vulgaris	common groundsel
Silybum marianum	milk thistle
Solidago sp	goldenrod
Sonchus oleraceus	common sow-thistle
Spartina foliosa	cordgrass
Spergularia marina	salt marsh sandspurry
Stenotaphrum secundatum	St. Augustine grass
Trifolium dubium	little hop clover
Triglochin maritima	seaside arrow-grass
Typha augustifolia	narrow-leaved cattail
Typha latifolia	common cattail
Vulpia myuros	rattail fescue
Xanthium strumarium ssp. *canadenesis*	Cocklebur

* Species listed here are compiled from observation during EIP's site visit February 11, 2000, and from H.T. Harvey and Associates, Biological Assessment, Airport Roadway Project, Oakland, Alameda County, May 1994.

Table E-2

Vertebrate Species Observed in the Vicinity* of the Connector Project Corridor

Common Name	Scientific Name
BIRDS	
Pied-billed Grebe	*Podilymbus podiceps*
Clark's Grebe	*Aechmophorus clarkii*
American White Pelican	*Pelecanus erythrorhyncho*
Double-crested Cormorant	*Phalacrocorax auritus*
Great Blue Heron	*Ardea herodias*
Great Egret	*Casmerodius albus*
Snowy Egret	*Egretta thula*
Black-crowned Night Heron	*Nycticorax nycticorax*
Canada Goose	*Branta canadensis*
Green-winged Teal	*Anas crecca*
Mallard	*Anas platyrhynchos*
Nothern Pintail	*Anas acuta*
Cinnamon Teal	*Anas cyanoptera*
Northern Shoveler	*Anas clypeata*
Gadwall	*Anas strepera*
American Wigeon	*Anas americana*
Canvasback	*Aythya valisineria*
Lesser Scaup	*Aythya affinis*
Common Goldeneye	*Bucephala clangula*
Bufflehead	*Bucephala albeola*
Ruddy Duck	*Oxyura jamaicensis*
Turkey Vulture	*Cathartes aura*
White-tailed Kite	*Elanus caeruleus*
Northern Harrier	*Circus cyaneus*
Cooper's Hawk	*Accipiter cooperi*
Red-tailed Hawk	*Buteo jamaicensis*
American Kestrel	*Falco sparverius*
American Peregrine Falcon **	*Falco peregrinus anatum*
Ring-necked Pheasant	*Phasianus colchicus*
American Coot	*Fulica americana*
Black-bellied Plover	*Pluvialis squatarola*
Western Snowy Plover **	*Charadrius alexandrinus nivosus*
Semipalmated Plover	*Charadrius semipalmatus*
Killdeer	*Charadrius vociferus*
Black-necked Stilt	*Himantopus mexicanus*

Table E-2

Vertebrate Species Observed in the Vicinity* of the Connector Project Corridor

Common Name	*Scientific Name*
American Avocet	*Recurvirostra americana*
Greater Yellowlegs	*Tringa melanoleuca*
Willet	*Catoptrophorus semipalmatus*
Spotted Sandpiper	*Actitis macularia*
Whimbrel	*Numenius phaeopus*
Long-billed Curlew	*Numenius americanus*
Marbled Godwit	*Limosa fedoa*
Ruddy Turnstone	*Arenaria interpres*
Western Sandpiper	*Calidris mauri*
Least Sandpiper	*Calidris minutilla*
Dunlin	*Calidris alpina*
Short-billed Dowitcher	*Limnodromus griseus*
Long-billed Dowitcher	*Limnodromus scolopaceus*
Common Snipe	*Gallinago gallinago*
Red-necked Phalarope	*Phalaropus lobatus*
Bonaparte's Gull	*Larus philadelphia*
Mew Gull	*Larus canus*
Ring-billed Gull	*Larus delawarensis*
California Gull	*Larus californicus*
Hering Gull	*Larus argentatus*
Thayer's Gull	*Larus thayeri*
Western Gull	*Larus occidentalis*
Glaucous-winged Gull	*Larus glaucescens*
Forster's Tern	*Sterna forsteri*
Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*
Burrowing Owl	*Speotyto cunicularia*
White-throated Swift	*Aeronautes saxatalis*
Anna's Hummingbird	*Calypte anna*
Allen's Hummingbird	*Selasphorus sasin*
Northern Flicker	*Colaptes auratus*
Black Phoebe	*Sayornis nigricans*
Say's Phobe	*Sayornis saya*
Western Kingbird	*Tyrannus verticalis*
Horned Lark	*Eremophila alpestris*
Tree Swallow	*Tachycineta bicolor*
Violet-green Swallow	*Tachycineta thalassina*
Northern Rogh-winged Swallow	*Stelgidopteryx serripennis*
Cliff Swallow	*Hirundo pyrrhonota*

Table E-2

Vertebrate Species Observed in the Vicinity* of the Connector Project Corridor

Common Name	*Scientific Name*
Barn Swallow	*Hirundo rustica*
Western Scrub Jay	*Aphelocoma coerulescens*
American crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Oak Titmouse	*Parus inornatus*
Bushtit	*Psaltriparus minimus*
Bewick's Wren	*Thryomanes bewickii*
House Wren	*Troglodytes aedon*
Marsh Wren	*Cistothorus palustris*
Ruby-crowned Kinglet	*Regulus calendula*
Hermit Thrush	*Catharus guttatus*
American Robin	*Turdus migratorius*
Wrentit	*Chamaea fasciata*
Northern Mockingbird	*Mimus polyglottos*
American Pipit	*Anthus rubescens*
Cedar Waxwing	*Bombycilla cedrorum*
Loggerhead Shrike	*Lanius ludovicianus*
European Starling	*Sturnus vulgaris*
Orange-crowned Warbler	*Vermivora celata*
Yellow Warbler **	*Dendroica petechia*
Yellow-rumped Warbler	*Dendroica coronata*
Common Yellowthroat	*Geothlypis trichas*
Saltmarsh Yellowthroat	*G.t. sinuosa*
Wilson's Warbler	*Wilsonia pusilla*
Spotted Towhee	*Pipilo erythrophthalmus*
California Towhee	*Pipilo crissalis*
Chipping Sparrow	*Spizella passerina*
Savannah Sparrow	*Passerulus sandwichensis*
Fox Sparrow	*Passerella iliaca*
Song Sparrow	*Melospiza melodia*
Alameda Song Sparrow	*Melospiza melodia pusillula*
Lincoln's Sparrow	*Melospiza lincolnii*
Golden-crowned Sparrow	*Zonotrichia atricapilla*
White-crowned Sparrow	*Zonotrichia leucophrys*
Dark-eyed Junco	*Junco hyemalis*
Red-winged Blackbird	*Agelaius phoeniceus*
Tricolored Blackbird **	*Agelaius tricolor*
Western Meadowlark	*Sturnella neglecta*
Brewer's Blackbird	*Euphagus cyanocephalus*

Table E-2

Vertebrate Species Observed in the Vicinity* of the Connector Project Corridor

Common Name	Scientific Name
Brown-headed Cowbird	*Molothrus ater*
House Finch	*Carpodacus mexicanus*
Lesser Goldfinch	*Carduelis psaltria*
American Goldfinch	*Carduelis tristis*
MAMMALS	
Viginia Opossum	*Didelphis virginiana*
Black-tailed Hare	*Lepus californicus*
California Ground Squirrel	*Spermophilus beecheyi*
Botta's Pocket Gopher	*Thomomys bottae*
California Vole	*Microtus californicus*
Norway Rat	*Rattus norvegicus*
Red Fox	*Vulpes vulpes*
Feral Dog	*Canis domesticus*
Gray Fox	*Urocyon cinereoargenteus*
Raccoon	*Procyon lotor*
Long-tailed Weasel	*Mustela frenata*
Black-tailed Deer	*Odocoileus hemionus*

* Species listed here are compiled from observations during EIP's site visit February 11, 2000, and from H.T. Harvey and Associates, Biological Assessment, Airport Roadway Project, Oakland, Alameda County, May 1994.
** Species observed during Harvey (1994) surveys but not observed within the Corridor project area by either Harvey (1994) or EIP (2000). Refer to Appendix Table 3.10-3 for details.

Table E-3 ***Sensitive Species Considered for the Connector Project Corridor***						
Common Name	***Scientific Name***	***Status Federal, State, CNPS***	***General Habitat***	***Survey Information***	***Project/Potential Occurrence***	***Level of Impact***
Mammals						
Salt Marsh Harvest Mouse	*Reithrodontomys raviventris*	FE, SE, SFP	Tidal and non-tidal salt to fresh pickleweed marshes.	Surveys conducted in 1985[1] , 1989/1990[2] , and 2001[7] on OIA property adjacent to or within Corridor.	Not expected, marginal habitat present in Fuel Farm Marsh, not observed in OIA surveys.	No impact.
Riparian Woodrat	*Neotoma fuscipes riparia*	FPE, SSC	Riparian areas of trees and brush along the San Joaquin, Stanislaus, and Tuolumne rivers.	No suitable habitat. Surveys not required.	Not expected, site not within range of subspecies.	No impact.
Pacific Western Big-eared Bat	*Corynorhinus (Plecotus) townsendii townsendii*	FSC, SSC	Roost in caves, tunnels, rock or cliff crevices, and abandoned buildings.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
Greater Western Mastiff Bat	*Eumops perotis californicus*	FSC, SSC	Roost in caves, tunnels, rock or cliff crevices, and abandoned buildings.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
Long -eared Myotis Bat	*Myotis evotis*	FSC	Roost in caves, tunnels, rock or cliff crevices, and abandoned buildings.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
Fringed Myotis Bat	*Myotis thysanodes*	FSC	Roost in caves, tunnels, rock or cliff crevices, and abandoned buildings.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
Long-legged Myotis Bat	*Myotis volans*	FSC	Roost in caves, tunnels, rock or cliff crevices, and abandoned buildings.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
Yuma Myotis bat	*Myotis yumanensis*	FSC, SSC	Roost in caves, tunnels, rock or cliff crevices, and abandoned buildings.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
San Francisco Dusky-footed Woodrat	*Neotoma fuscipes annectens*	FSC, SSC	Forests and chaparral adjacent to water courses.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
San Joaquin Pocket Mouse	*Perognathus inornatus*	FSC	Friable soils in grassland and blue oak savanna in the San Joaquin and Sacramento valleys.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
Alameda Island Mole	*Scapanus latimanus parvus*	FSC, SSC	Friable soils in grassland. Known only from Alameda Island	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.

Table E-3 ***Sensitive Species Considered for the Connector Project Corridor***						
Common Name	***Scientific Name***	***Status Federal, State, CNPS***	***General Habitat***	***Survey Information***	***Project/Potential Occurrence***	***Level of Impact***
Salt-marsh Vagrant Shrew (Salt-marsh Wandering Shrew)	*Sorex vagrans halicoetes*	FSC, SSC	Breeds in dense canopy of pickleweed with upland areas to escape tides.	Surveys conducted in 1985[1], 1989/1990[2], and 2001[7] on OIA property adjacent to or within Corridor.	Not expected, marginal habitat present in Fuel Farm Marsh, not observed in OIA surveys.	No impact.
Birds						
Western Snowy Plover	*Charadrius alexandrinus nivosus*	FT, SSC	Sandy beaches on marine and estuarine shores, also salt pond levees. Forages in tidal ponds.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite. Known to nest at OIA west of Runway 11/29.	No impact.
Bald Eagle	*Haliaeetus leucocephalus*	FT, SE, SFP, FPD	Ocean shorelines, lake margins, and river courses within one mile of water.	1992/1993[2].	Not expected, no suitable habitat present onsite, not observed during survey.	No impact.
California Brown Pelican	*Pelecanus occidentalis californicus*	FE, SE, SFP	Nests in islands off of California coast, forges in open Bay and ocean waters	1991-1995[4].	Occasional visitor to forage in project area.	No impact.
Double-crested cormorant	*Phalacrocorax auritus*	SSC	Nests in groves of tall trees adjacent to streams, rivers, and lakes.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
California Clapper Rail	*Rallus longirostris obsoletus*	FE, SE, SFP	Nests and forages in dense pickleweed	1992/1993[2] surveys along San Leandro Creek and Airport Drive marsh.	Low, potentially suitable habitat present on site, but not observed during OIA surveys.	No impact.
California Least Tern	*Sterna antillarum browni*	FE, SE, SFP	Nests and forages in sandy beaches and coastal wetlands.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
Tricolored Blackbird	*Agelaius tricolor*	FSC, SSC	Nests in emergent plants or thickets adjacent to freshwater source.	1992/1993[2].	No suitable breeding habitat onsite, wintering birds recorded on Galbraith Golf Course.	No impact.
Yellow Warbler	*Dendroica petechia brewsteri*	SSC	Nests and forages in riparian forest.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
Little Willow Flycatcher	*Empidonax traillii brewsteri*	SE	Dense willow thickets.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
American Peregrine Falcon	*Falco peregrinus anatum*	FD, SE	Nests on cliffs and forages on shorebirds and passerines.	No suitable nesting habitat. Surveys not required.	No suitable nesting habitat, occasional foraging visitor.	No impact.
Bell's Sage Sparrow	*Amphispiza belli belli*	FSC, SSC	Sage scrub or chaparral.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat present onsite.	No impact.
Western Burrowing Owl	*Athene cunicularia hypugea*	FSC, SSC	Nests in burrows of ground squirrels in grassland.	1992/1993[2], 1994[5], 1999[3].	Burrows observed on site.	Potential impact.
Ferruginous Hawk	*Buteo regalis*	FSC	Does not breed in Bay Area. In winter, forages in open grassland.	1992/1993[2].	No suitable nesting habitat, may forage on-site, but not observed during survey.	No impact.

Table E-3 ***Sensitive Species Considered for the Connector Project Corridor***						
Common Name	***Scientific Name***	***Status Federal, State, CNPS***	***General Habitat***	***Survey Information***	***Project/Potential Occurrence***	***Level of Impact***
California Horned Lark	*Eremophila alpestris actia*	SSC	Breeds and winters in open grasslands and pastures.	1992/1993[2].	Not expected, no suitable habitat present onsite. Horned Larks observed at OIA near Pump House Pond outside of breeding season.	No impact.
Saltmarsh Common Yellowthroat	*Geothlypis trichas sinuosa*	FSC, SSC	Nests in freshwater willows and forages in salt marshes.	1992/1993[2].	Not expected, no suitable breeding habitat onsite, not observed during surveys.	No impact.
Loggerhead Shrike	*Lanius ludovicianus*	SSC	Nests in open fields and woodlands.	1992/1993[2].	Breeding observed near Airport Drive marsh.	No impact.
California Black Rail	*Laterallus jamaicensis coturniculus*	FSC, ST, SFP	Saltmarsh dominated by pickleweed and cordgrass.	1992/1993[2] surveys along San Leandro Creek and Airport Drive marsh.	Low, potentially suitable habitat present on site, but not observed during OIA surveys.	No impact.
Alameda Song Sparrow	*Melospiza melodia pusillula*	FSC, SSC	Nests on ground near freshwater.	1992/1993[2].	Morphologically identified observed in Airport Drive wetland, assumed present on-site.	No impact.
Cooper's Hawk	*Accipiter cooperi*	SSC	Nests in hardwood and conifer forest.	No suitable habitat. Surveys not required.	No suitable nesting habitat, potential foraging habitat for migrants.	No impact.
Northern Harrier	*Circus cyaneus*	SSC	Nests in low scrubby vegetation on edges of marshes.	1992/1993[2].	Known to nest at OIA, but no nests observed within project area.	No impact.
American White Pelican	*Pelecanus erythrorhynchos*	SSC	Nests on ground near bays and inland rivers in the Klamath Basin	1992/1993[2].	Not observed during surveys, potential foraging habitat for migrants on-site.	No impact.
Black Skimmer	*Rynchops niger*	SSC	Nests in coastal beaches or sandbars.	No suitable habitat. Surveys not required.	Not present during surveys, potential foraging habitat for migrants.	No impact.
White-tailed Kite	*Elanus leucurus*	SFP	Nests in dense-topped trees in vicinity of marshes and grasslands.	1992/1993[2].	Known to nest at OIA, but no nests observed within project area.	No impact.
Reptiles						
Alameda Whipsnake	*Masticophis lateralis euryxanthus*	FT, ST	Rocky upland scrub and chaparral.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Northwestern Pond Turtle	*Clemmys marmorata marmorata*	FSC, SSC	Freshwater ponds and streams.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Southwestern Pond Turtle	*Clemmys marmorata pallida*	FSC, SSC	Freshwater ponds and streams.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.

Table E-3
Sensitive Species Considered for the Connector Project Corridor

Common Name	***Scientific Name***	***Status Federal, State, CNPS***	***General Habitat***	***Survey Information***	***Project/Potential Occurrence***	***Level of Impact***
California Horned Lizard	*Phrynosoma coronatum frontale*	FSC	Lowlands and sandy washes with scattered low bushes in Inner Coast Range.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Amphibians						
California Red-legged Frog	*Rana aurora draytonii*	FT, SSC	Freshwater ponds and streams with emergent vegetation and basking areas.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
California Tiger Salamander	*Ambystoma californiense*	FC, SSC	Breeds in freshwater ponds in association with upland areas with small mammal burrows.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Foothill Yellow-legged Frog	*Rana boylii*	FSC, SSC	Partially shaded shallow streams and riffles with rocky substrate.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Western Spadefoot Toad	*Scaphiopus hammondii hammondii*	FSC, SSC	Grasslands in arid and semiarid areas of the Inner Coast Range.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Fish						
Tidewater Goby	*Eucyclogobius newberryi*	FE, SSC	Occurs in fresh to brackish water habitats or shallow lagoons and lower stream reaches along the California coast	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Delta Smelt	*Hypomesus transpacificus*	FT	Spawns in fresh to slightly brackish backwater sloughs and edgewaters in the Sacramento/San Joaquin Delta.	No suitable spawning habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Coho Salmon - central CA coast	*Oncorhynchus kisutch*	FT	Spawns in streams with gravel bottoms, juveniles may use estuary habitat.	No suitable spawning habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Central California Steelhead	*Oncorhynchus mykiss*	FT	Spawns in streams with gravel bottoms, juveniles may use estuary habitat.	No suitable spawning habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Central Valley Spring-run Chinook Salmon	*Oncorhynchus tshawytscha*	FT, FPX	Spawns in streams with gravel bottoms, juveniles may use estuary habitat.	No suitable spawning habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.

Table E-3

Sensitive Species Considered for the Connector Project Corridor

Common Name	Scientific Name	Status Federal, State, CNPS	General Habitat	Survey Information	Project/Potential Occurrence	Level of Impact
Winter-run Chinook Salmon	*Oncorhynchus tshawytscha*	FE	Spawns in streams with gravel bottoms, juveniles may use estuary habitat.	No suitable spawning habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Central Valley Fall/late fall-run Chinook Salmon	*Oncorhynchus tshawytscha*	FC	Spawns in streams with gravel bottoms, juveniles may use estuary habitat.	No suitable spawning habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Sacramento Splittail	*Pogonichthys macrolepidotus*	FT	Slow-moving rivers and sloughs in the Sacramento/San Joaquin Delta and Suisun Marsh.	No suitable spawning habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Longfin Smelt	*Spirinchus thaleichthys*	FSC	Rivers and sloughs in the Sacramento/San Joaquin Delta and Suisun Marsh.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Invertebrates						
Vernal Pool Fairy Shrimp	*Branchinecta lynchi*	FT	Vernal pools and swales.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Callippe Silverspot Butterfly	*Speyeria callippe callippe*	FE	Coastal scrub	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Ricksecker's Water Scavenger Beetle	*Hydrochara rickseckeri*	FSC	Creeks, ponds, and vernal pools in San Francisco Bay Area. USFWS recommends surveying remaining ponds and pools in the SF Bay Area	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
San Francisco Forktailed Damselfly	*Ischnura gemina*	FSC	Freshwater and brackishwater ditches and drainages supporting emergent vegetation.	1992/1993[2].	Known to occur at OIA, but no suitable habitat within project area.	No impact.
California Linderiella	*Linderiella occidentalis*	FSC	Vernal pools and swales.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
San Francisco Lacewing	*Nothochrysa californica*	FSC	Larvae known to feed on coast live oak and California Bay, adults feed on nectar and pollen.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.

Table E-3 ***Sensitive Species Considered for the Connector Project Corridor***						
Common Name	***Scientific Name***	***Status Federal, State, CNPS***	***General Habitat***	***Survey Information***	***Project/Potential Occurrence***	***Level of Impact***
California Brackishwater Snail (Mimic Tryonia)	*Tryonia imitator*	FSC	Slow-moving brackishwater streams, tidal influenced marshes and drainages along the coast. Requires permanent brackish-water conditions.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Plants						
Pallid Manzanita	*Arctostaphylos pallida*	FT, SE, 1B	Chaparral. Blooms December to March.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
California Sea Blite	*Suaeda californica*	FE, 1B	Coastal salt marsh. Blooms July to October.	1992/1993[2], 2000[6].	Low, potentially suitable habitat present onsite, not observed during surveys.	No impact.
Monterey Spineflower	*Chorizanthe pungensvar. pungens*	FE, 1B	Coastal dunes. Blooms April to June.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Robust Spineflower	*Chorizanthe robusta var. robusta*	FE, 1B	Coastal dunes and scrub. Exterpated in Alameda County. Blooms May to September.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Presidio Clarkia	*Clarkia franciscana*	FE, SE, 1B	Coastal scrub and grasslands underlain by ultramafic soils. Blooms May to July.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Soft Bird's Beak	*Corydylanthus mollis spp. mollis*	FE, SR, 1B	Coastal salt marsh. Blooms July to November.	1992/1993[2], 2000[6].	Low, potentially suitable habitat present onsite, not observed during surveys.	No impact.
Contra Costa Goldfields	*Lasthenia conjugens*	FE, 1B	Vernal pools, valley and foothill grassland. Blooms March to June.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Santa Cruz Tarplant	*Holocarpha macradenia*	FPT, SE, 1B	Coastal prairie, valley and foothill grassland. Blooms June to October.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Pt. Reyes Bird's Beak	*Corydylanthus maritimus spp. palustris*	FSC, 1B	Coastal salt marsh. Blooms May to October.	1992/1993[2], 2000[6].	Low, potentially suitable habitat present onsite, not observed during surveys.	No impact.
Fragrant Fritillaria	*Fritillaria liliacea*	FSC, 1B	Heavy soil, open hills and fields near coast. Blooms February to April.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Diablo Helianthella	*Helianthella castanea*	FSC, 1B	Broadleaved upland forest, chaparral. Blooms April to June.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.

Table E-3 ***Sensitive Species Considered for the Connector Project Corridor***						
Common Name	***Scientific Name***	***Status Federal, State, CNPS***	***General Habitat***	***Survey Information***	***Project/Potential Occurrence***	***Level of Impact***
Pappose Spikeweed (Congdon's Tarplant)	*Hemizonia parryi spp. congdonii*	FSC, 1B	Valley and foothill grasslands (alkaline). Extirpated in Alameda County. Blooms June to November.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Kellogg's Horkelia	*Horkelia cuneata spp. sericea*	FSC, 1B	Closed-cone coniferous forest, coastal scrub, chaparral, old dunes. Blooms April to September.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Mason's Lilaeopsis	*Lilaeopsis masonii*	FSC, SR, 1B	Margins of fresh and brackish marshes. Blooms April to October.	1992/1993[2], 2000[6].	Low, potentially suitable habitat present onsite, not observed during surveys.	No impact.
Most Beautiful Jewelflower	*Streptanthus albidus ssp. peramoenus*	FSC, 1B	Chaparral, valley and foothill grassland. Blooms April to June.	No suitable habitat. Surveys not required.	Not expected, no suitable habitat onsite.	No impact.
Hairless Popcorn-flower	*Plagiobothrys glaber*	1A	Alkaline meadows, coastal salt marsh. Presumed extinct in California. Blooms April to July.	1992/1993[2], 2000[6].	Low, potentially suitable habitat present onsite, not observed during surveys.	No impact.

Status Key:
Federal Status

FE Endangered. Species in danger of extinction throughout all or significant portion of its range.
FT Threatened. Species likely to become endangered within forseeable future throughout all or a significant portion of its range.
FPE Proposed for listing as endangered.
FC Candidate for listing as endangered. Candidate information now available indicates that listing may be appropriate with supporting data currently on file.
FSC Species of Concern. Former Category 2 Candidate for listing as endangered.
FPX Proposed critical habitat.
FPD Proposed for delisting
FD Delisted.

California State Status

SE Endangered. Species whose continued existence in California is jeopardized.
ST Threatened. Species, although not presently threatened with extinction, that is likely to become endangered in the foreseeable future.
SSC Species of Concern.
SFP State Fully Protected under Sections 3511 and 4700 of the Fish and Game Code.

California Native Plant Society

1A Plants presumed extinct in California
1B Plants that are rare or endangered in California and elsewhere.
2 Plants that are endangered in California, but more common elsewhere.
3 Plants about which more information is needed.
4 Plants of limited distribution (a watch list).

Sources

1. H.T. Harvey and Associates, *Oakland Airport Salt Marsh Harvest Mouse Trapping Program*, 1985.

2. H.T. Harvey and Associates, *Biological Assessment*, Airport Roadway Project, Oakland, Alameda County, May 1994.

3. Port of Oakland, *Burrowing Owl Management Plan* (Prepared by URS Greiner Woodward Clyde). December 1999.

4. Port of Oakland, *Metropolitan Oakland International Airport Proposed Airport Development Program FEIR*, December 1997.

5. Port of Oakland, *Oakland Harbor Deep Draft Navigation Improvements, Protection Plan for Burrowing Owls: Part II* (Prepared by Feeney, L.R. and J.A. Alvarez). February 1995.

6. EIP Associates, site visit. February 11, 2000.

7. H.T. Harvey and Associates, Small Mammal Trapping of BART OAC “Tank Farm” Wetland, Prepared for EIP Associates, June 13, 2001.

Appendix F
Air Quality

F.1 Introduction

With increased passenger volumes to the Oakland International Airport (OIA) and predicted increases in traffic volumes in the area, it is important to implement projects that will result in vehicular traffic reductions. The Automated Guided Transit (AGT) Alternative for the Connector project is estimated to result in an emissions reduction on both the local and regional levels.

A quantitative air quality assessment was conducted to estimate the local and regional impacts from the AGT Alternative and the Quality Bus (QB) Alternative as compared to the Baseline or "No Action" alternative. Emissions were predicted for existing conditions (2000), the project first year of operation (2005), and the horizon year (2020) under all three alternatives.

This appendix is provided in support of Section 3.12, Air Quality, of the DEIS/DEIR. It provides details on the methodology used for the analysis of net and cumulative air impacts for the scenarios listed above.

F.2 Emission Estimation

Vehicle exhaust emission factors were calculated for roadway and intersection segments by speed. Average vehicle running speeds for existing conditions and vehicle speed estimates for future scenarios were provided by CCS Planning and Engineering. The California Air Resources Board (CARB) EMFAC7G Model[1] (a component of the MVEI 7G1cJY98 Model) was used to determine vehicle emission factors at vehicle speeds ranging from 5 to 60 miles per hour (mph).

EMFAC7G calculates individual emissions for a range of vehicle classes and technologies. To obtain an overall emission factor for the roadway and intersection links, a weighted average using San Francisco Bay Area vehicle fleet characteristics was used. Table F-2 presents the fleet characteristics.

For local analysis, the adjusted EMFAC7G emissions (in grams per vehicle-mile) were directly inputted into the CAL3QHC dispersion model used for the analysis of local CO concentrations. Also required are idle emission factors for CO emissions. While EMFAC7G does not supply idle emission factors, an idle emission factor can be calculated based on the emission factors calculated for CO for a specific year by plotting speed versus emission factor and solving for the y-intercept.

---

1 EMFAC 7G, which is included with the MVEI 7G1cJY98, model was the latest EMFAC model available from the CARB website (http://www.arb.ca.gov/msei/mvei/mvei.htm) at the time of analysis and was last updated in February 2000.

For the regional analysis, the adjusted EMFAC7G emission factors were used along with regional trip lengths and vehicle miles traveled (VMT) data to determine regional emissions.

EMFAC7G requires few input parameters to run. The input parameters used are presented in Table F-3. The adjusted EMFAC7G emission factors at a temperature of 60° F, for vehicle speeds ranging from 5 mph to 60 mph are presented in Table F-4

San Francisco Bay Area Vehicle Fleet mix
Table F-2

% of fleet	Vehicle Class	Fuel/Technology Class	Fuel/Tech %
75%	Light Duty Auto	Non-catalyst	1.16%
		Catalyst	98.58%
		Diesel	0.26%
10%	Light Duty Truck	Non-catalyst	0.13%
		Catalyst	99.54%
		Diesel	0.33%
3%	Medium Duty Truck	Non-catalyst	1.44%
		Catalyst	98.56%
1%	Light-heavy Duty Truck	Non-catalyst	19.56%
		Catalyst	40.00%
		Diesel	40.44%
1%	Medium-heavy Duty Truck	Non-catalyst	19.56%
		Catalyst	40.00%
		Diesel	40.44%
5%	Heavy-heavy Duty Truck	Diesel	100%
2%	Urban Bus	Diesel	100%
3%	Motorcycle	All fuels	100%
100%			

Source: Bay Area Air Quality Management District, BAAQMD CEQA Guidelines, URBEMIS7 Model Vehicle Fleet Characteristics for San Francisco Bay Area, April 1996 (updated December 1999).

Table F-3
EMFAC7G Model Input Parameters

Planning Inventory	Winter CO
Calendar Year(s)	2000, 2005, 2020
Model Years	Standard run with all model years used
Air Basin	San Francisco Area
Organic Gas	ROG
Particulate Matter	PM_{10}
Gasoline Regulations	Default
Diesel Regulations	Default
Vehicle Classes	All
Vehicle Technologies	All

Table F-4
Weighted Composite Emission Factors (g/mi) for All Vehicles at Temperature = 60° F

Speed	Reactive Organic Gases			Carbon Monoxide			Oxides of Nitrogen			Exhaust PM		
MPH	2000	2005	2020	2000	2005	2020	2000	2005	2020	2000	2005	2020
idle				91.6	76.7	39.3						
5	1.79	1.33	0.61	23.43	19.02	10.57	2.89	2.25	1.62	0.05	0.03	0.02
10	1.04	0.81	0.37	13.60	11.23	6.34	2.25	1.76	1.28	0.05	0.03	0.02
15	0.76	0.59	0.28	9.30	7.66	4.38	1.87	1.46	1.07	0.04	0.03	0.02
16	0.73	0.56	0.27	8.74	7.19	4.12	1.80	1.42	1.04	0.04	0.03	0.02
20	0.62	0.48	0.22	7.06	5.76	3.33	1.62	1.27	0.93	0.04	0.03	0.02
25	0.53	0.41	0.19	5.75	4.64	2.69	1.46	1.16	0.85	0.04	0.03	0.02
30	0.46	0.35	0.17	4.88	3.91	2.28	1.40	1.11	0.80	0.04	0.03	0.02
35	0.41	0.30	0.15	4.27	3.41	2.02	1.41	1.11	0.81	0.04	0.03	0.02
40	0.36	0.26	0.13	3.86	3.09	1.85	1.49	1.17	0.84	0.04	0.03	0.02
45	0.32	0.24	0.12	3.65	2.95	1.80	1.65	1.29	0.92	0.04	0.03	0.02
50	0.30	0.23	0.12	3.75	3.03	1.86	1.89	1.48	1.04	0.04	0.03	0.02
55	0.32	0.24	0.11	4.36	3.47	2.11	2.23	1.74	1.22	0.04	0.03	0.02
60	0.40	0.30	0.11	6.16	4.68	2.70	2.70	2.10	1.47	0.04	0.03	0.02
65	0.79	0.50	0.12	12.09	8.35	4.21	3.35	2.60	1.86	0.04	0.03	0.02

F.3 Regional Analysis

Regional air quality impacts are evaluated on the basis of total ROG, CO, NO_X and PM regional vehicular emissions in the Bay Area. The region includes the 25 airport analysis districts in the nine county Bay Area. The calculation of regional emissions is based on VMT data for access trips to OIA and on vehicular pollutant emission factors estimated with the EMFAC. VMT calculations are based on the number of vehicles for each traveler type and traveler mode together with the distance from each of 25 airport analysis districts. Peak-hour and daily VMT data were used together with the EMFAC emission factors (EF) to estimate the worst-case cumulative regional emissions (RE) in pounds per hour (lbs/hr) and tons per year (tons/yr):

$$VMT_{daily} * EF * .0004[\text{day-ton/yr-g}] = RE_{yr}\ [\text{tons/year}]$$
$$VMT_{peak\text{-}hour} * EF * 0.002[\text{lbs/g}] = RE_{hr}\ [\text{lbs/hr}]$$

The No Action Alternative for all years of analysis reflects background growth, as defined by the Association of Bay Area Governments (ABAG) forecast, as well as the operation of other similar, already approved projects in the region. Cumulative regional emissions for the build alternatives reflect the emissions from these approved projects as well as the emissions impact predicted for the proposed project. Project-specific, or "net," regional emissions for a given analysis year only reflect the emissions from the proposed project, excluding emissions attributable to approved and funded projects. The net regional emissions of pollutant, for a given analysis year are calculated as the regional emissions for the AGT Alternative or the QB Alternative in the given analysis year minus the regional emissions for the No Action Alternative in the given analysis year:

$$\text{Yearly regional emissions (tons/year)} = RE_{yr,net} = RE_{yr,\,build} - RE_{yr,\,NoAction}$$
$$\text{Peak-hour regional emissions (lbs/hr)} = RE_{hr,net} = RE_{hr,\,build} - RE_{hr,\,NoAction}$$

F.4 Local Analysis

For the Connector project, PM_{10} and CO are the air pollutants of concern on a local scale. A quantitative analysis of local PM_{10} concentrations is not required as part of the transportation conformity assessment. Therefore, local PM_{10} levels are qualitatively evaluated on the basis of the regional analysis. For CO concentrations, dispersion modeling using CAL3QHC (version 95221) was used to determine local CO concentrations and to predict future impacts.

Intersections and Roadway Segments Selection

To determine the local CO impact of the Connector alternatives, the three most congested intersections and the three most heavily trafficked roadway segments during the p.m. peak period were selected and analyzed. The Connector project is designed to run approximately 3.2 miles from the Oakland-Alameda Coliseum Complex, south along Hegenberger Road, to the OIA. Eight roadways segments near the proposed project location were reviewed for this analysis:

- 98th Avenue between Airport Access and Empire
- 98th Avenue between Empire and I-880 Southbound Off-ramp
- Airport Drive between N. Armstrong and Air Cargo Road
- Airport Drive between Air Cargo Road and Doolittle Drive
- Hegenberger Road between Doolittle Drive and Pardee
- Hegenberger Road between Pardee and Hegenberger Loop
- Hegenberger Road between Hegenberger Loop and Edgewater Drive
- Hegenberger Road between Edgewater Drive and the I-880 Southbound Off-ramp

Seven intersections near and along the proposed project location were reviewed for this analysis:

- Hegenberger Road and Edes Avenue
- Hegenberger Road and the I-880 Southbound Off-ramp
- Hegenberger Road and Edgewater Drive
- Airport Drive and Doolittle Drive
- 98th Avenue and the I-880 Southbound Off-ramp
- 98th Avenue and the I-880 Northbound Off-ramp
- Hegenberger Road and Doolittle Drive

As part of the procedure for determining the most congested intersections, those intersections at Level-of-Service (LOS) D, E, or F or those that have changed to LOS D, E, or F because of increased volumes of traffic related to the Connector project were considered for modeling. Intersections that are LOS A, B or C did not require further analysis because the delay and congestion would not likely cause or contribute to potential CO exceedances of the CAAQS or NAAQS.

The seven intersections were ranked by traffic volumes and by the LOS calculated by traffic engineers for the intersections, based on volumes. Table F-5 presents a summary of the traffic data and LOS for each intersection. By evaluating 2000, 2005 and 2020 traffic data, three intersections were chosen for dispersion modeling based on the highest traffic volumes and/or worst LOS:

- Hegenberger Road and Edes Avenue
- Hegenberger Road and Edgewater Drive
- Airport Drive and Doolittle Drive

The eight roadway segments were ranked by traffic volumes. Table F-6 presents a summary of the traffic data for each roadway segment. By evaluating 2000, 2005 and 2020 traffic data, three roadway segments were chosen for dispersion modeling based on the highest traffic volumes:

- Hegenberger Road between Pardee and Hegenberger Loop
- Hegenberger Road between Hegenberger Loop and Edgewater Drive
- Hegenberger Road between Edgewater Drive and the I-880 Southbound Off-ramp

Receptors

Receptor site locations selected for estimating maximum CO concentrations near an intersection and roadway segment were based on guidance provided in the EPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections*. Receptors were not located within three meters from the edge of the traveled roadways which comprise the intersection and roadway, or free-flow, segment, where vehicle turbulence cannot be accurately estimated by the CAL3QHC model.

Table F-5
Using Average Delay for all Future Turning Movements - PM Conditions

Intersection Level of Service Existing Conditions - 2000

#	Intersection Location	No Action		QB		AGT	
		LOS for Intersection	Total Volume (veh/hr)	LOS for Intersection	Total Volume (veh/hr)	LOS for Intersection	Total Volume (veh/hr)
1	Hegenberger Rd / Edes Ave	E	3639				
2	Hegenberger Rd / I-880 SB Off-ramp	B	3874				
3	Hegenberger Rd / Edgewater Dr	D	4505				
5	Airport Dr / Doolittle Drive	E	4128				
6	98th Ave / I-880 SB Off-ramp	B	2493				
7	98th Ave / I-880 NB Off-ramp	B	2480				
15	Hegenberger Rd / Doolittle Dr.	C	3461				

Intersection Level of Service Future Conditions - 2005

#	Intersection Location	No Action		QB		AGT	
		LOS for Intersection	Total Volume (veh/hr)	LOS for Intersection	Total Volume (veh/hr)	LOS for Intersection	Total Volume (veh/hr)
1	Hegenberger Rd / Edes Ave	D	4693	D	4686	D	4673
2	Hegenberger Rd / I-880 SB Off-ramp	B	5273	B	5205	B	5071
3	Hegenberger Rd / Edgewater Dr	C	5282	C	5213	C	5072
5	Airport Dr / Doolittle Drive	C	5201	C	5165	C	5087
6	98th Ave / I-880 SB Off-ramp	B	2764	B	2739	B	2687
7	98th Ave / I-880 NB Off-ramp	D	2994	D	2980	D	2950
15	Hegenberger Rd / Doolittle Dr.	C	5191	C	5150	C	5069

Intersection Level of Service Future Conditions - 2020

#	Intersection Location	No Action		QB		AGT	
		LOS for Intersection	Total Volume (veh/hr)	LOS for Intersection	Total Volume (veh/hr)	LOS for Intersection	Total Volume (veh/hr)
1	Hegenberger Rd / Edes Ave	D	4806	D	4794	D	4772
2	Hegenberger Rd / I-880 SB Off-ramp	D	6719	C	6592	B	6369
3	Hegenberger Rd / Edgewater Dr	D	7037	D	6904	D	6670
5	Airport Dr / Doolittle Drive	D	6088	D	6016	D	5889
6	98th Ave / I-880 SB Off-ramp	B	3525	B	3475	B	3389
7	98th Ave / I-880 NB Off-ramp	D	3341	D	3312	D	3262
15	Hegenberger Rd / Doolittle Dr.	D	6130	D	6053	D	5920

Source: Wilbur Smith Associates Traffic Analysis

Table F-6
Arterial Roadway Volumes

		2000		2005						2020					
		Existing		No Action		QB		AGT		No Build		QB		AGT	
Between		*NB*	*SB*	*NB*	*SB*	*NB*	*SB*	*NB*	*SB*	*NB*	*SB*	*NB*	*SB*	*NB*	*SB*
98th Avenue															
Airport Access	Empire	1,619	1,870	1,206	1,552	1,194	1,535	1,168	1,501	1,688	1,959	1,663	1,926	1,619	1,870
Empire	I-880SB Off Ramp	826	1,870	539	1,552	539	1,535	537	1,501	832	1,959	829	1,926	826	1,870
Airport Drive															
*N. Armstrong	Air Cargo Rd	1,119	922												
*Air Cargo Road	Doolittle	1,119	922												
N. Armstrong	Doolittle			1,700	1,144	1,662	1,098	1,583	1,007	2,528	2,244	2,454	2,158	2,324	2,006
Hegenberger Road															
Doolittle	Pardee	498	473	703	1,500	703	1,457	703	1,373	703	2,526	703	2,446	703	2,305
Pardee	Hegenberger Loop	1,740	1,142	2,231	1,855	2,192	1,802	2,108	1,698	3,292	3,124	3,214	3,025	3,076	2,851
Hegenberger Loop	Edgewater Drive	1,740	1,126	2,231	1,969	2,192	1,921	2,108	1,827	3,292	3,122	3,214	3,032	3,076	2,874
Edgewater Drive	I-880SB Off Ramp	1,949	1,104	3,047	2,083	3,012	2,040	2,943	1,955	3,689	3,121	3,624	3,039	3,509	2,897

*There is no intersection at Air Cargo road for the future scenarios.

Receptors were placed at three meters from the edge of the traveled segments that comprised the roadway or intersection and at a height of 1.8 m. Receptors were located near the corner, at 25 m from the intersection, at 50 m from the intersection. Receptors were also placed at mid-block or at approximately 150 m from the intersection, whichever was closer to the intersection. Receptors were placed on both sides of a road.

Background Concentrations

Background concentrations are added to the predicted project impacts to determine the total effect of the proposed project on the surrounding area. For the existing year scenario, the background concentration is taken to be the highest second-high concentration reported in the 5 years of monitoring data available. The monitoring data can be found in Table F-1.

Table F-7
Existing and Adjusted Future Background Concentrations

	1-hour Background Concentrations			8-hour Background Concentrations		
Year	No Action	QB	AGT	No Action	QB	AGT
Intersection #1 Hegenberger / Edes						
2000	7.2			4.4		
2005	7.7	7.6	7.6	4.7	4.7	4.7
2020	4.5	4.5	4.4	2.7	2.7	2.7
Intersection #3 Hegenberger / Edgewater						
2000	7.2			4.4		
2005	7.0	6.9	6.7	4.3	4.2	4.1
2020	5.3	5.2	5.0	3.2	3.2	3.1
Intersection #5 Airport / Doolittle						
2000	7.2			4.4		
2005	7.5	7.4	7.3	4.6	4.5	4.5
2020	5.0	4.9	4.8	3.1	3.0	2.9
Roadway Between Edgewater and I-880SB Off-ramp						
2000	7.2			4.4		
2005	10.0	9.8	9.5	6.1	6.0	5.8
2020	7.6	7.4	7.1	4.6	4.5	4.3
Roadway Between Hegenberger Loop and Edgewater						
2000	7.2			4.4		
2005	8.7	8.5	8.1	5.3	5.2	5.0
2020	7.6	7.4	7.0	4.6	4.5	4.3
Roadway Between Pardee and Hegenberger Loop						
2000	7.2			4.4		
2005	8.4	8.2	7.8	5.1	5.0	4.8
2020	7.5	7.3	7.0	4.6	4.5	4.3

For future year scenarios, the background concentration needed to be adjusted to account for changes in vehicles on the roadway and vehicle technology. The BAAQMD guidance provides adjustment factors from 1992 to 2010. While an adjustment factor is presented for 2005, a factor was not listed for the 2020 scenarios. For consistency, the existing background concentration was adjusted in accordance with the EPA guidance for both future years of analysis. The existing year concentration was multiplied by the ratio of the future EMFAC7G CO emission factor to the existing year EMFAC7G emission factor, and by the ratio of future traffic volume to present traffic volume for each location. Table F-7 presents the adjusted background concentrations used for this analysis.

Dispersion Modeling

Modeling for this analysis is based on the procedures outlined in the EPA *Guideline for Modeling Carbon Monoxide from Roadway Intersections*. That document was used to determine appropriate worst-case meteorology that represents the project area. In addition, methods outlined in that document were used to determine a persistence factor used to convert eight-hour concentrations from one-hour concentrations.

CAL3QHC contains the CALINE3 algorithm for roadway segments. The CALINE3 algorithm is used to calculate one-hour CO concentrations at sensitive receptors located near the worst-case free-flowing roadway segment. The following input parameters are necessary to run the CALINE3 algorithm:

- Site Variables
  - Surface roughness
  - Settling and deposition velocities
  - Meteorology

- Segment Variables
  - Roadway geometry
  - Vehicles per hour
  - Emission factors

CAL3QHC also includes an algorithm to handle queues at intersections and was used to calculate one-hour concentrations at sensitive receptors near the worst-case intersections. For intersections, CAL3QHC requires all the input parameters necessary to run the CALINE3 algorithm plus the following additional inputs:

- Idling emission rate
- Number of lanes in approach link
- Signal timing of the intersection (signal cycle length, red time, and clearance lost time)
- Saturation flow rate (vehicles per hour of effective green time)
- Signal type
- Arrival type

In accordance with the EPA guidance cited above, worst-case values for meteorological variables were used for this analysis. A wind speed of 1.0 m/s in all directions (in 10° increments) was used. Atmospheric stability class D was assumed.

Traffic modeling inputs were obtained from Wilbur Smith Associates traffic analysis. All intersections were modeled with an actuated signal type. Peak-hour p.m. traffic volumes were used to predict worst-case one-hour averaged CO concentrations at model receptors.

The one-hour averaged CAL3QHC results are presented in Tables F-8 to F-13. To obtain an eight-hour average value, the one-hour averaged results were multiplied by a 0.7 persistence factor as suggested in the EPA guidance. For the local cumulative analysis, highest concentration predicted for an intersection or roadway segment was added to the appropriate background concentration listed in Table F-7 and compared to the CAAQS and NAAQS. For the local net impact analysis, which compares only the emissions associated with the project, the highest predicted concentration from the specific build scenario was subtracted from the predicted concentration for the No Action Alternative for the same year, then added to the appropriate background concentration. This net concentration was compared to the CAAQS and NAAQS.

Table F-8
CAL3QHC Predicted CO Concentrations 1-Hour Averaged Without Background (ppm)
Intersection of Hegenberger and Edes

Receptor Number	2000 Existing	2005 No Action	QB	AGT	2020 No Action	QB	AGT
R1	3.5	2.9	2.9	2.9	1.5	1.5	1.5
R2	3.8	2.9	2.9	2.9	1.7	1.7	1.7
R3	3.8	3.0	3.1	3.1	1.7	1.7	1.6
R4	1.2	1.3	1.3	1.3	0.8	0.8	0.7
R5	3.5	2.8	2.8	2.8	1.6	1.6	1.6
R6	1.9	1.7	1.7	1.7	1.0	1.0	1.0
R7	1.7	1.6	1.6	1.6	0.9	0.9	0.9
R8	1.2	1.2	1.2	1.2	0.9	0.8	0.7
R9	2.7	2.3	2.3	2.3	1.4	1.4	1.3
R10	3.2	2.6	2.6	2.6	1.6	1.6	1.5
R11	2.6	2.0	2.1	2.1	1.3	1.2	1.0
R12	1.2	1.0	1.0	1.0	0.7	0.7	0.6
R13	2.3	2.1	2.1	2.1	1.3	1.3	1.1
R14	2.0	1.5	1.5	1.5	0.9	0.9	0.8
R15	1.9	1.6	1.6	1.6	0.9	0.9	0.8
R16	1.1	1.2	1.2	1.2	0.8	0.7	0.5
R17	1.1	1.2	1.2	1.2	0.7	0.7	0.7
R18	0.9	1.1	1.1	1.1	0.6	0.6	0.6
R19	0.3	0.4	0.4	0.4	0.2	0.2	0.2
R20	2.7	2.3	2.3	2.2	1.3	1.3	1.2
R21	2.1	1.8	1.8	1.8	1.1	1.0	1.0
R22	1.1	0.9	0.9	0.9	0.5	0.5	0.5
R23	3.9	3.1	3.1	3.0	1.7	1.7	1.7
R24	3.0	2.2	2.2	2.2	1.3	1.3	1.2
R25	1.0	0.8	0.8	0.8	0.4	0.4	0.4
R26	1.3	1.1	1.1	1.1	0.6	0.6	0.6
R27	1.0	0.8	0.8	0.8	0.5	0.5	0.4
R28	0.3	0.4	0.4	0.4	0.2	0.2	0.2
Highest	3.9	3.1	3.1	3.1	1.7	1.7	1.7

Table F-9
CAL3QHC Predicted CO Concentrations 1-Hour Averaged Without Background (ppm)
Intersection of Hegenberger and Edgewater

Receptor	2000	2005			2020		
Number	Existing	No Action	QB	AGT	No Action	QB	AGT
R1	2.2	2.4	2.4	2.4	1.7	1.7	1.4
R2	2.8	3.1	3.1	3.2	2.0	2.0	1.8
R3	2.3	2.8	2.8	2.8	2.1	2.0	1.8
R4	1.3	1.2	1.2	1.2	1.0	0.9	0.9
R5	2.6	2.1	2.1	2.1	1.6	1.6	1.3
R6	2.0	2.2	2.2	2.2	1.6	1.5	1.2
R7	1.9	1.9	1.9	2.0	1.6	1.6	1.3
R8	1.3	1.6	1.6	1.6	1.4	1.4	1.2
R9	3.0	2.8	2.8	2.8	2.3	2.2	1.8
R10	3.3	2.8	2.8	2.9	2.1	1.9	1.6
R11	2.3	2.7	2.7	2.5	2.1	2.0	1.6
R12	1.1	1.6	1.5	1.5	1.8	1.7	1.2
R13	3.3	3.4	3.4	3.4	2.7	2.7	2.1
R14	1.7	1.8	1.8	1.8	1.5	1.5	1.2
R15	1.5	1.3	1.3	1.3	0.9	1.0	0.8
R16	1.2	0.8	0.7	0.7	0.6	0.6	0.5
R17	2.4	2.3	2.3	2.1	1.5	1.5	1.4
R18	1.9	1.7	1.7	1.7	1.3	1.3	1.1
R19	1.1	1.2	1.2	1.2	0.9	0.8	0.8
R20	1.2	1.1	1.1	1.1	0.9	0.9	0.7
R21	0.9	0.9	0.9	0.8	0.8	0.8	0.6
R22	0.7	0.8	0.8	0.7	0.6	0.5	0.5
R23	1.9	1.6	1.5	1.5	1.0	1.0	0.8
R24	1.1	1.0	1.0	1.0	1.0	0.8	0.7
R25	1.0	0.9	0.9	0.9	0.7	0.6	0.5
R26	1.7	1.5	1.5	1.5	1.0	1.0	0.9
R27	1.4	1.2	1.2	1.2	0.9	0.7	0.7
R28	0.7	0.7	0.7	0.8	0.6	0.6	0.4
Highest	3.3	3.4	3.4	3.4	2.7	2.7	2.1

Table F-10
CAL3QHC Predicted CO Concentrations 1-Hour Averaged Without Background (ppm)
Intersection of Airport and Doolittle

Receptor	2000	2005			2020		
Number	Existing	No Action	QB	AGT	No Action	QB	AGT
R1	3.0	2.3	2.3	2.3	1.3	1.3	1.4
R2	2.5	2.1	2.1	2.1	1.2	1.2	1.2
R3	1.7	1.8	1.8	1.8	1.0	1.0	1.0
R4	0.8	1.0	1.0	1.0	1.0	0.9	0.9
R5	2.8	2.6	2.6	2.6	1.6	1.6	1.5
R6	1.5	1.5	1.5	1.5	0.9	0.9	0.9
R7	1.4	1.4	1.4	1.3	1.0	0.9	0.8
R8	1.1	1.2	1.2	1.2	0.9	0.9	0.9
R9	2.8	2.7	2.7	2.6	1.7	1.7	1.6
R10	2.1	1.9	1.9	1.9	1.2	1.2	1.2
R11	1.4	1.4	1.4	1.3	1.1	1.1	1.1
R12	1.4	1.1	1.1	1.0	1.0	1.0	1.0
R13	2.4	1.9	1.9	1.9	1.2	1.2	1.2
R14	1.9	1.7	1.7	1.6	0.9	0.9	0.9
R15	1.5	1.4	1.4	1.4	0.8	0.8	0.8
R16	0.8	1.0	0.9	0.8	0.7	0.7	0.6
R17	2.7	2.1	2.1	2.1	1.1	1.1	1.1
R18	2.5	2.1	2.1	1.9	1.2	1.2	1.2
R19	1.9	1.2	1.2	1.2	0.7	0.7	0.7
R20	1.9	1.6	1.5	1.5	0.9	0.9	0.9
R21	1.8	1.6	1.6	1.5	1.0	1.0	1.0
R22	1.3	1.1	1.1	1.1	0.6	0.6	0.6
R23	2.9	2.4	2.4	2.4	1.4	1.4	1.4
R24	2.2	2.4	2.4	2.4	1.3	1.3	1.3
R25	1.1	1.2	1.2	1.2	0.8	0.8	0.6
R26	1.7	1.5	1.5	1.4	0.9	0.9	0.9
R27	1.5	1.3	1.3	1.3	1.0	1.0	0.9
R28	1.3	1.3	1.3	1.3	0.7	0.7	0.7
Highest	3.0	2.7	2.7	2.6	1.7	1.7	1.6

Table F-11
CAL3QHC Predicted CO Concentrations 1-Hour Averaged Without Background (ppm)
Hegenberger Roadway Segment Between Edgewater and I-880 Southbound Off-ramp

Receptor	2000	2005			2020		
Number	Existing	No Action	QB	AGT	No Action	QB	AGT
R1	1.0	1.2	1.2	1.2	1.3	1.1	1.0
R2	1.5	1.7	1.6	1.6	1.8	1.7	1.5
R3	1.1	1.2	1.2	1.2	1.2	1.2	1.1
R4	1.1	1.1	1.1	1.1	1.2	1.2	0.9
R5	1.0	1.3	1.3	1.3	1.2	1.1	0.9
R6	1.0	1.3	1.3	1.2	1.4	1.2	1.0
R7	1.0	1.3	1.3	1.2	1.4	1.2	1.0
R8	1.1	1.4	1.3	1.3	1.2	1.2	0.9
Highest	1.5	1.7	1.6	1.6	1.8	1.7	1.5

Table F-12
CAL3QHC Predicted CO Concentrations 1-Hour Averaged Without Background (ppm)
Hegenberger Roadway Segment Between Hegenberger Loop and Edgewater

Receptor	2000	2005			2020		
Number	Existing	No Action	QB	AGT	No Action	QB	AGT
R9	0.7	1.0	1.0	1.0	1.1	1.1	0.8
R10	0.7	1.0	1.0	1.0	1.1	1.1	0.8
R11	0.8	1.0	1.0	1.0	1.1	1.1	0.8
R12	0.7	1.0	1.0	1.0	1.1	1.1	0.9
R13	1.4	1.8	1.7	1.6	1.9	1.8	1.5
R14	0.8	1.1	1.0	1.0	1.2	1.2	0.9
R15	0.4	0.6	0.6	0.6	0.6	0.6	0.5
R16	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Highest	1.4	1.8	1.7	1.6	1.9	1.8	1.5

Table F-13
CAL3QHC Predicted CO Concentrations 1-Hour Averaged Without Background (ppm)
Hegenberger Roadway Segment Between Pardee and Hegenberger Loop

Receptor	2000	2005			2020		
Number	Existing	No Action	QB	AGT	No Action	QB	AGT
R17	0.9	1.1	1.1	1.1	1.5	1.3	0.9
R18	0.9	1.1	1.1	1.0	1.1	1.0	0.9
R19	0.9	1.1	1.0	1.0	1.1	1.0	0.9
R20	0.9	1.0	1.0	1.0	1.0	1.0	0.9
R21	0.1	0.2	0.2	0.2	0.2	0.2	0.2
R22	0.1	0.2	0.2	0.1	0.2	0.2	0.0
R23	0.1	0.2	0.1	0.1	0.2	0.1	0.0
Highest	0.9	1.1	1.1	1.1	1.5	1.3	0.9

References

Bay Area Air Quality Management District, *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*, BAAQMD, San Francisco, California, April 2000, Revised December 2000.

Jeff Long, CARB, Re: Using EMFAC, email correspondence, July 28, 2000.

U.S. Environmental Protection Agency, *Guideline for Modeling Carbon Monoxide from Roadway Intersections*. U.S.EPA, OAQPS, Research Triangle Park, North Carolina, EPA-454/R-92-005, 1992.

Appendix G
Hazardous Materials

Table G-1
Environmental Databases Searched

FEDERAL ASTM RECORDS:

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-413-0223
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 04/21/99	Date of Data Arrival at EDR: 05/14/99
Date Made Active at EDR: 06/09/99	Elapsed ASTM days: 26
Database Release Frequency: Quarterly	Date of Last EDR Contact: 03/03/99

ERNS: Emergency Response Notification System
Source: EPA/NTIS
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/98	Date of Data Arrival at EDR: 01/13/99
Date Made Active at EDR: 01/18/99	Elapsed ASTM days: 5
Database Release Frequency: Quarterly	Date of Last EDR Contact: 01/04/99

NPL: National Priority List
Source: EPA
Telephone: N/A
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC).

Date of Government Version: 5/10/99	Date of Data Arrival at EDR: 05/12/99
Date Made Active at EDR: 06/09/99	Elapsed ASTM days: 28
Database Release Frequency: Semi-Annually	Date of Last EDR Contact: 02/08/99

RCRIS: Resource Conservation and Recovery Information System
Source: EPA/NTIS
Telephone: 800-424-9346
Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Date of Government Version: 4/26/99	Date of Data Arrival at EDR: 05/14/99
Date Made Active at EDR: 06/09/99	Elapsed ASTM days: 26
Database Release Frequency: Semi-Annually	Date of Last EDR Contact: 03/31/99

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/01/99	Date of Data Arrival at EDR: 03/17/99
Date Made Active at EDR: 04/16/99	Elapsed ASTM days: 30
Database Release Frequency: Semi-Annually	Date of Last EDR Contact: 03/16/99

FEDERAL NON-ASTM RECORDS:

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/95 — Date of Last EDR Contact: 03/25/99
Database Release Frequency: Biennially — Date of Next Scheduled EDR Contact: 06/21/99

CONSENT: Superfund (CERCLA) Consent Decrees
Source: EPA Regional Offices
Telephone: Varies
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: Varies — Date of Last EDR Contact: Varies
Database Release Frequency: Varies — Date of Next Scheduled EDR Contact: N/A

FINDS: Facility Index System/Facility Identification Initiative Program Summary Report
Source: EPA
Telephone: N/A
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/01/99 — Date of Last EDR Contact: 04/16/99
Database Release Frequency: Quarterly — Date of Next Scheduled EDR Contact: 07/12/99

HMIRS: Hazardous Materials Information Reporting System
Source: US Department of Transportation
Telephone: 202-365-4526
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/97 — Date of Last EDR Contact: 03/24/99
Database Release Frequency: Annually — Date of Next Scheduled EDR Contact: 04/26/99

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 12/08/98 — Date of Last EDR Contact: 03/02/99
Database Release Frequency: Quarterly — Date of Next Scheduled EDR Contact: 05/31/99

NPL LIENS: Federal Superfund Liens
Source: EPA
Telephone: 205-564-4267
Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability.

Date of Government Version: 10/15/91 — Date of Last EDR Contact: 02/22/98
Database Release Frequency: No Update Planned — Date of Next Scheduled EDR Contact: 05/24/99

FEDERAL NON-ASTM RECORDS:

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-260-3936
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 09/22/97 — Date of Last EDR Contact: 03/05/99
Database Release Frequency: No Update Planned — Date of Next Scheduled EDR Contact: 05/17/99

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issues under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/95 — Date of Last EDR Contact: 03/15/99
Database Release Frequency: No Update Planned — Date of Next Scheduled EDR Contact: 06/14/99

ROD: Records of Decision
Source: NTIS
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 01/31/99 — Date of Last EDR Contact: 04/19/99
Database Release Frequency: Annually — Date of Next Scheduled EDR Contact: 07/19/99

TRIS: Toxic Chemical Release Inventory System
Source: EPA
Telephone: 202-260-1531
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title II Section 313.

Date of Government Version: 12/31/97 — Date of Last EDR Contact: 04/01/99
Database Release Frequency: Annually — Date of Next Scheduled EDR Contact: 06/28/99

TSCA: Toxic Substances Control Act
Source: EPA
Telephone: 202-260-1444
Toxic Substances Control Act. TSCA identifies manufacturer s and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/94 — Date of Last EDR Contact: 04/26/99
Database Release Frequency: Every 4 Years — Date of Next Scheduled EDR Contact: 07/26/99

MINES: Mines Master Index File
Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959

Date of Government Version: 08/01/98 — Date of Last EDR Contact: 04/08/99
Database Release Frequency: Semi-Annually — Date of Next Scheduled EDR Contact: 07/05/99

STATE OF CALIFORNIA ASTM RECORDS:

BEP: Bond Expenditure Plan
Source: Department of Health Services
Telephone: 916-255-2118
Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/21/99	Date of Data Arrival at EDR: 07/27/94
Date Made Active at EDR: 08/02/94	Elapsed ASTM days: 6
Database Release Frequency: No Update Planned	Date of Last EDR Contact: 05/31/94

CAL-SITES (AWP): Annual Workplan
Source: California Environmental Protection Agency
Telephone: 916-323-3400
Known Hazardous Waste Sites. California DTSC's Annual Workplan (AWP), formerly BEP, identifies known hazardous substance sites targeted for cleanup.

Date of Government Version: 11/04/97	Date of Data Arrival at EDR: 11/21/97
Date Made Active at EDR: 12/20/97	Elapsed ASTM days: 29
Database Release Frequency: Annually	Date of Last EDR Contact: 02/02/99

CAL-SITES (ASPIS): Calsites
Source: Department of Toxic Substance Control
Telephone: 916-323-3400
The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database.

Date of Government Version: 04/01/99	Date of Data Arrival at EDR: 05/04/99
Date Made Active at EDR: 06/03/99	Elapsed ASTM days: 30
Database Release Frequency: Quarterly	Date of Last EDR Contact: 12/08/98

CHMIRS: California Hazardous Material Incident Report System
Source: Office of Emergency Services
Telephone: 916-464-3277
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/94	Date of Data Arrival at EDR: 03/13/95
Date Made Active at EDR: 004/24/95	Elapsed ASTM days: 42
Database Release Frequency: No Update Planned	Date of Last EDR Contact: 03/02/99

CORTESE: Cortese
Source: CAL EPA/Office of Emergency Information
Telephone: 916-327-1848
The sites for the list are designated by the State Water Resource Control Board (LUST), the integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 04/01/98	Date of Data Arrival at EDR: 08/26/98
Date Made Active at EDR: 09/23/98	Elapsed ASTM days: 28
Database Release Frequency: Annually	Date of Last EDR Contact: 02/08/99

LUST: Leaking Underground Storage Tank Information System
Source: State Water Resources Control Board
Telephone: 916-445-6532
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 01/31/99	Date of Data Arrival at EDR: 03/05/99
Date Made Active at EDR: 04/02/99	Elapsed ASTM days: 28
Database Release Frequency: Quarterly	Date of Last EDR Contact: 02/08/99

STATE OF CALIFORNIA ASTM RECORDS:

NOTIFY 65: Proposition 65
Source: State Water Resources Control Board
Telephone: 916-657-0696
Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/93
Date of Data Arrival at EDR: 11/01/93
Date Made Active at EDR: 11/19/93
Elapsed ASTM days: 18
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/08/99

SWF/LF (SWIS): Solid Waste information System
Source: Integrated Waste Management Board
Telephone: 916-255-4035
Active, Closed and Inactive Landfills. SWF/LF records typically contain an inventory of solid waste disposal facilities or landfills. These may be active or inactive facilities or open dumps that failed to meet RCRA Section 2004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 03/08/99
Date of Data Arrival at EDR: 03/08/99
Date Made Active at EDR: 04/07/99
Elapsed ASTM days: 30
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/08/99

TOXIC PITS: Toxic Pits
Source: State Water Resources Control Board
Telephone: 916-657-0696
Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/95
Date of Data Arrival at EDR: 08/30/95
Date Made Active at EDR: 09/26/95
Elapsed ASTM days: 27
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/08/99

UST: Hazardous Substance Storage Container Database
Source: State Water Resources Control Board
Telephone: 916-227-4408
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/90
Date of Data Arrival at EDR: 01/25/91
Date Made Active at EDR: 02/12/91
Elapsed ASTM days: 18
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 04/19/99

FID: Facility Inventory Database
Source: California Environmental Protection Agency
Telephone: 916-445-6532
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State water Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/93
Date of Data Arrival at EDR: 09/05/95
Date Made Active at EDR: 09/29/95
Elapsed ASTM days: 24
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 12/28/98

WMUDS/SWAT: Waste Management Unit Database
Source: State Water Resources Control Board
Telephone: 916-227-4448
Water Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the regional water quality control boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TCPA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.
Date of Government Version: 03/01/99
Date of Data Arrival at EDR: 04/02/99
Date Made Active at EDR: 04/30/99
Elapsed ASTM days: 28
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/24/99

STATE OF CALIFORNIA NON-ASTM RECORDS:	
AST: Aboveground Petroleum Storage Tank Facilities Source: State Water Resources Control Board Telephone: 916-227-4382 Registered Aboveground storage tanks. Date of Government Version: 02/22/99 Database Release Frequency: Quarterly	 Date of Data Arrival at EDR: 02/08/99 Date of Next Scheduled EDR Contact: 05/10/99
HAZNET: Hazardous Waste Information System Source: California Environmental Protection Agency Telephone: 916-324-1781 Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000-1,000,000 annually, representing approximately 350,000-500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. Date of Government Version: 12/31/97 Database Release Frequency: Annually	 Date of Data Arrival at EDR: 04/19/99 Date of Next Scheduled EDR Contact: 07/19/99
SOUTH BAY: South Bay Site Management System Source: California Regional Water Quality Control Board San Francisco Bay Region (2) Telephone: 510-286-0457 Groundwater Pollution cases in the Santa Clara Valley where the regulatory lead is the San Francisco Bay Regional Water Quality Control Board. Date of Government Version: 09/01/96 Database Release Frequency: Annually	 Date of Data Arrival at EDR: 03/15/99 Date of Next Scheduled EDR Contact: 06/14/99
WDS: Waste Discharge System Source: State Water Resources Control Board Telephone: 916-657-1571 Sites which have been issued waste discharge requirements. Date of Government Version: 03/01/99 Database Release Frequency: Quarterly	 Date of Data Arrival at EDR: 02/22/99 Date of Next Scheduled EDR Contact: 05/24/99

Source: EDR, 1999.

Table G-2
Hazardous Materials Sites Within the Project Corridor

EDR ID#	Location Relative to Alignment	Distance from Alignment (feet)	Category	Site Name	Address	Databases Identified
24	North	930	I	George E Masker Inc.	887 71st Ave.	RCRIS-SQG, HAZNET, FINDS
27	North	860	IV	L&M Plating Company	902 72nd Ave.	CERC-NFRAP, HAZNET
28	North	750	I	George E Masker Inc.	901 73rd Ave.	LUST, HAZNET
29	West	480	IV	BART - Coliseum Station	7200 San Leandro St.	HAZNET
30/97	North	500	III	Oakland Alameda County Coliseum	Hwy 880 at Hegenberger Rd	RCRIS-SQG, UST/CA FID, HAZNET
31	East	790	I	Damert Co	900 75th Ave.	RCRIS-LQG, FINDS
33	East	500	III	R&A Trucking Co.	865 75th Ave	UST/CA FID
34	East	790	IV	Olin Hunt Specialty Products	900 77th Ave., Unit B	HAZNET
34	East	960	IV	Tony's Street Custom Painting	7650 Hawley St.	HAZNET
35	East	500	III	R&A Trucking Co.	800 75th Ave	UST/CA FID
35	East	500	I	Omega Termite Control	807 75th Ave	LUST, RCRIS-SQG, HAZNET
35/41	--	--	I	Moose Lodge #324	690 Hegenberger Rd.	LUST, HAZNET
39	East	860	I	R&A Trucking/Martinez Trucking	865 77th Ave.	LUST, Cortese, HAZNET
39/40	East	820	III	Ocean Shore Iron Works	850 77th Ave	UST/CA FID
40	East	500	IV	Blue Water Environment Service	727 77th Ave	HAZNET
40	East	500	IV	Waste Oil Recovery Systems Inc.	765 77th Ave	HAZNET
40	East	570	I	County Recycling Services Inc.	800 77th Ave	LUST, Cortese
40	East	570	III	ENGS Lease Plan	800 77th Ave	UST/CA FID, SWF/LF
40	East	570	IV	Waste Management of Alameda County	800 77th Ave	HAZNET
40	East	500	I	Chevron Training Center	7616/7616 San Leandro St	LUST, Cortese, HAZNET
41	East	500	IV	Waste Oil Recovery Systems Inc.	7617 San Leandro St	HAZNET
44	East	570	III	CSB Construction Inc.	800 77th Ave	UST/CA FID
46	East	660	I	American Brass & Iron	7825 San Leandro St.	LUST, SLIC, Cortese, RCRIS-LQG, UST/CA FID, HAZNET
48	--	--	III	Tesoro Gasoline Digas Oakland	633 Hegenberger Rd	RCRIS-SQG
48	--	--	III	Texas Instruments inc.	633 Hegenberger Rd	RCRIS-SQG
48	--	--	III	Trailmobile Inc.	640 Hegenberger Rd	RCRIS-SQG
48	--	--	I	Environmental Innovations Corp	675 Hegenberger Rd, Suite 110	FINDS
48/55/58	--	--	I	Oakland International Trade Center	625-655 Hegenberger Rd	LUST, Cortese, HAZNET
58	--	--	III	--	625 Hegenberger Rd	UST/CA FID

Table G-2
Hazardous Materials Sites Within the Project Corridor

EDR ID#	Location Relative to Alignment	Distance from Alignment (feet)	Category	Site Name	Address	Databases Identified
58	--	--	IV	Quality Tune-Up #29	625 Hegenberger Rd	HAZNET
61	East	500	I	Golden Gate Truck Center	8200 Baldwin St.	LUST, RCRIS-SQG, HAZNET
62	--	--	I	ARCO Products Company	566 Hegenberger Rd	LUST, Cortese, UST/CA FID, HAZNET
62	--	--	III	Khalil Rooshan	566 Hegenberger Rd	UST/CA FID
67	--	--	I	Caltrans	555 Hegenberger Rd	LUST, RCRIS-SQG, HAZNET
68/69	East	580	I	Morris Transportation	8300 Baldwin St.	LUST, Notify 65
71/82	--	--	I	Shell	540 Hegenberger Rd	LUST, UST/CA FID, HAZNET
73	East	760	IV	Airport Automotive	8378 Baldwin St.	HAZNET
73	East	900	IV	Dwyer Contstruction	8401 Baldwin St.	LUST
73	East	790	I	Treescape	660 McClary Ave.	LUST
73	East	790	IV	Wayan Sardalla	660 McClary Ave.	HAZNET
77	East	710	I	West Coast Wire Rope & Rigging	608 McClary Ave	Notify 65
78	East	790	III	West Coast Wire Rope & Rigging	604 McClary Ave.	UST/CA FID
78	East	770	I	--	616 McClary Ave.	CHMIRS
86	East	930	IV	Techni Print	8470 Enterprise	HAZNET
87	--	--	I	Precision Trucking School	444 Hegenberger Rd	LUST
87	--	--	I	Unocal SS #5043	449 Hegenberger Rd	LUST, Cortese, UST/CA FID, HAZNET
87	--	--	II	Port of Oakland	455 Hegenberger Rd	HAZNET
87	--	--	III	Union Bank	560 Hegenberger Rd	LUST, UST/CA FID, RCRIS-SQG, HAZNET
87/113	--	--	I	Chevron SS #91851	451 Hegenberger Rd	LUST, UST/CA FID
92	--	--	IV	Sir Speedy Printing Center	433E Hegenberger Rd	HAZNET
95	East	500	IV	Navcare	8450 Edes Ave	HAZNET
96	--	--	II	Oakland APCA	410 Hegenberger Rd	HAZNET
96	--	--	I	--	I880 S/W Hegenberger	CHMIRS
97	--	--	II	Caltrans	Hwy 880 at Hegenberger Rd	RCRIS-SQG, HAZNET, FINDS
101	--	--	III	California Motor Express	333 Hegenberger Rd	RCRIS-SQG
101	--	--	III	Delta Lines Inc.	333 Hegenberger Rd	RCRIS-SQG
101	--	--	III	Thunderbird Freight Lines	333 Hegenberger Rd	RCRIS-SQG
104	--	--	IV	Precision Trucking School	300 Hegenberger Rd	HAZNET
104/125	--	--	III	Pacific Bell (Q3-650)/Rollins Leasing - Branch #141-B	295 Hegenberger Rd	LUST, UST/CA FID, RCRIS-SQG, HAZNET, AST
106/109	East	610	IV	Roys Auto Body	20 Hegenberger Ct.	HAZNET
109	East	590	I	Tab Label Co. Inc.	21 Hegenberger Ct.	HAZNET

Table G-2
Hazardous Materials Sites Within the Project Corridor

EDR ID#	Location Relative to Alignment	Distance from Alignment (feet)	Category	Site Name	Address	Databases Identified
113/125	--	--	I	Shell Oil Co.	285 Hegenberger Rd	LUST, Cortese, RCRIS-SQG, UST/CA FID, Notify 65
115	East	500	I	Ward Hard Chrome dba Dolsby In	124 Hegenberger Loop	LUST, CERCLIS-NFRAP, RCRIS-SQG, UST/CA FIND, HAZNET
116	--	--	II	Port of Oakland	265 Hegenberger Rd	HAZNET
116/125	--	--	I	Bldg. K101 Yard	265 Hegenberger Rd	LUST, SLIC, UST/CA FID
120	--	--	I	Agricultural Property	250 Hegenberger Rd	LUST
121	East	500	II	American Safety Technologies	100 Hegenberger Loop	RCRIS-SQG, HAZNET
122	--	--	IV	General Tire Service	240 Hegenberger Rd	LUST, HAZNET
123	East	500	IV	Great Sierra Exploration	80 Hegenberger Loop	HAZNET
124	East	500	II	W Fargo Na Co-Trustee/Carpentar Pension	45 Hegenberger Loop	HAZNET
124	East	500	I	W.E.Lyons Construction	50 Hegenberger Loop	LUST, UST/CA FID, HAZNET
124	East	500	III	Britell Environmental Corp	60 Hegenberger Loop	RCRIS-SQG
125	--	--	I	TGR Container Sales	20 Hegenberger Rd	FINDS
125	--	--	IV	Marriot Courtyard	265 Hegenberger Rd	LUST
129	East	500	IV	Paramount Pest Control	20 Hegenberger Place	LUST
129	East	500	IV	Metals Evaluation & Testing Inc.	35 Hegenberger Place	HAZNET
129	--	--	II	Park Plaza Hotel	150 Hegenberger Rd	HAZNET
132	East	500	III	Baird Color Lab Inc.	65 Hegenberger Rd	RCRIS-SQG, HAZNET
134	--	--	I	David Property	106/110 Hegenberger Rd.	LUST, Cortese
136	--	--	I	Diablo Cellular	110 Hegenberger Rd	LUST
137	East	570	III	Scientific Platers of N Cal Inc.	9809 Kitty Lane	RCRIS-LQG
137	East	390	III	Gilbarco Service Center	9820 Kitty Lane	RCRIS-SQG
137	East	390	III	G M Associates	9824 Kitty Lane	RCRIS-SQG, HAZNET
137	East	470	III	Western Union Telegraph Company	9828 Kitty Lane	UST/CA FID
137	East	428	III	Rainbo Baking Co.	9832 Kitty Lane	RCRIS-SQG, HAZNET
137	East	600	IV	Dr. Sam Scarlett	9836 Kitty Lane	HAZNET
137	East	600	III	Xerox Corporation	9838 Kitty Lane	UST/CA FID
137	East	840	III	Dean X Ray Inc.	9849 Kitty Lane	RCRIS-LQG, HAZNET
139	--	--	IV	AF ALSF	1 Airport Dr	LUST
139	--	--	I	Elsinore Aerospace	1 Airport Dr	CHMIRS, HAZNET
139	--	--	IV	Port of Oakland	1 Airport Dr	HAZNET
139/145	--	--	I	Hertz Rent-a-Car	1 Airport Dr	LUST, Cortese, RCRIS-SQG

Table G-2
Hazardous Materials Sites Within the Project Corridor

EDR ID#	Location Relative to Alignment	Distance from Alignment (feet)	Category	Site Name	Address	Databases Identified
141	East	600	IV	North American Motors	132 98th Ave.	HAZNET
142	East	580	III	Budget Rent-A-Car	121 98th Ave.	LUST, UST/CA FID, HAZNET
143/144	East	500	III	Thrify-rent-a-car Air Park	111 98th Ave.	UST/CA FID
144	East	500	I	Douglas Airpark	111 98th Ave.	LUST, Cortese
144	East	500	III	L D R Company	111 98th Ave.	UST/CA FID
146/149	--	--	I	National Car Rental	100 Airport Drive	LUST, UST/CA FID, HAZNET
149	--	--	III	Daves Aircraft Service Inc.	1100 Airport Dr	RCRIS-SQG
149	--	--	I	Port of Oakland, Hangar 6	1100 Airport Dr	LUST, Cortese
149	--	--	III	World Airways Inc.,	1100 Airport Dr., Hangar 11	UST/CA FID
149	--	--	I	United Airlines Maintenance	1100 Airport Dr., Hangar 110	LUST, RCRIS-SQG, FINDS, HAZNET
151	West	100	II	Lloyd Elmore	98th Ave & Doolitle	HAZNET
151	West	100	III	Oil Changers #103	2 Hegenberger Rd	RCRIS-SQG
151/ 152	West	500	III	Pacific Car Rental of Oakland	2 Hegenberger Rd	UST/CA FID
153	--	--	II	Port of Oakland	Doolittle & Airport	HAZNET
154	--	--	I	Oakland International Airport	Doolittle & Airport	Cal-Sites
159	East	870	I	Galbraith Golf Court	10505 Doolittle Dr.	LUST, UST/CA FID, HAZNET
166	--	--	I	Federal Express Corp.	1 Sally Ride Way	HMIRS, RCRIS-SQG, UST/CA FID, HAZNET
169	--	--	III	Avis Rent a Car	Neil Armstrong Way & Airport	UST/CA FID
170	--	--	IV	Avis Rent a Car	1 Neil Armstrong	LUST
171	--	--	I	Chevron	1 Neil Armstrong	LUST
173	--	--	I	Shell	1 Neil Armstrong	LUST

Source: EDR, 1999

The full Environmental Data Resources, Inc. (EDR) report is available for review at the BART Extension Planning office, 1000 Broadway, 6th floor, Oakland, California. The following figure was generated by EDR for the report; the figure on the following page is a one-third-size reproduction of the original and is included here for visual reference only.

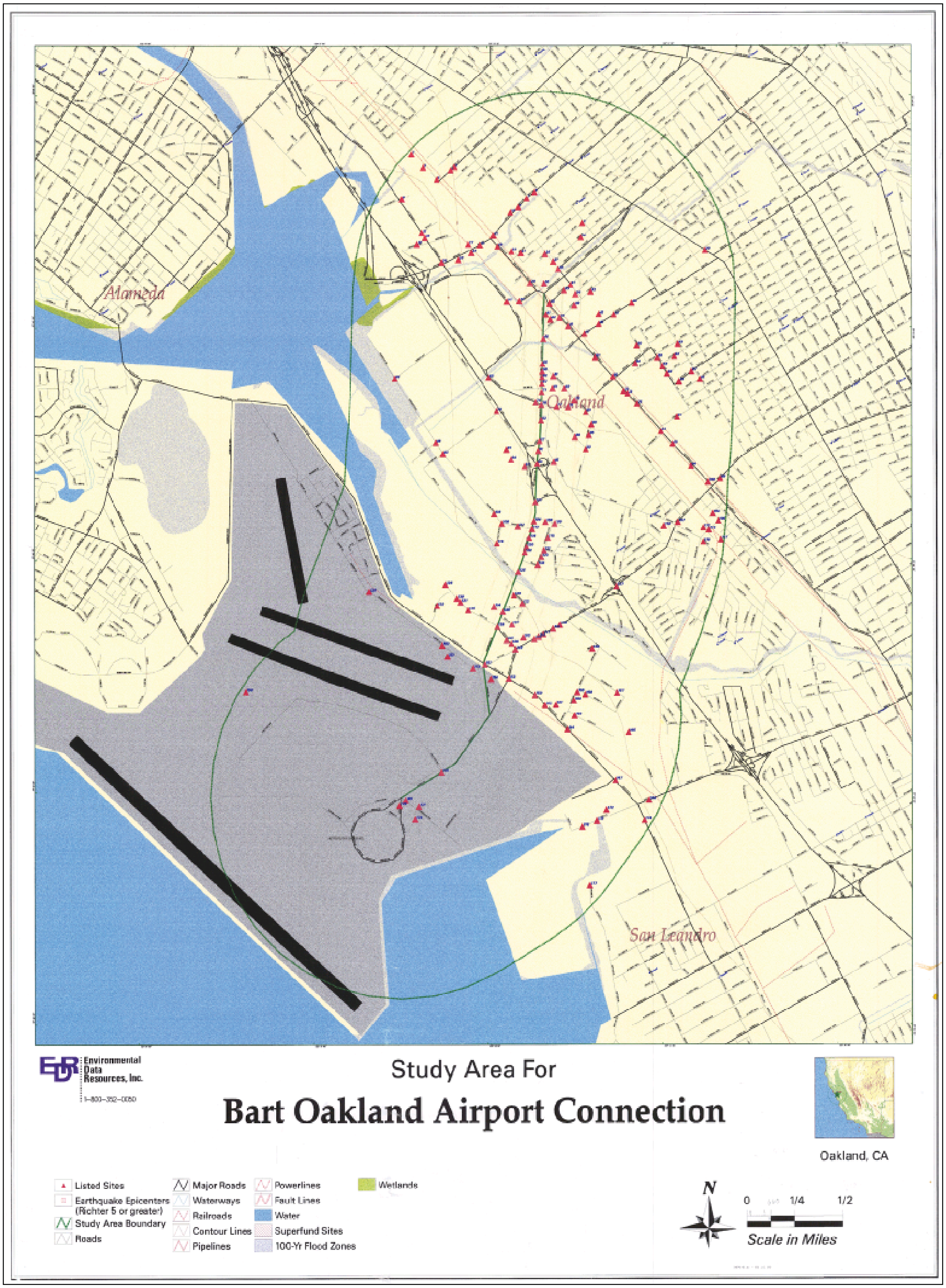


Figure G-1
Locations of Listed Hazardous Materials Sites in the Study Area (1999)