
**Final
Environmental Assessment**

**Travis Air Force Base
Burke Property Housing**

Submitted by

Travis Air Force Base
Fairfield, California

June 7, 1999

Prepared by

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ACRONYMS

AFB	Air Force Base
AHPA	Archeological and Historic Preservation Act
ARB	California Air Resources Board
ARPA	Archeological Resources Preservation Act
BAAQMD	Bay Area Air Quality Management District
BAERA	Bay Area Electric Railroad Association
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
EA	environmental assessment
EBS	environmental baseline survey
EIS	environmental impact statement
EO	Executive Order
FH	Family Housing
FONSI	finding of no significant impact
FTA	fire training area
IRP	Installation Restoration Program
LF	landfill
LUFT	leaking underground fuel tank
MFH	Military Family Housing
MSL	mean sea level
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPL	National Priorities List
PCB	polychlorinated biphenyls
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
ROI	Region of Influence
RONA	Record of Non-Applicability
ROW	right-of-way
SFBAAB	San Francisco Bay Area Air Basin
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

FINDING OF NO SIGNIFICANT IMPACT
AND
FINDING OF NO PRACTICABLE ALTERNATIVE

Burke Property Housing
Travis Air Force Base CA

1. Pursuant to the Council on Environmental Quality regulations, the provisions of the National Environmental Policy Act (40 CFR Parts 1500-1508) and Air Force Instruction 32-7061, the U.S. Air Force conducted an assessment of the potential environmental consequences of the construction of up to 281 military family housing units at Travis AFB. The housing units are sited on a 101-acre USAF-owned parcel of property referred to hereafter as the Burke property. The environmental assessment considered all potential impacts of the proposed action and alternatives, both as solitary actions and in conjunction with other proposed activities. A 30 day public comment period for the environmental assessment ended on 18 May 1999. The finding of no significant impact summarizes the results of the evaluations of proposed military family housing construction. Its discussion focuses on activities that have the potential to change both the natural and human environments. The finding of no practical alternative summarizes the options considered and why the housing was designed and sited as proposed.

2. Proposed Action.

a. The project will construct up to 281 military family housing (MFH) units, utilities, roads, playgrounds, and landscaping of same on a 101-acre tract called "Burke property." The Air Force acquired the Burke parcel in March 98 for the purpose of constructing new military family housing units. A 1993 Base Realignment and Closure Commission decision relocated personnel from March AFB CA to Travis AFB CA.

b. Travis AFB evaluated impacts from the relocation and mission changes in an Air Force Environmental Impact Statement (EIS), Realignment of Travis AFB, and Record of Decision (USAF 1994). The EIS and Record of Decision are available upon request from Travis AFB (60 AMW/EM at (707) 424-3739). Travis AFB tiered an environmental assessment (EA) from the EIS, consistent with the Council on Environmental Quality regulations (40 CFR Sections 1502.20, 1502.21, 1508.28), which focuses on Burke property site-specific environmental issues not fully addressed in the EIS.

c. The no action alternative would be inconsistent with Air Force policies and the Congressionally-approved realignment, which included the construction of new on-base housing. The no action alternative also results in a diminished quality of life for junior enlisted personnel who must cope with off-base housing that is distant from their place of work, in short supply, and at costs that exceed the housing allowance. Off-base housing does not provide the community support that military families need when personnel are deployed away from home station.

d. Two construction alternatives are discussed in the EA for Travis AFB Burke Property:

Construction of 281 military family housing units.

Construction of 226 military family housing units.

e. The preferred alternative is construction of 226 military family housing units.

f. The EA concludes that the proposed 226-unit housing project at Travis AFB meets the finding of no practical alternative (FONPA) requirements outlined in Executive Order 11990 (Wetland Protection). There are no practicable alternatives to this housing project. The proposed action includes all practicable measures to minimize harm. Potential impacts were analyzed in the EA.

(1) The 226 military family housing unit option was developed as a practicable alternative to the originally proposed 281 military family housing unit project, specifically to minimize impacts on wetlands. There is sufficient space on the property to construct 281 units. Travis AFB made the decision to remove 55 units from the Burke property project scope of work.

(2) The 226-unit alternative substantially reduces impacts to wetlands. Travis AFB configured the 226-unit project to minimize overlap between the development footprint and wetlands. There are no alternative configurations that would provide the same number of units and amenities, while limiting impact on wetlands. A smaller number of units would be inconsistent with the BRAC decision.

(3) All practicable measures to minimize harm were incorporated into the mitigation plan described in section 4.3.4 and appendix E of the EA. Travis AFB developed mitigation measures in cooperation with the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers.

(4) The proposed 226-unit design impacts only 1.40 out of 14.34 acres of wetlands. The project replaces lost wetlands with 1.5 acres of new constructed wetlands.

3. Summary of Findings.

a. Soil and Groundwater: It is unlikely that past site use resulted in soil or groundwater contamination of the Burke property. Additionally, potential off-site sources of contamination are all located hydrologically down-gradient or cross-gradient from the site. The potential for contamination associated with off-site sources of contamination is low. Development of residential housing on the site would not introduce significant sources of soil or groundwater contamination. Based on these findings, Travis AFB concluded no significant impacts related to soil and groundwater contamination. Mitigation measures are not required.

b. Biological Resources:

(1) *Vegetation and Wildlife Habitat.* The housing development is located on primarily elevated, upland portions of the Burke property site. The area supports grassland previously disturbed by livestock grazing, and planted trees (mostly eucalyptus). Site grading will be limited to 45 of the 101 acres. Given the abundance of similar habitat in the region (USAF 1994) and the absence of protected species, the loss of these areas to housing is considered less than significant. Some upland areas of the site will remain undeveloped, but will experience noise and activity during construction, and be subject to increasing passive recreational use when the housing is occupied. Increased disturbance of these areas from construction is temporary and considered less than significant. Travis AFB will ensure the contractor uses best management practices during construction to prevent erosion from travelling into vernal pools and other wetland habitats.

(2) *Wetland and Aquatic Habitat.* Construction of housing units avoids all areas that support vernal pools and the majority of other wetland and aquatic habitats. Construction of roadways and utilities minimally impact wetlands, but can be effectively mitigated. The impact to wetlands and other jurisdictional waters of the U.S. was analyzed by overlaying the perimeter "footprints" of rough grading onto the habitat map approved by the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service. Nearly all construction activities are located away from wetlands and other waters. Only 1.40 out of 14.34 acres of associated wetlands and other waters are effected (10%). Small areas where construction-related filling cannot be avoided are unlikely to be ecologically significant, but require mitigation in conjunction with Section 404 permitting. Mitigation measures include on-site and off-site compensation for affected habitat, and measures to protect the sites from direct and indirect impacts. Travis AFB will compensate for filling vernal swale #1 (in the Burke Property Housing EA) by shifting the outlet of pond #1 away from its current position. A broad, flat channel will be constructed that drains eastward into pond #2 during high rainfall events. This allows development of a constructed vernal swale/wetland mitigation area on the east side of the pond. Travis AFB will construct an outlet weir into the upper pond to allow control of the water height in pond #1 and the discharge into pond #2. Three artificial seasonal pools will be constructed in the new swale area as well. Additionally, the U.S. Air Force will contribute \$70,000 to a regional mitigation bank. The above mitigation measures reduce impact to less than significant.

(3) *Threatened and Endangered Species.* Based on the review of existing information on threatened and endangered species in the vicinity of Travis AFB, and on the results of site surveys (including focused surveys for endangered plants and animals, and site reconnaissance), the following species were identified and mitigation measures recommended:

(a) Contra Costa Goldfield Plants. Two individual endangered Contra Costa goldfield plants were found in two locations on the property. One plant was observed in a vernal pool—a traditional habitat for this plant. The second plant was located in a grassy area, not associated with its normal habitat. Construction activities will avoid all vernal pools. Mitigation measures include collection of seedbank from the Contra Costa goldfield sites for use in inoculating suitable habitat on site, or at a separate mitigation site at Travis AFB. This mitigation measure reduces the impact to the plant to less than significant. Travis AFB cooperated with the U.S. Fish and Wildlife Service to develop these mitigation measures.

(b) Vernal Pool Fairy Shrimp. Adult federally-listed threatened vernal pool fairy shrimp were found in three separate vernal pools. Vernal pool fairy shrimp resting cysts were identified in two additional vernal pools. To avoid direct impacts to these species, construction of housing units, roads, utilities, and parks will avoid these pools. Indirect impacts on remaining vernal pools will be mitigated to non-significance by:

- Restricting the use of herbicides and insecticides
- Re-vegetation with native plantings and erosion control plantings outside the housing landscaping footprint
- Restriction of cattle grazing
- Control of discharge water from water storage tanks
- Implementation of water-saving trickle or drip irrigation to control runoff
- Re-direction of foot and bike traffic away from the most sensitive areas
- Implementation of a Stormwater Pollution Prevention Plan meeting the requirements of the Clean Water Act
- Annual monitoring of a representative sample of vernal pools and ponds for four years and reporting results to U.S. Fish and Wildlife Service

(c) Giant Garter Snake. The federally and state-listed giant garter snake was considered for residence on the Burke property, but determined not to occur on-site. The Burke property is geographically separated from the nearest known population. The on-site freshwater marsh is discontinuous with other giant garter snake habitat. The U.S. Fish and Wildlife Service agrees with this conclusion. The housing project will not significantly impact the giant garter snake.

(d) California Tiger Salamander. The U.S. Army Corps of Engineers found one California tiger salamander carcass on-site (candidate for federal listing). Travis AFB surveyed the Burke property for suitability of habitat. Most or all of the potential breeding habitat on site is of recent origin resulting from human activities. Mitigation for Tiger Salamander includes siting the project to avoid impacts to potential Tiger Salamander habitat (vernal pools and wetlands), installation of drainage culverts to retain pond and pool hydrology, construction of rounded curbs and gutters to prevent trapping of migrating salamanders. Restrictions on the use of herbicides and pesticides and monitoring will minimize any potential impacts to Tiger Salamanders.

(e) Golden Eagle. Travis conducted surveys for the golden eagle (Bald and Golden Eagle Protection Act, 16 U.S.C. 668-668d). Presence of the golden eagle on the Burke property is limited to transient foraging. This is expected given their sporadic occurrence in surrounding areas. The housing project will not impact the golden eagle foraging. No mitigation is required.

c. Cultural Resources: Archaeological investigation for the Burke property concluded that no National Register of Historic Places listed or eligible prehistoric or historic resources are located on the Burke property. Construction of family housing would not have any significant impacts on cultural resources. Travis AFB provided the California State Historical Preservation Office with a copy of this finding. No mitigation is required.

d. Air Emissions: In June 1994 the Air Force accomplished a Clean Air Act general conformity determination for the realignment of Travis AFB, including construction and occupation of new military family housing. The conformity determination concluded that the Travis realignment action, including the construction of additional housing and consequent decrease in commuting time for military personnel, would result in fewer emissions than historic activity levels at Travis AFB. The proposed housing project is in positive conformity with the current State Implementation Plan and in compliance with United States Environmental Protection Agency regulation, Determining Conformity of General Federal Actions to State or Federal Implementation Plans, 40 Code of Federal Regulations, Part 93, Subpart B, effective 31 January 1994.

e. Environmental Justice: The Burke property is uninhabited. Minority or low-income populations are not affected by construction of military family housing. No adverse environmental impacts would occur outside the Burke property. Hence, no adverse effects on minority and low-income populations would occur as a result of construction of new housing. No mitigation is required.

f. Indirect and Cumulative Impacts: Indirect and cumulative impacts associated with the realignment of Travis AFB were addressed in the EIS for the Realignment of Travis AFB (1994). The EIS determined some actions were beneficial for certain types of socioeconomic impacts, and otherwise insignificant with the implementation of mitigation measures. There are no indications of site contamination on the Burke property and, consequently, no potential indirect or cumulative effects. Construction of housing on the property would not contribute significantly to base-wide contamination. Mitigation for site-specific biological resources impacts will take into account and mitigate for any on- and off-site indirect impacts, as well as regional cumulative impacts on the affected resources. There are no site-specific direct, indirect, or cumulative impacts associated with cultural resources on the Burke property.

g. Unavoidable Adverse Impacts: There are no significant unavoidable adverse impacts. All potentially significant impacts will be mitigated to less-than-significant levels.

on the affected resources. There are no site-specific direct, indirect, or cumulative impacts associated with cultural resources on the Burke property.

g. Unavoidable Adverse Impacts: There are no significant unavoidable adverse impacts. All potentially significant impacts will be mitigated to less-than-significant levels.

h. Relationship Between Short-term Uses and Enhancement of Long-term Productivity: Implementation of the proposed or alternative project designs has a positive effect on long-term productivity by enabling U.S. Air Force personnel to live closer to Travis AFB and reduce the cost and inefficiencies associated with commuting from off-base locations.

i. Irreversible and Irretrievable Commitment of Resources: Construction of military family housing on Travis AFB would irreversibly commit portions of the Burke property to residential development, while leaving significant areas as undeveloped open space that would continue to support valuable wetland habitats.

4. Finding of No Significant Impact: Based on the attached environmental assessment, conducted in accordance with the requirements of the National Environmental Policy Act, the Council on Environmental Quality Regulations, and Air Force Instruction 32-7061, I conclude that the preferred alternative, construct 226 military family housing units at Travis AFB, will have no significant individual or cumulative impact upon the environment. An environmental impact statement is not warranted and one will not be prepared.

5. Finding of No Practicable Alternative: Pursuant to Executive Order 11990 and taking the above information into consideration, I find that there is no practicable alternative to this action and that the proposed action includes all practicable measures to minimize harm. In accordance with Executive Order 11990, Section 2(a)(2), the Travis AFB Environmental Management Section will send notice of the proposed action to the U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service. Travis AFB will also send notices to single points of contact, local government representatives, and the local news media.



THOMAS W.L. MCCALL, JR.

Deputy Assistant Secretary of the Air Force
(Environment, Safety and Occupational Health)

Attachment:
Environmental Assessment

07 JUN 1999

Final Environmental Assessment for Travis Air Force Base Housing

Lead Agency:	U.S. Air Force, Travis Air Force Base
Cooperating Agency:	U.S. Fish and Wildlife Service; U.S. Army Corps of Engineers
Title of Proposed Action:	Environmental Assessment for Travis Air Force Base Housing
Affected Jurisdictions:	City of Fairfield and County of Solano, California
Designation:	Environmental Assessment

ABSTRACT

In support of previously reviewed, approved, and implemented Base Realignment and Closure (BRAC) actions, Travis Air Force Base (AFB) proposes to construct military family housing on the 101-acre Burke Property on the north side of the base. The use of the property for that purpose was previously reviewed and approved along with the other BRAC actions in an Environmental Impact Statement (EIS), from which this Environmental Assessment (EA) is tiered (40 CFR 1502.20). To meet the BRAC-related housing needs, alternative designs for the construction of 281 units and 226 units have been developed and are evaluated in this EA, along with No Action.

This EA focuses on Soil, Groundwater, Air Quality, Biological Resources, and Cultural Resources. For other resource and issue areas, impacts and, where appropriate, mitigation measures associated with the construction of housing on the Burke Property were adequately described in the BRAC EIS and Record of Decision (ROD) (USAF 1994a,b). This EA finds that there are no potentially significant areas of site contamination or cultural resources on the site and no significant impacts on air quality. With respect to Biological Resources, the 281-unit design would eliminate 3.90 acres of wetland and aquatic habitats, including some areas that may support threatened and endangered species. The preferred 226-unit alternative would eliminate 1.40 acre of wetland and aquatic habitats while avoiding wetlands that may support threatened and endangered species. For either alternative, remaining impacts that cannot be avoided would be mitigated on- or off-site, based upon requirements stipulated by the USFWS and U.S. Army Corps of Engineers, pursuant to the requirements of the Endangered Species Act and Clean Water Act. Other potential short- and long-term impacts associated with the construction and use of housing in proximity to wetland and aquatic habitats on the site would be mitigated to insignificance through measures described in this EA. No other potentially significant environmental impacts are identified for either the Proposed or Alternative projects.

The No-Action alternative would be inconsistent with Air Force policies and the congressionally approved realignment, which included the construction of new on-base housing. No Action also results in a diminished quality of life for junior-enlisted personnel who must cope with off-base housing that is distant from their place of work, and in short supply, at costs that exceed the housing allowance provided with their salaries. Off-base housing does not provide the community support that military families need when personnel are called to duty.

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June 7, 1999

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EXECUTIVE SUMMARY

1 INTRODUCTION

2 This Environmental Assessment (EA) analyzes the potential impacts on the environment resulting
3 from construction of military family housing on the Burke Property, Travis Air Force Base (AFB).
4 This EA is tiered from the Environmental Impact Statement (EIS) for the Realignment of Travis
5 AFB (USAF 1994a,b) and focuses on the substantive issues that could not be fully addressed in that
6 EIS, namely Soil, Groundwater, and Air Quality, Biological Resources, and Cultural Resources.
7 This EA has been prepared pursuant to the requirements of the National Environmental Policy
8 Act (NEPA), the Council on Environmental Quality (CEQ) implementing regulations (40 CFR
9 1500-1508), and Air Force Instruction 32-7061, which implements Directive 32-70 (Environmental
10 Quality).

11 PURPOSE AND NEED

12 The purpose of the project is to provide military family housing (MFH) on the 101-acre (41-
13 hectare) Burke Property, which was acquired by the Air Force for that purpose in March 1998. The
14 project would help meet the need for additional military family housing that was created by the
15 relocation of personnel to Travis AFB from March AFB, an action approved by the Base Closure
16 and Realignment Commission and evaluated in the Air Force's EIS and Record of Decision (USAF
17 1994a,b). Currently, personnel that have relocated to Travis AFB reside off-base in surrounding
18 communities, where housing is in short supply and relatively expensive. Construction of military
19 family housing on the Burke Property would enable Air Force personnel and their families to live
20 in closer proximity to Travis AFB, and to avoid the high costs, uncertain availability and suitability
21 of off-base housing, and commuting associated with residing off-base.

22 In combination with other on-base housing projects, 281 units on the Burke Property are necessary
23 to fully meet the housing needs associated with the realignment of personnel. If fewer than 220
24 units are to be constructed congressional notification would be required. Delays associated with
25 such notification may jeopardize the Air Force's opportunity to obligate funds by July 1999 to
26 ensure compliance with current policies regarding implementation of the Base Closure and
27 Realignment Act of 1990, as amended.

28 PROJECT ALTERNATIVE DESCRIPTIONS

29 The Proposed Project is to develop housing on the Burke Property. There are two alternative
30 project designs, a 281-unit design and a 226-unit design. The 281-unit design entails construction
31 on about 58 acres of the 101-acre site, avoiding most areas of wetland and aquatic habitats. In
32 response to input from the Fish and Wildlife Service and Corps of Engineers, to further reduce the
33 impact on wetlands and associated endangered species, a Reduced (226-Unit) Housing Alternative
34 has been designed and is fully considered in this document. This alternative would use about 45
35 acres of the site while avoiding construction in nearly all areas of vernal pools and other wetland
36 and aquatic habitats. The 226-unit design is the preferred alternative.

For either alternative the housing would be a mix of 2 bedroom, 3 bedroom, and 4 bedroom units in duplex. The final site plan will also include provisions for recreation (tot lots, playgrounds, and basketball courts) as well as a trail system. Site utilities will include underground water, sewer, storm sewer, electric power, street lighting, gas, telephone, and cable TV. Peaks from storm runoff will be accommodated by retention basins on site, or on adjacent Air Force property. Street access will be provided at two locations from the western and eastern sides of the property.

ENVIRONMENTAL IMPACTS

The EIS for Realignment of Travis AFB and Record of Decision (ROD) concludes that there are no significant unmitigated impacts in resource/issue areas with the exception of Soil, Groundwater and Air Quality, Biological Resources, and Cultural Resources. Impacts and where appropriate, mitigation measures, would apply for other resource areas associated with construction of housing on the Burke Property identified in the EIS and ROD, including dust control measures for short-term air quality impacts. Each of the three areas of primary concern for this EA are discussed below.

With regard to Soil and Groundwater (sections 3.2 and 4.2 of this document), no significant impacts related to soil and groundwater contamination are anticipated and no mitigation measures would be required. Site investigations indicate that soil or groundwater contamination is unlikely to be present on the Burke Property. All potential off-site sources of contamination are located hydrologically downgradient or cross-gradient from the site; therefore, the potential for contamination associated with off-site sources of contamination is low. The same conclusions would apply to either the Proposed Project or the Reduced Housing Alternative. With regard to Air Quality (sections 3.2 and 4.2 of this document), impacts of construction would not be significant with implementation of Bay Area Air Quality Maintenance District (BAAQMD) enhanced fugitive dust control measures. Construction of the project would result in reduced vehicle miles traveled compared and a resulting reduction in combusive emissions compared to the existing situation and impacts from the action would be insignificant.

With regard to Biological Resources (sections 3.3 and 4.3 of this document), both the 281-unit design and the 226-unit design would avoid impacts on most areas of wetlands and aquatic habitats. Impacts on non-wetland grassland and eucalyptus woodland habitats are considered insignificant. The 281-unit design would require the grading and/or filling of 3.90 acres of wetlands and aquatic habitats, for which a permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act would be required. The 281-unit design would eliminate two locations where two individual plants of the endangered Contra Costa goldfields were found and one location potentially supporting the vernal pool fairy shrimp, a threatened species. A combination of on-site and offsite mitigation will be implemented based upon requirements stipulated by the U.S. Fish and Wildlife Service (USFWS) in their Biological Opinion concluding Section 7 Endangered Species Act Consultation. The 226-unit design substantially reduces the impact on wetlands and aquatic habitats, to 1.40 acres. This alternative avoids the loss of any pools that may support the threatened vernal pool fairy shrimp.

For either alternative, remaining impacts that cannot be avoided would be mitigated on- or off-site, based upon requirements stipulated by the USFWS and U.S. Army Corps of Engineers, pursuant to the requirements of the Endangered Species Act and Clean Water Act. Other measures are identified in this EA to mitigate the short-term impacts of construction, as well as the long-term impacts associated with the occupancy of the housing development.

With regard to Cultural Resources (sections 3.4 and 4.4 of this document), ground disturbances associated with the proposed construction of family housing on the Burke Property would not have any significant impacts on cultural resources because no properties eligible for listing on the National Register are present. No mitigation measures would be required. The same conclusions would apply to either the 281-unit design or the 226-unit design alternative.

Other issues have been considered as required under NEPA, with the following conclusions:

- Relevant to Environmental Justice, there would be no adverse effects on minority or low-income populations.
- There would be no unavoidable significant adverse environmental impacts.
- The project would irreversibly commit portions of the Burke Property to residential development while preserving as undeveloped open space other portions that support sensitive wetland and aquatic habitats.
- The project would enhance long-term productivity by reducing the inefficiencies associated with Air Force personnel having to live in surrounding communities rather than on the base.
- Cumulative and indirect impacts associated with the realignment action have been previously addressed through the EIS for Realignment of Travis AFB (USAF 1994a,b). With regard to the new issue areas considered in this EA, the project would have no cumulative impacts. The only indirect impacts are associated with on-site biological resources, and those are addressed in section 4.3 of this document.

PUBLIC PARTICIPATION

The housing project is part of the proposed action that was evaluated in the EIS for Realignment of Travis AFB (USAF 1994a), which included scoping and consideration of public and agency comments on the realignment action, as required by the National Environmental Policy Act. To provide additional opportunity for public and agency input, a draft Environmental Assessment (EA) was circulated for public agency review and comment on February 8, 1999, with the comment period closing on March 10, 1999. The availability of the draft EA was announced in two local newspapers, *The Vacaville Reporter* and *The Fairfield Daily Republic*. Subsequent to the public comment period on the Draft Environmental Assessment (EA), the Air Force prepared a Draft Final Environmental Assessment and Draft Finding of No Significant Impact (FONSI) and Finding of No Practicable Alternative (FONPA). These were available for public review and comment for

Executive Summary

- 1 a 30-day period beginning April 19, 1999 and ending May 18, 1999. A notice of availability was
2 published on April 19, 1999 in two local newspapers, the *Reporter* and the *Daily Republic*.
- 3 Four letters commenting on the Draft EA were received. These comments concerned fiscal issues
4 regarding local schools and roads, impacts on local services, project consistency with local plans
5 and policies, wetlands, and endangered species. Responses to these comments are included in
6 Appendix D along with the comment letters and the transmittal letter that accompanied the draft
7 EA. Additional comments received during the comment period for the Draft Final EA were
8 received from the City of Fairfield Department of Planning and Development. Their letter says
9 that the City continues to support projects that will provide housing for military personnel at
10 Travis AFB and identifies no concerns with regard to the proposed Burke Property housing project
11 or its consistency with local plans or policies.
- 12 This is the Final Environmental Assessment. At the time of its release in June 1999, the Air Force
13 published the availability of FONSI and FONPA in the *Reporter* and the *Daily Republic*.

1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1 1.1 PURPOSE OF THE PROPOSED ACTION

2 The proposed action is to develop on-base family housing on land known as the Burke Property,
3 on the north side of Travis Air Force Base (AFB). The purpose of the proposed action is to provide
4 housing for Air Force personnel and their families that have been relocated from March AFB to
5 Travis AFB as a result of actions taken by the Defense Base Closure and Realignment Commission.

6 The use of the Burke Property for this purpose was previously analyzed in the Environmental
7 Impact Statement (EIS) for the Realignment of Travis AFB (USAF 1994a) and approved in the Air
8 Force's Record of Decision on the realignment (USAF 1994b). The EIS and Record of Decision are
9 available upon request from Travis AFB (60th AMW/EM at 707-424-3739). This Environmental
10 Assessment (EA) is tiered from the EIS, consistent with Council on Environmental Quality (CEQ)
11 regulations (40 CFR Sections 1502.20, 1502.21, and 1508.28), and focuses on the site-specific
12 environmental issues (see Chapters 3 and 4 of this document) that could not be fully addressed at
13 the time the EIS for Realignment of Travis AFB was prepared, namely site contamination,
14 biological resources, and cultural resources. This EA is intended to inform the Air Force's decision
15 on the design and construction of housing on the Burke Property.

16 Figures 1-1 and 1-2 show the location of the proposed action. Selection of the Burke Property for
17 new family housing was based on its proximity to existing Travis AFB family housing, land use
18 compatibility, access to utilities, availability for purchase, capability to meet anticipated housing
19 needs, and aesthetics for housing. The Burke Property is contiguous with, and accessible through,
20 existing family housing on Travis AFB. The Air Force purchased the 101-acre (41-hectare) Burke
21 Property in March 1998 and has conducted planning and environmental studies on the site to
22 identify constraints and opportunities for development that will make effective use of land and
23 infrastructure while avoiding significant environmental impacts.

24 Site selection criteria focus on configuring the housing area construction "footprint" to minimize
25 the impact on the following on-site resources:

- 26 • Freshwater ponds and associated wetlands created by previous excavations on the site.
- 27 • Vernal pools that provide habitat for migratory birds, rare plants, and invertebrates.
- 28 • Other wetland habitats the filling of which would require a Clean Water Act section 404
29 permit.
- 30 • Areas known or likely to support threatened and endangered species.

1. Purpose of and Need for the Proposed Action

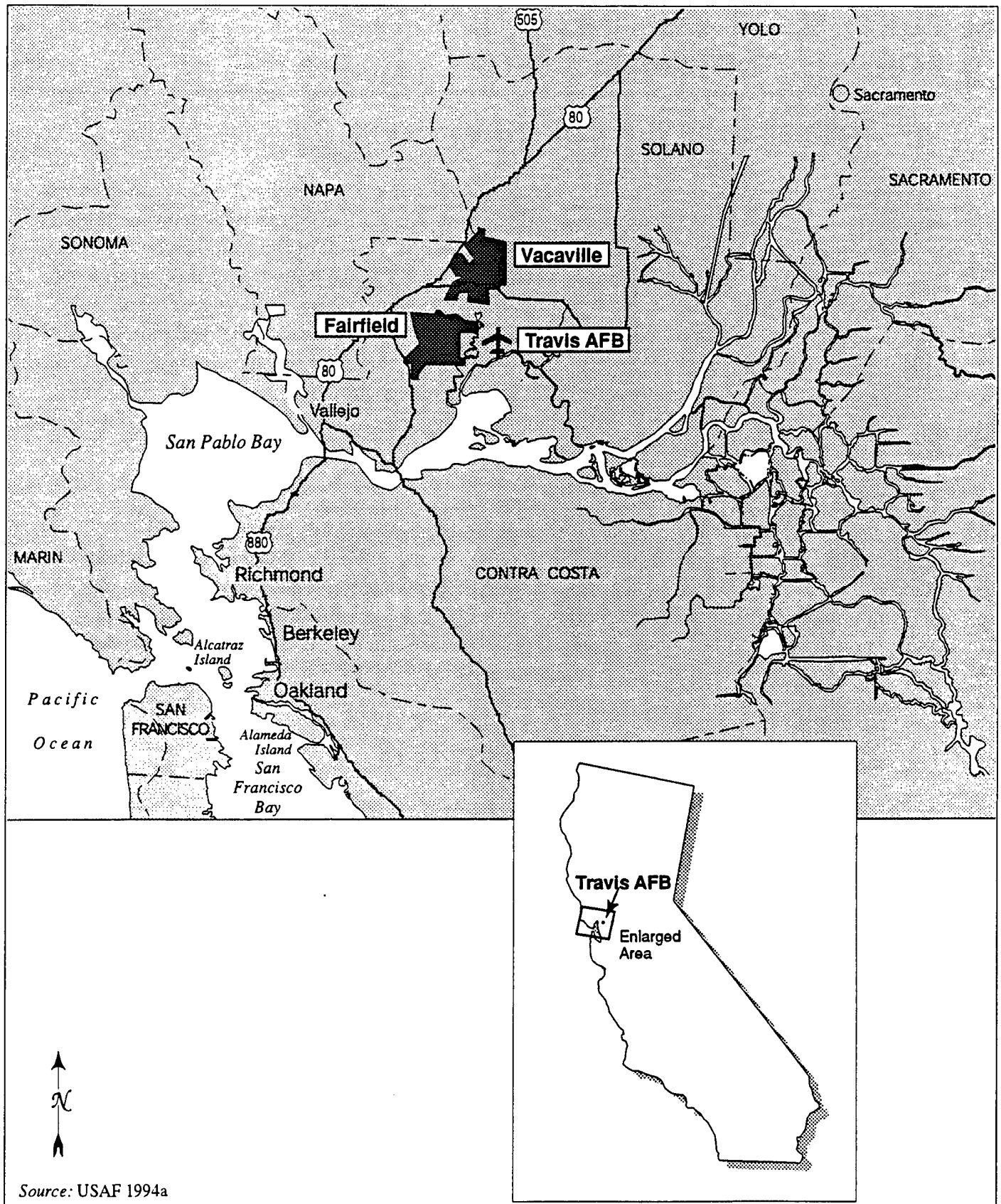


Figure 1-1. Location of Travis AFB

1. Purpose of and Need for the Proposed Action

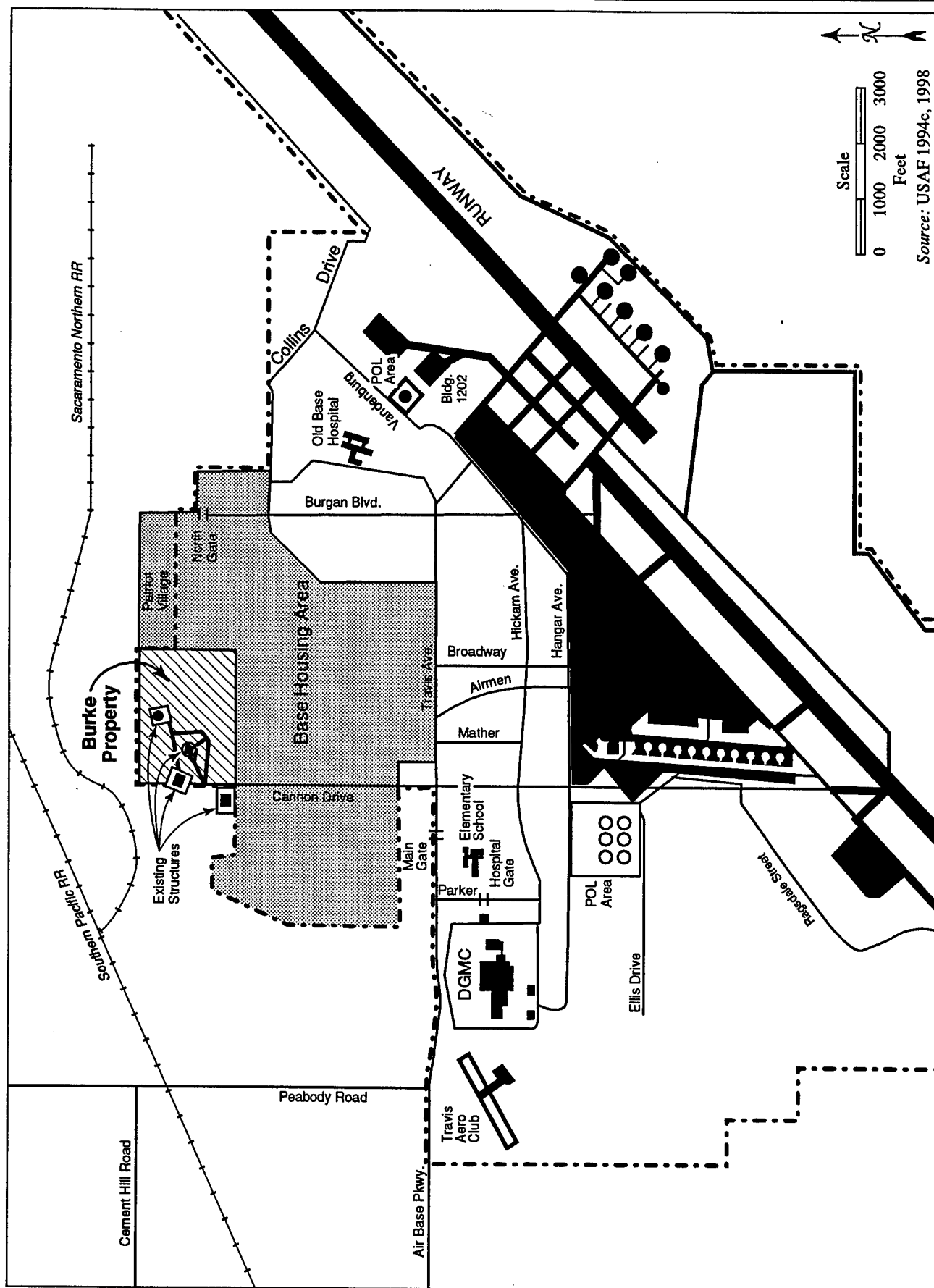


Figure 1-2. Location of Burke Property in Relation to Other Facilities on Travis AFB

1. Purpose of and Need for the Proposed Action

The proposed action would provide housing units consisting of 2-, 3-, and 4-bedroom units in duplexes for junior enlisted military members and their families. The construction of housing on the Burke Property would, in combination with other on-base housing projects, help meet the goals that have been established and funded by Congress in support of the Base Realignment and Closure (BRAC) process, to provide new housing for the relocated personnel at Travis AFB.

1.2 NEED FOR THE PROPOSED ACTION

Acting under the Defense Base Closure and Realignment Act of 1990 (Public Law 101-510), the 1993 Defense Base Closure and Realignment Commission relocated a KC-10 aerial tanker squadron from March AFB to Travis AFB. The realignment action included the transfer of 19 KC-10 aircraft and 1,255 full-time military, part-time drill, and civilian manpower personnel to Travis AFB, necessitating the construction of new facilities, including family housing.

New housing must be constructed because Travis AFB does not have adequate housing for junior enlisted military members and their families. The 1997 Housing Market Analysis for Travis AFB (Niehaus 1998) found a deficit of 152 units of military family housing at Travis AFB as of 1997. For FY 2002, the projected deficit without the construction of additional housing would rise to 473 units of military family housing. This deficit consists of long-standing deficiencies combined with the additional requirements associated with relocation of personnel from other installations as part of ongoing base realignment and closure actions. Failure to construct new on-base housing makes it necessary for Air Force families to live off-base, where they experience greater travel distances, housing costs that are generally in excess of the housing allowance provided for junior enlisted personnel, and the uncertain availability of suitable housing.

The Final EIS for Realignment of Travis AFB and Record of Decision (ROD) (USAF 1994a,b) were prepared in accordance with the National Environmental Policy Act (NEPA) and the provisions of the Defense Base Closure and Realignment Act of 1990. The Final EIS assumed that 384 units would be constructed on the Burke Property to alleviate the increased demand for housing associated with the BRAC relocation. This number of new units does not eliminate the longstanding deficit cited above. The Final EIS assessed the potential environmental impacts of the realignment action, including 384 units, on the mission and operation of the base, air quality, geological resources, water resources, biological resources, cultural resources, the base environmental programs, noise, transportation, and socioeconomic concerns (USAF 1994a). No significant environmental impacts were identified for the construction of 384 new housing units and a Record of Decision was filed with the EPA in 1994 completing the NEPA process at that time (USAF 1994b).

The scope for the Burke property was reduced to 281 units by siting 80 units in two other projects on Travis AFB. One of the projects is a 52-unit development that has since been constructed. The other is a 28-unit project that is fully designed. The 281-unit project, in combination with these other two projects, fully meets the BRAC housing requirement.

To meet the housing need and comply with the rules established in the *Air Force Family Housing Guide*, at least 75 percent of the BRAC-required 361 units must be provided. Failure to meet the 75

percent goal would necessitate going back to Congress to reprogram the project, which could result in a loss of funds. Given that 52 units have been constructed, the minimum need for new housing on the Burke property has been determined to be 220 units. This would allow the Air Force to meet the minimum objective for new housing.

1.3 SCOPING PROCESS AND PUBLIC PARTICIPATION

During the preparation of the EIS for Realignment of Travis AFB, a public scoping meeting was held to obtain input from the general public and agency personnel to assist the Air Force in determining the nature, extent, and scope of significant issues related to the realignment action. Specific areas of concern that were identified included the following (USAF 1994a):

- Concerns generic to all military base closures, realignments, and reuse, including the need to conform with Clean Air Act requirements; to assess impacts on other media such as hazardous waste, water quality, and biological resources; and to coordinate with other federal and state agencies.
- Aircraft noise and potential conflicts with the general land use plans of Suisun City and Fairfield.
- Effects on federally recognized threatened, endangered, and sensitive species.
- Effects on ground and surface water resources, cultural resources, geological resources, flight safety, land uses, and socioeconomic resources.

The EIS for Realignment of Travis AFB addressed the above concerns and evaluated use of the Burke Property for housing in support of the realignment action. Public comments on that action were considered in the Final EIS (USAF 1994a). This Environmental Assessment (EA) is tiered from the EIS, consistent with CEQ regulations (40 CFR Sections 1502.20, 1502.21, and 1508.28), and focuses on the site-specific environmental issues that could not be fully addressed at the time the EIS for Realignment of Travis AFB was prepared. These issues include soil and water contamination, biological resources, and cultural resources.

During the preparation of this EA, representatives of the Air Force consulted with the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the California Office of Historic Preservation regarding potential site-specific issues. A draft of this EA was circulated for public agency review and comment on February 8, 1999, with the comment period closing on March 10, 1999. The availability of the draft EA was announced in two local newspapers, *The Vacaville Reporter* and *The Fairfield Daily Republic*. Subsequent to the public comment period on the Draft Environmental Assessment, the Air Force prepared a Draft Final Environmental Assessment and Draft Finding of No Significant Impact (FONSI) and Finding of No Practicable Alternative (FONPA). These were available for public review and comment for a 30-day period beginning April 19, 1999 and ending May 18, 1999. A notice of availability was published on April 19, 1999 in two local newspapers, the *Reporter* and the *Daily Republic*.

Four letters commenting on the Draft EA were received. These comments concerned fiscal issues regarding local schools and roads, impacts on local services, project consistency with local plans

and policies, wetlands, and endangered species. Responses to these comments are included in Appendix D along with the comment letters and the transmittal letter that accompanied the draft EA. Additional comments received during the comment period for the Draft Final EA were received from the City of Fairfield Department of Planning and Development. Their letter says that the City continues to support projects that will provide housing for military personnel at Travis AFB and identifies no concerns with regard to the proposed Burke Property housing project or its consistency with local plans or policies.

This is the Final Environmental Assessment. At the time of its release in June, 1999, the Air Force published the FONSI and FONPA in the *Reporter* and the *Daily Republic*.

1.4 PERMITS AND OTHER REGULATORY COMPLIANCE REQUIRED FOR THE PROJECT

Several permits and other types of regulatory compliance are required prior to construction to implement either the 281-unit project or the 226-unit housing alternative. Permits include the following:

- A permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act for the placement of fill in jurisdictional Waters of the United States, including wetlands. A Water Quality Certification or Waiver from the Regional Water Quality Control Board prior to construction is also required by Section 401 of the Clean Water Act.
- Under Section 402 of the Clean Water Act, a Stormwater Pollution Prevention Plan (SWPPP) would be required as part of a National Pollutant Discharge Elimination System (NPDES) permit issued for the project by the Regional Water Quality Control Board.

Construction of the housing project on the Burke Property also required resolution of endangered species concerns through Section 7 Endangered Species Act Consultation with the U.S. Fish and Wildlife Service (USFWS); completion of Section 106 Consultation for Cultural Resources; and the Air Force's (SAF/MI) Finding of No Practicable Alternative (FONPA) for any unavoidable losses of wetland habitat. As described in this document the Air Force has met with the U.S. Fish and Wildlife Service and U. S. Army Corps of Engineers and has incorporated their concerns and suggestions into the design of project, especially the preferred 226-unit alternative. The Air Force has completed formal Section 7 Consultation with the USFWS (see Appendix E). A report on the Cultural and Historic Resource inventory of the project property has been submitted to the State Historic Preservation Officer (Appendix C). Preparation of the SWPPP will be completed prior to construction as an initial task in the construction contract.

2 PROPOSED ACTION AND ALTERNATIVES

2.1 ALTERNATIVES DESIGN PROCESS

2.1.1 SITE DESCRIPTION AND ENVIRONMENTAL CONSIDERATIONS

The Burke Property (Figure 2-1) consists of 101 acres (41 hectares) of hilly land, 100 to 160 feet (30 to 48 m) above mean sea level (MSL), that includes several small drainage swales, five permanent ponds that have established in old excavations, and 42 small seasonally wet (vernal) pools, consisting of natural or manmade depressions that are subject to seasonal ponding or inundation. Vegetation on the site is primarily grassland with several stands of willows and cottonwoods associated with drainages and ponds. Within the property boundaries but not included in the 101 acres (41 hectares) is a city water treatment plant, several storage tanks, and a sedimentation pond (located on the ridge crest). The site was formerly used for quarrying and the existing ponds are the remains of the quarry operation. The site was also used for grazing, but was rarely plowed or cultivated.

To address environmental issue areas that were not covered in the EIS for Realignment of Travis AFB, the Air Force has conducted site-specific environmental studies as a part of the planning process. These studies include investigating the potential for site contamination; biological resource studies focused on vernal pools and other wetlands and the potential occurrence of endangered species; and a cultural resource survey and analysis. No constraints to site development have been identified with respect to site contamination or cultural resources (see sections 3.2 and 3.4 of this document, respectively). Potential environmental or regulatory constraints are associated with the vernal pools and other wetland habitats on the site (Figure 2-1), which may support threatened or endangered species. As information on the status of these resources has been developed, the design of the housing project has been modified to avoid potential impacts.

2.1.2 PROJECT DESIGN FEATURES

Under either the 281-unit or 226-unit alternative designs, residential development, including houses, roadways, and utilities, would occur primarily on the upland (non-wetland) areas of the site, leaving half or more of the site as undeveloped open space. The final site plan will also include provisions for recreation (tot lots, playgrounds, and basketball courts) as well as a trail system. These amenities may be a part of this project or may be constructed at a later date, depending on availability of funds. Site utilities will include underground water, sewer, storm sewer, electric power, street lighting, gas, telephone, and cable TV. Peaks from storm run-off will be accommodated by retention basins on site, or on adjacent Air Force property. Street access will be required at two locations from the western and eastern sides of the property. Streets will be 40 feet (12 m) wide to accommodate on-street parking. Normal site grading will be required. Site design, including grading, will be sensitive to protecting the hydrology of any vernal pools or wetlands that are identified for preservation or mitigation in consultation with the various regulatory agencies involved.

2.1.3 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

As noted in Chapter 1, the initial EIS for Realignment of Travis AFB concept for Housing on the Burke Property was revised downward from 384 units to 281 units. This reduction enabled the housing development to be sited predominantly on the upland portions of the property, enabling most of the areas of wetlands and open water to be avoided by the development footprint.

2.2 ALTERNATIVES CARRIED FORWARD FOR DETAILED ANALYSIS

A housing design that provides 281 units was developed, and is shown in Figure 2-2. The design avoids most but not all areas of wetlands and open water habitat. In response to concerns from the U.S. Fish and Wildlife Service and Corps of Engineers over potential endangered species and wetlands impacts, a reduced housing alternative was subsequently developed, to provide a minimally adequate number of housing units, while reducing site development impacts. The design of this alternative has been carefully configured to avoid areas of vernal pool and other wetland and aquatic habitats that have been mapped in biological surveys conducted during 1998 and 1999. Figure 2-3 shows this 226-unit Housing Alternative in relation to biological resources of concern (discussed in more detail in section 3.3).

These two alternatives were carried forward for detailed analysis. Table 2-1 provides a summary comparison of the impacts of these two housing alternatives based upon the analysis contained in Chapter 4 of this document. The two alternatives differ with regard to their biological impacts. The preferred 226-unit alternative impacts less wetland acreage and has a lower potential impact on threatened and endangered species. The impacts of both alternatives were found to be mitigable to insignificant levels as described in Chapter 4.

2.3 NO-ACTION ALTERNATIVE

The No-Action Alternative would entail a decision not to construct housing on the Burke Property. As discussed in Chapter 1, failure to provide new on-base family housing that was approved as part of the BRAC realignment actions would result in the continuation of a substantial housing deficit for military families. Currently, personnel that have relocated to Travis AFB reside off-base in surrounding communities, where housing is in short supply and the cost of rent typically exceeds the housing allowances of junior enlisted personnel. Construction of MFH on the Burke Property would enable Air Force personnel and their families to live in closer proximity to their jobs and the schools their children attend, while avoiding the high costs, commuting, and uncertain availability and suitability of off-base housing. On-base housing also provides a supportive community for Air Force families when Air Force personnel are called to duty overseas. The No-Action Alternative's failure to construct MFH would be inconsistent with the BRAC realignment actions approved by Congress, and would result in a diminished quality of life for junior enlisted personnel and their families.

1 The Air Force has no plans for the Burke Property other than as a site for family housing. If
 2 housing is not constructed, in the short term the site would remain in its present condition as
 3 undeveloped open space. Long-term potential uses of the site, other than housing, are unknown,
 4 but would be subject to future review under NEPA. It should be noted that uses of the site other
 5 than for housing were not contemplated in the EIS for Realignment of Travis AFB (USAF 1994a),
 6 and would, accordingly, require full review in all resource-issue areas under NEPA.

**Table 2-1. Summary Comparison of Potential Impacts Associated
with Alternative Burke Property Housing Designs**

<i>Issue Area</i>	<i>281-Unit Design</i>	<i>226-Unit Design</i>	<i>Comments</i>
Soil and Groundwater	No impact	No impact	No soil or groundwater contamination identified on site.
Biological Resources			
Vegetation and Wildlife Habitat	58 acres (23.5 ha)	45 acres (18.2 ha)	Total habitat on property is 101 acres (41 ha).
Wetlands/Waters of the U.S.	3.90 acres (1.58 ha)	1.40 acres (0.57 ha)	A total of 14.34 acres (5.80 ha) of wetlands/Waters of the U.S. identified on site.
Threatened/Endangered Species			
Contra Costa Goldfields	2 locations	2 locations	A total of 2 locations for this endangered species identified on site in May 1998 (1 plant at each location); none in 1999
Vernal Pool Fairy Shrimp	1 location	0 locations	Adults found in 3 locations (vernal pools). Two additional locations identified as suitable habitat based on presence of resting stages (cysts) not identified to species.
Cultural Resources	No impact	No impact	No eligible cultural resources identified from the site during surveys and background research.

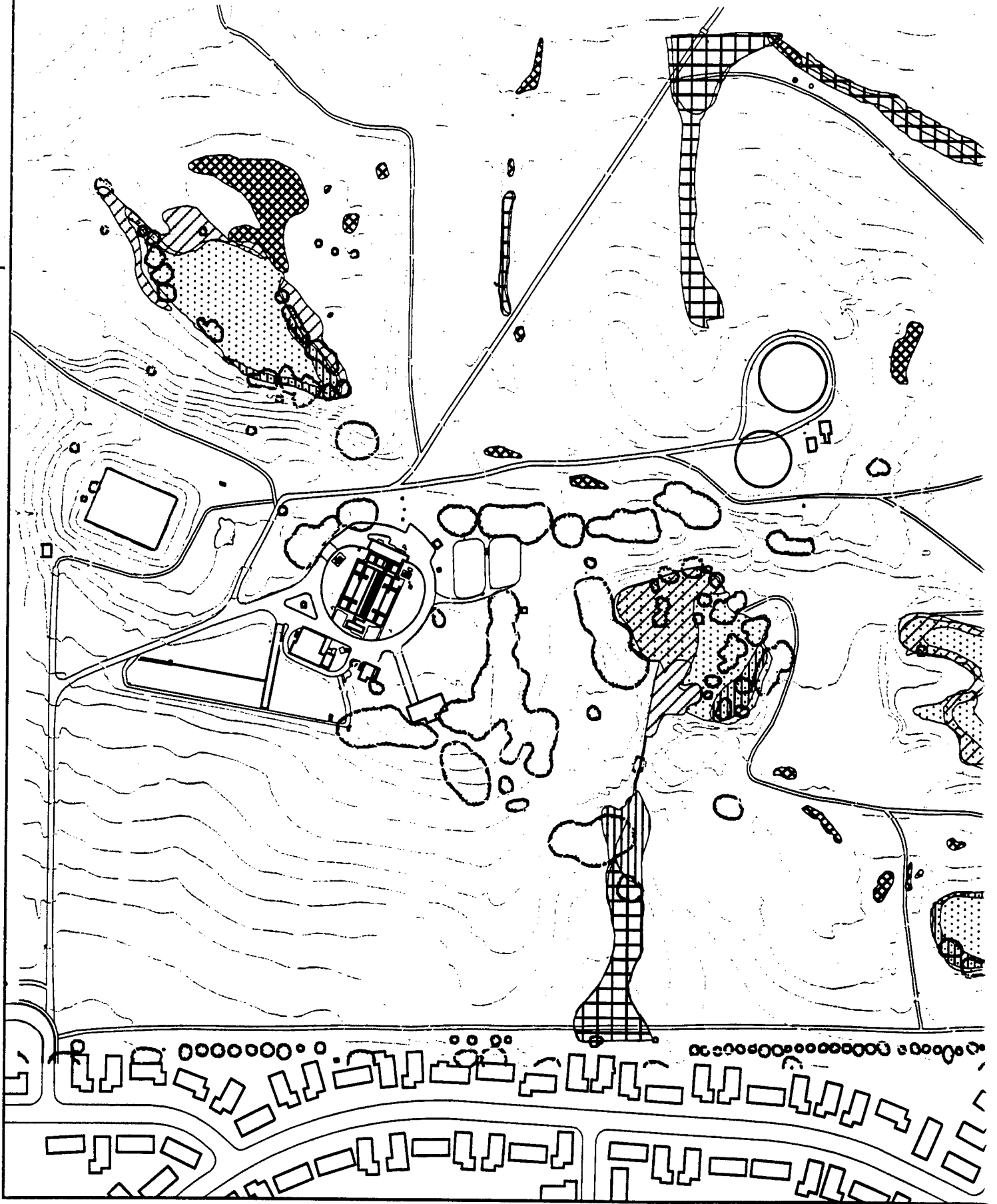


Figure 2-1

Existing Conditions
on the
Burke Property,
Travis AFB

-  VS - Vernal Swale
-  SM - Seasonal Marsh
-  VP - Vernal Pools
-  Open Water
-  FM - Freshwater Marsh

— Major Contours

 Trees

--- Fence Line

== Roads

— Structures

VS = 3.03 acres

SM = 2.16 acres

VP = 1.71 acres

FM = 1.18 acres

Open Water = 6.26 acres



30 0 30 60 Meters



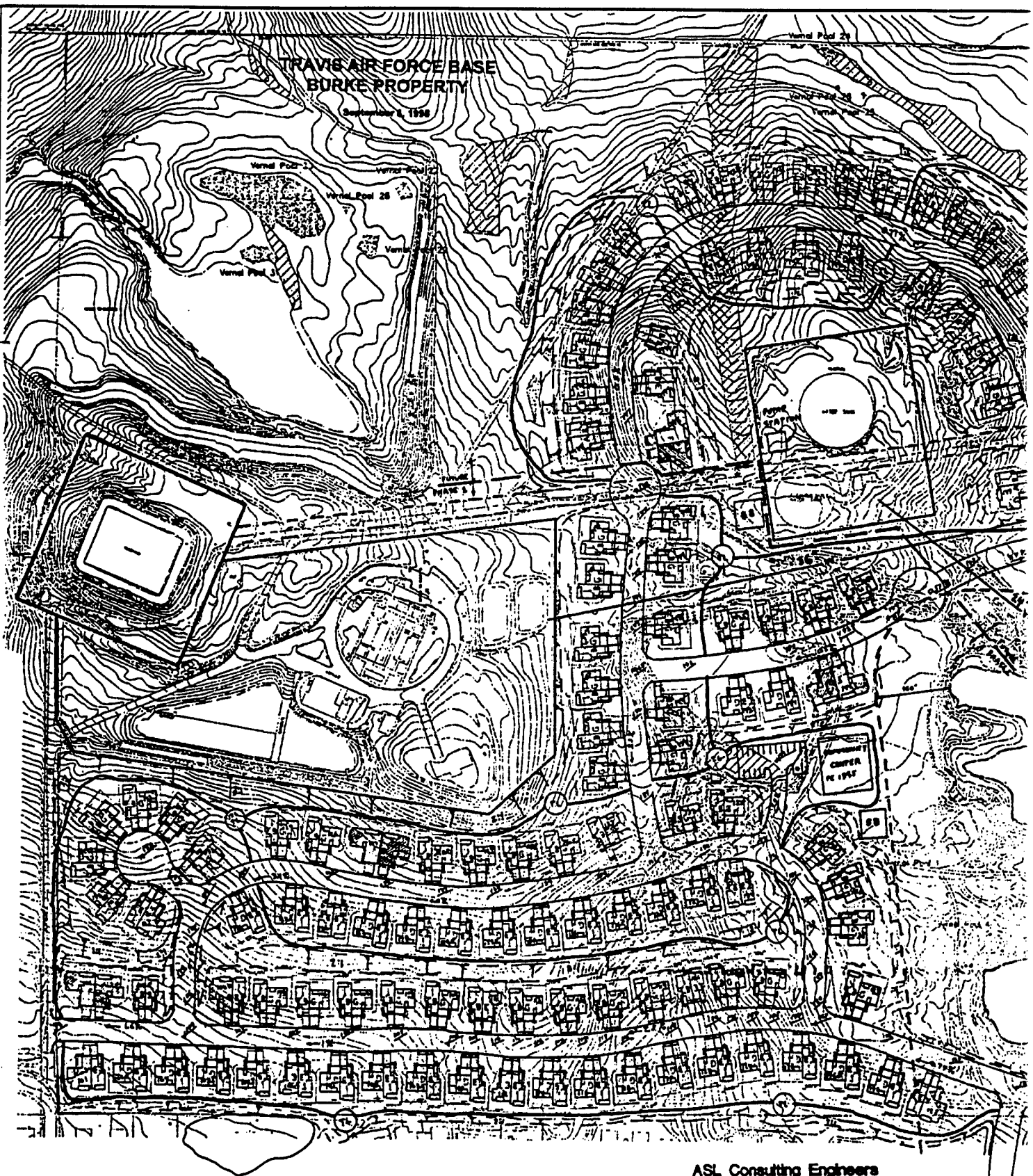
200 0 200 400 Feet



Source: ASL Consulting Engineers, 1998

TRAVIS AIR FORCE BASE
BURKE PROPERTY

September 8, 1958

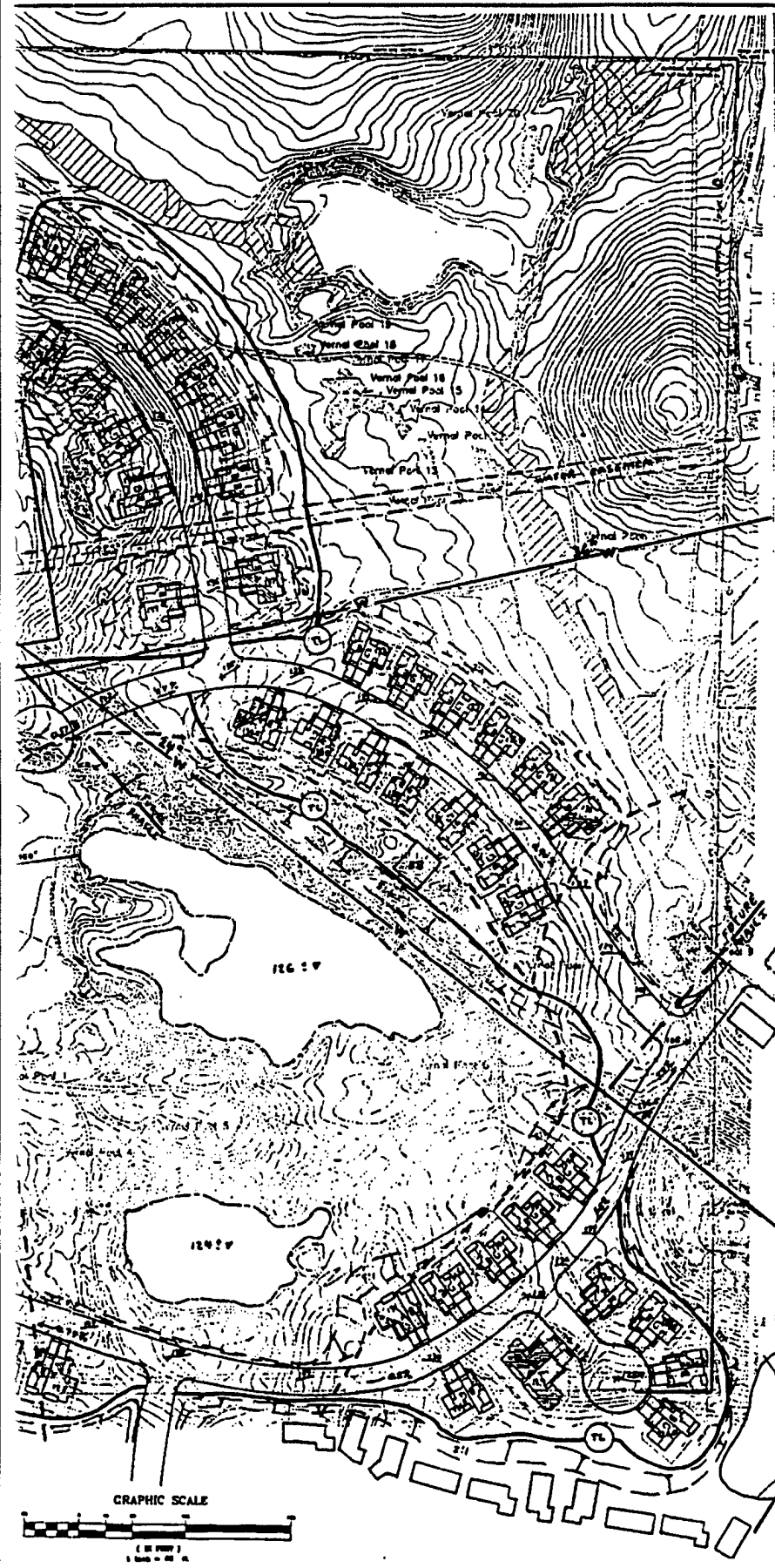


ASL Consulting Engineers
225 West Hesperia Lane
Suite 206
San Bernardino, California 92408



Figure 2-2

**281-Unit Housing Design
for the Burke Property,
Travis AFB**



Scale

0 Meters 150

0 Feet 500

Source: ASL 1998

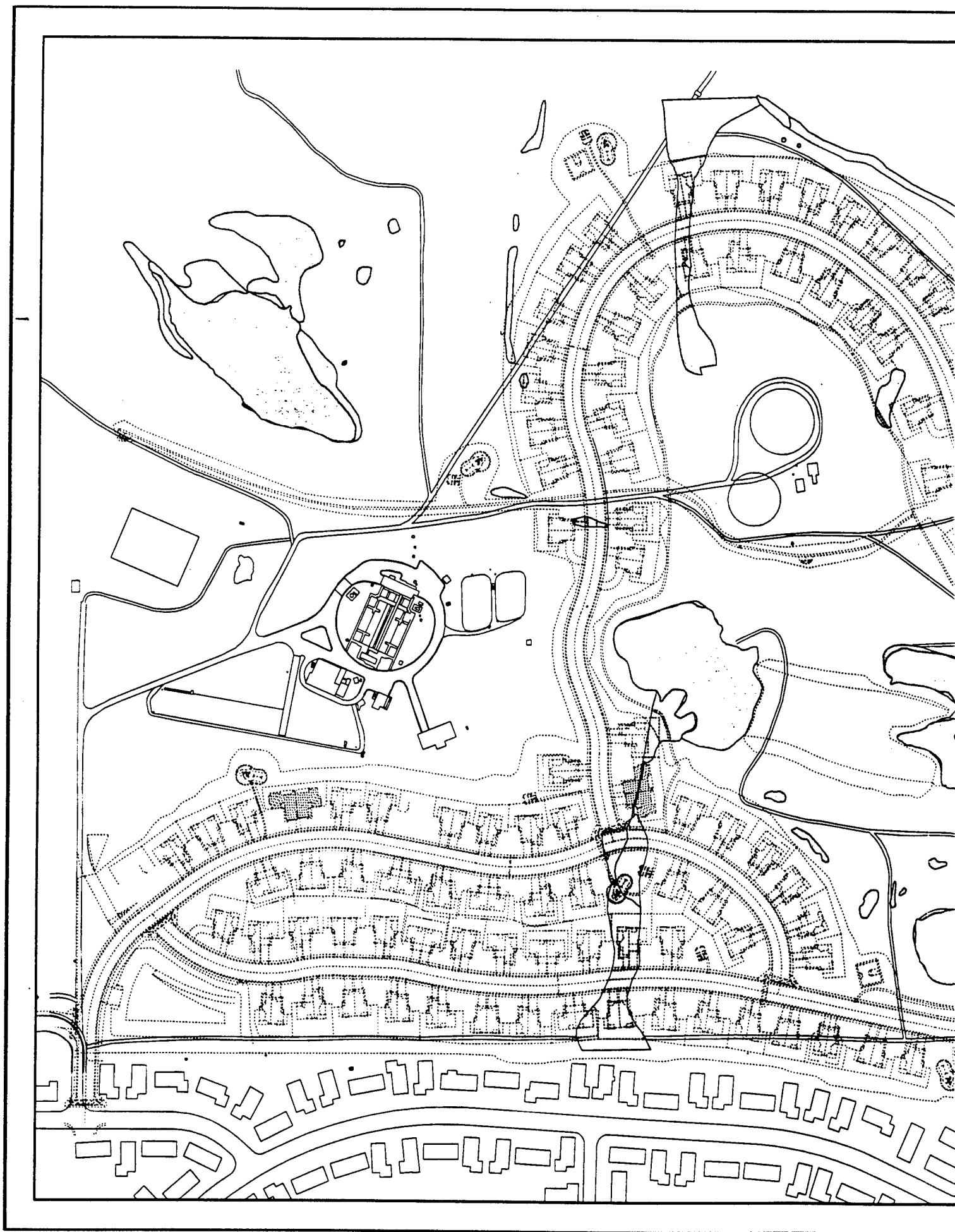
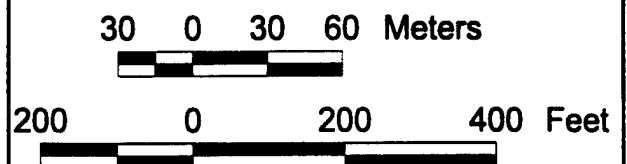


Figure 2-3

**226-Unit Housing Design
for the Burke Property,
Travis AFB**

-  Aquatic, wetland, vernal pool and vernal swale habitats
-  Existing Development
-  226 Unit Housing Design
-  Existing Roads



Source: ASL Consulting Engineers, 1998

3

AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter presents relevant resource components of the existing environment (baseline conditions) for Soil, Groundwater and Air Quality (section 3.2), Biological Resources (section 3.3), and Cultural Resources (section 3.4). For resource and issue areas other than those discussed below, and for general background on the environment of Travis AFB, the reader is referred to the EIS for Realignment of Travis AFB (USAF 1994a), the conclusions of which are summarized in Appendix A.

3.2 SOIL, GROUNDWATER, AND AIR QUALITY

An environmental baseline survey (EBS) (USAF 1994c) was completed for the Burke Property prior to acquisition by the Air Force, to determine if the site has the potential to have environmental contamination. Environmental contamination means the presence or likely presence of any hazardous substances on the property under conditions that indicate an existing release, a past release, or a material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property. The EBS documents the nature, magnitude, and extent of any environmental contamination and assesses the health and safety risks related to the property transaction (USAF 1994c). Except where otherwise noted, the following environmental setting is derived primarily from the EBS.

3.2.1 SITE DESCRIPTION AND HISTORY

The Burke property currently and historically has consisted primarily of unimproved grazing land. The site currently surrounds an 8.3-acre (3.4-hectare) City of Vallejo water treatment plant and a 4.9-acre (2-hectare) Air Force water storage tank compound. Buried water pipelines associated with the water treatment plant traverse the property. A homestead was once present on the property. An area of earth fill and concrete rubble is present in the east-central portion of the property (USAF 1994c). In addition, five ponds are present in remnants of sandstone borrow pits excavated on the property in the 1930s (USAF 1994c). These ponds have contained surface water throughout 1998 (personal communication, Robert Holmes 1998).

Gentle slopes and small hills characterize the topography of the Burke property. Steep slopes are locally present in the northwest portion of the site and in the vicinity of the borrow pits immediately south of the water tanks. A seep was observed in the south central portion of the site. It is probably fed by seepage from ponded water in a borrow pit upslope. Groundwater is present beneath the site at depths ranging from 8 to 40 feet (2.4 to 12 m) below ground surface. The regional groundwater flow direction is to the south-southeast (USAF 1994c).

1 **3.2.2 POTENTIAL ON-SITE CONTAMINATION**

2 No visible signs of soil contamination or other indications of hazardous materials or waste
3 disposal were noted on the property. The known uses of the property would not have likely
4 contributed to any soil or groundwater contamination (USAF 1994c).

5 Approximately 1,120 cubic yards (855 cubic meters) of earth material and 23 loads of concrete
6 present on the property were derived during demolition of concrete pads and a wash water pond
7 used prior to an upgrade of the water treatment plant. The concrete pads were used for
8 foundations for steel tanks at the treatment plant. The only known use of the tanks and wash
9 pond concrete was for holding drinking water or drinking water structures. Chemical analysis for
10 heavy metals, regulated under the Resource Conservation and Recovery Act (RCRA), was
11 conducted on the wash water pond concrete and soil material prior to disposal in the fill area. No
12 hazardous concentrations of metals were detected. Analyses did not include other potential
13 contaminants (e.g., solvents or petroleum products) due to the lack of reasonable risk associated
14 with prior use of the concrete and earth material (USAF 1994c).

15 Other solid waste present on the subject property includes fragments of steel, aggregate rock,
16 asphalt, concrete, terra cotta piping, and a few scattered tires. This solid waste is minimal and
17 does not indicate past disposal of any hazardous materials or waste. No polychlorinated biphenyl
18 (PCB)-containing electrical transformers were observed on the property. No underground or
19 aboveground fuel storage tanks or pipelines are present on the property (USAF 1994c).

20 It is unlikely that historical train derailments and associated spills have occurred on the
21 Sacramento Northern Railway, which is located approximately 1,000 feet northwest of the Burke
22 property at the closest point. Based on information derived from Mr. Doug Morgan of the Portola
23 Railroad Museum and Mr. Rick Borgwardt, Environmental Affairs Officer of the Bay Area Electric
24 Railroad Association (BAERA), this portion of the railway line was constructed in 1946 as a detour
25 around the base and has historically been used for freight. This track is considered a light density
26 line, which is currently maintained but used very infrequently. When BAERA bought the
27 property in 1983, Union Pacific, the seller, was required to disclose any known hazardous waste or
28 contamination in the right-of-way (ROW) and they indicated that there were no hazardous or
29 toxic chemicals in the ROW.

30 Several contaminated properties are located in the regional vicinity of the site, but it is not
31 anticipated that any of these sites have, or will, adversely impact the subject property (USAF
32 1994c). Properties with soil and/or groundwater contamination in the vicinity of the Burke
33 property are illustrated on Figure 3-1.

34 Leaking underground fuel tank (LUFT) sites in the vicinity of the site include Cement Hill Ready
35 Mix (site 1), Northwest Pipe (site 3), G&M Towing (site 4), the Area F Tank Farm (site 5), and the
36 North and South Gas Stations (site 6). The closest of these LUFT sites is G&M Towing, which is
37 located approximately 0.5 mile (0.8 km) south (hydrologically downgradient) of the Burke

1. Purpose of and Need for the Proposed Action

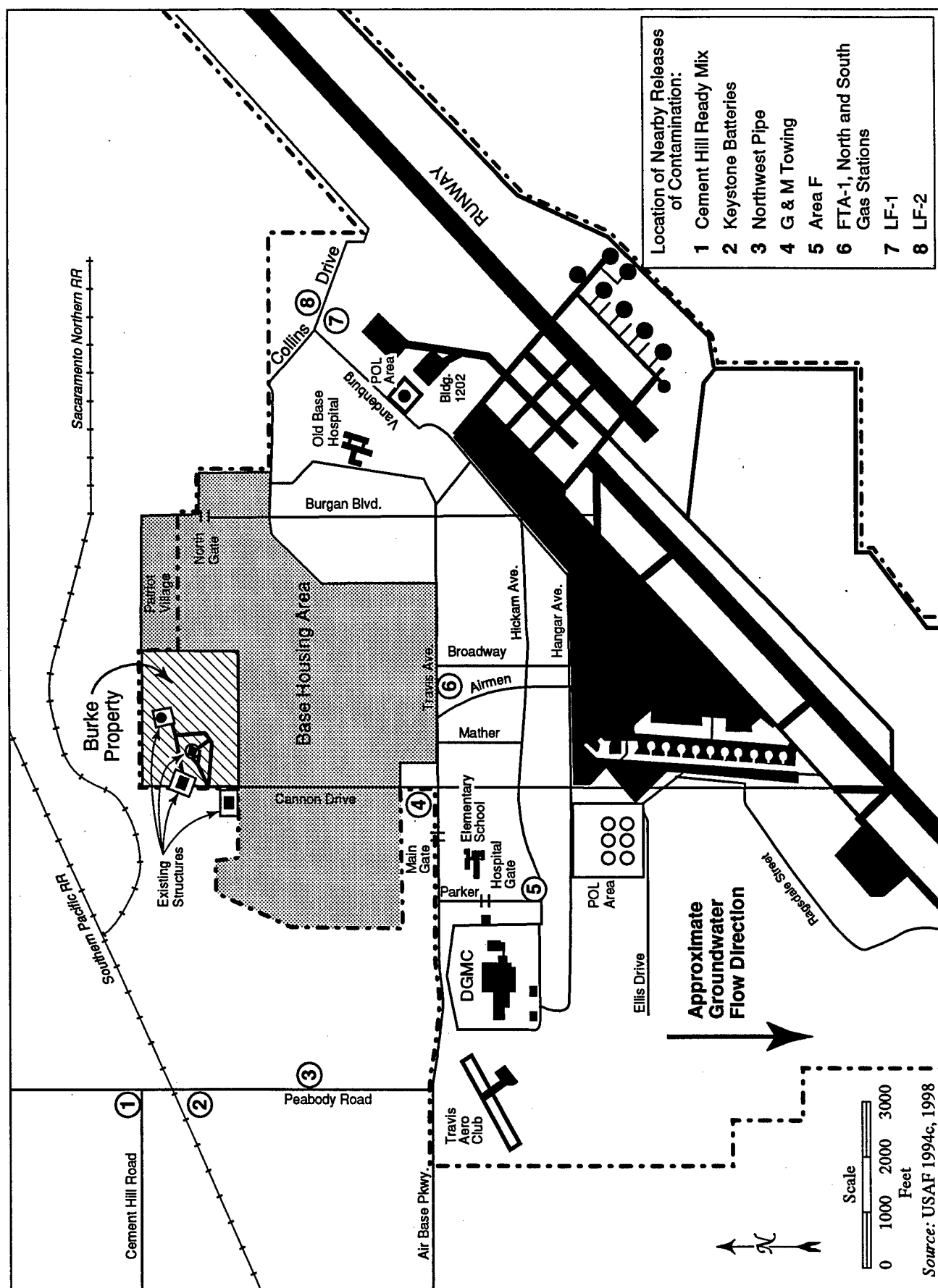


Figure 3-1. Properties with Soil and/or Groundwater Contamination in the Vicinity of the Burke Property

3. Affected Environment

property. These properties had varying degrees of soil and groundwater contamination and are in various stages of assessment or remediation (USAF 1994c).

Travis AFB is listed on the federal National Priorities List (NPL), which is compiled by the EPA to rank properties with the highest priority for cleanup. Sources of contamination on Travis AFB include past hazardous waste disposal and spill sites being investigated and remediated under the Installation Restoration Program (IRP). Based on the IRP study (USAF 1994c), the three nearest IRP sites to the Burke property include the former fire training area (FTA-1, site 6) and two former solid waste landfills (LF-1 and LF-2, sites 7 and 8). The fire training area, located over 0.5 mile (0.8 km) south (hydrologically downgradient) of the site, is the closest IRP site (USAF 1994c, 1998).

None of these properties are anticipated to adversely impact the Burke property due to the location of these sites hydrologically downgradient or cross-gradient from the subject site.

3.2.3 AIR RESOURCES

Air quality within the project area and surrounding region would be affected by emissions from construction and operation of the proposed family housing project. The following section describes the affected air quality resource, impacts to air quality from the proposed action, and measures required to mitigate significant impacts.

Description of Resource

Air quality at a given location is often described by the concentrations of pollutants in the atmosphere. The significance of a pollutant concentration is determined by comparing the concentration to its applicable national and/or state ambient air quality standard. These standards represent allowable atmospheric concentrations that protect public health and welfare and include a reasonable margin of safety to protect the more sensitive individuals in the population. Federal standards established by the EPA are termed the National Ambient Air Quality Standards (NAAQS) and are defined as the maximum acceptable concentrations that may not be exceeded. State standards established by the California Air Resources Board (ARB) are termed the California Ambient Air Quality Standards (CAAQS). The CAAQS are at least as restrictive as the NAAQS and include pollutants for which there are no national standards. Table 3-1 presents the N/CAAQS.

The pollutants of primary concern which are considered in this analysis include volatile organic compounds (VOC), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter less than 10 microns in diameter (PM₁₀). Although there are no ambient standards for VOCs or NO_x, they are important as precursors to O₃ formation. The analysis focuses on these pollutants, as the project region presently do not attain the national and/or state ambient air quality standards for O₃ and PM₁₀ and recently did not attain the CO standards.

Table 3-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	NATIONAL STANDARDS (a)	
			Primary (b,c)	Secondary (b,d)
Ozone(e)	8-hour	—	0.08 ppm (160 µg/m ³)	Same as primary
	1-hour	0.09 ppm (180 µg/m ³)	0.12 ppm (235 µg/m ³)	Same as primary
Carbon monoxide	8-hour	9 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	—
	1-hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	—
Nitrogen dioxide	Annual	—	0.053 ppm (100 µg/m ³)	Same as primary
	1-hour	0.25 ppm (470 µg/m ³)	—	—
Sulfur dioxide	Annual	—	0.03 ppm (80 µg/m ³)	—
	24-hour	0.04 ppm (105 µg/m ³)	0.14 ppm (365 µg/m ³)	—
	3-hour	—	—	0.5 ppm (1,300 µg/m ³)
	1-hour	0.25 ppm (655 µg/m ³)	—	—
PM ₁₀	Annual (arithmetic mean)	—	50 µg/m ³	Same as primary
	Annual (geometric mean)	30 µg/m ³	—	—
	24-hour	50 µg/m ³	150 µg/m ³	Same as primary
PM _{2.5} (f)	Annual (arithmetic)	—	15 µg/m ³	Same as primary
	24-hour	—	65 µg/m ³	Same as primary
Lead	Calendar quarter	—	1.5 µg/m ³	Same as primary
	30-day average	1.5 µg/m ³	—	—

- Notes: (a) Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.
- (b) Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.
- (c) Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that states implementation plan is approved by the EPA.
- (d) Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- (e) The 8-hour ozone standard was promulgated in 1997, and will replace the 1-hour standard. However, the 1-hour standard will continue to apply to areas not attaining it for an interim period.
- (f) The PM_{2.5} standard (particulate matter with a 2.5 micron diameter) will be implemented over an extended time frame. Areas will not be designated as in attainment or nonattainment of this standard until the 2002-2005 time frame.

1 **Region of Influence (ROI)**

2 The project area is located in the southwest portion of Solano County, which is part of the San
3 Francisco Bay Area Air Basin (SFBAAB). The SFBAAB includes the counties of Santa Clara, San
4 Mateo, San Francisco, Marin, Napa, Contra Costa, Alameda, and the southeast portion of Sonoma
5 and the southwest portion of Solano counties. Identifying the ROI for air quality requires
6 knowledge of the types of pollutants emitted, the emission rates and release parameters of the
7 pollutant source, the source proximity to other pollutant sources, and local and regional
8 meteorological conditions. The ROI for emissions of inert pollutants (pollutants other than O₃ and
9 its precursors) is generally limited to a few miles downwind from a source.

10 The ROI for O₃ can extend much farther downwind than for inert pollutants. Ozone is a
11 secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted
12 pollutants, or precursors. Ozone precursors are mainly the reactive portion of VOCs and NO_x. In
13 the presence of solar radiation, the maximum effect of VOCs and NO_x emissions on O₃ levels
14 usually occurs several hours after they are emitted and many miles from the source.

15 **Baseline Air Quality**

16 The EPA designates all areas of the United States as having air quality better than (attainment) or
17 worse than (nonattainment) the NAAQS. A nonattainment designation means that a primary
18 NAAQS has been exceeded more than three discontinuous times in 3 years in a given area. In
19 1995, the EPA redesignated the SFBAAB to attainment of the national O₃ standard, after data
20 showed that the region had not violated the standard for at least 3 years. The official classification
21 for the region was an O₃ maintenance area. Soon after redesignation, the region experienced
22 several violations of the O₃ standard, requiring the EPA to redesignate the SFBAAB as an O₃
23 nonattainment area in 1997 (the EPA provides no classification on the severity of the
24 nonattainment condition). In 1998, the SFBAAB was redesignated as in attainment of CO by the
25 EPA. Hence, the region is known as a CO maintenance area. The CO maintenance areas are
26 limited to the Vallejo-Fairfield-Napa and San Jose metropolitan areas. The project area within the
27 SFBAAB is currently in attainment of all other NAAQS.

28 The ARB designates areas of the state as either in attainment or nonattainment of the CAAQS. An
29 area is in nonattainment if the CAAQS has been exceeded more than once in 3 years. At the
30 present time, the SFBAAB is in nonattainment of the CAAQS for O₃ and PM₁₀. The SFBAAB is
31 designated as a "serious" nonattainment area for O₃ by the ARB. The ARB redesignated the
32 SFBAAB as attainment for CO in 1994.

33 **Regulatory Setting**

34 Air quality regulations were first promulgated with the Federal *Clean Air Act of 1969* (CAA). This
35 act established the NAAQS and delegated the enforcement of air pollution control regulations to
36 the states. In California, the ARB enforces air regulations, but delegates the responsibility of
37 stationary emission source regulation to local air pollution agencies. In the project area, this
38 responsibility is taken by the BAAQMD. In areas that exceed the NAAQS, the CAA requires

preparation of a State Implementation Plan (SIP), detailing how the state will attain the standards within mandated time frames. The CAA Amendments of 1990 (1990 CAA) revised the attainment planning process. The 1990 CAA identifies new emission reduction goals and compliance dates based upon the severity of the ambient air quality standard violation within a region.

The 1990 CAA states that a federal agency cannot support an activity unless the agency determines that the activity will conform to the most recent EPA-approved SIP within the region of the proposed action. This means that federally supported or funded activities will not (1) cause or contribute to any new air quality standard violation, (2) increase the frequency or severity of any existing standard violation or, (3) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area. The EPA provides no classification on the severity of the O₃ nonattainment condition in the SFBAAB. However, for purposes of determining project conformity, it is assumed that the region has a moderate nonattainment status for O₃. Consequently, the project would conform to the most recent EPA-approved SIP if its annual emissions remain below 50 tons of VOC or 100 tons of NO_x or CO. Section 4.2.1.2 of this EA includes the project conformity determination. Appendix F presents the project Record of Non-Applicability (RONA).

The California Clean Air Act of 1988, as amended in 1992, outlines a program to attain the CAAQS for O₃, nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and CO by the earliest practical date. Since the CAAQS are more stringent than the NAAQS, emissions reductions beyond what would be required to show attainment for the NAAQS will be needed. Consequently, the main focus of attainment planning in California has shifted from the federal to state requirements.

Historically, the BAAQMD has developed air quality attainment plans designed to reduce emissions to a level that will bring the SFBAAB into attainment of the ambient air quality standards. Plans intended to attain the NAAQS are incorporated into the California SIP. The BAAQMD has until November 15, 1999 to submit a plan to the EPA that will demonstrate attainment of the national O₃ standard. The BAAQMD also develops rules to regulate stationary sources of air pollution within the SFBAAB.

3.3 BIOLOGICAL RESOURCES

3.3.1 INTRODUCTION

The description and analysis of biological resources on the Burke Property is based on a variety of sources, including several field surveys conducted during 1998 and early 1999. These surveys are as follows:

- On May 6-8, 1998, a survey was conducted to identify and map the occurrence of vernal pools and other habitats on the site, and to assess the potential occurrence of rare, threatened, and endangered species. Plant species associated with vernal pools were systematically recorded, and notes were made on the occurrence of plants and wildlife of potential concern (Earth Tech 1998a).

3. Affected Environment

- On September 8 and 16, 1998, vernal pools and other wetland and aquatic habitats potentially subject to regulation under Section 404 of the Clean Water Act (CWA) were systematically delineated in the field using the accepted federal methodology (USACE 1987), and mapped using a global positioning system. Concurrently, the suitability of habitats on the site for the threatened giant garter snake, and the possibility of nesting by golden eagles, were assessed (JSA and Earth Tech 1998a). A field verification of the wetlands on the Burke Property by the Army Corps of Engineers was conducted in early February 1999 with supplemental sampling and delineation conducted in March 22-26, 1999. Resulting adjustments in wetland boundaries have been incorporated into this EA and the concurrent Section 404 permit action.
- On September 18, 1998, "dry season" samples were collected from vernal pools and analyzed according to U.S. Fish and Wildlife Service guidelines (USFWS 1996) to determine the potential occurrence of rare, threatened, and endangered invertebrates in these pools (JSA and Earth Tech 1998b).
- During the winter and spring of 1998-99, "wet season" sampling of vernal pools was conducted to confirm the presence/absence of protected species of invertebrates. This sampling continued into April, 1999, by which time the vernal pools had dried up.
- Data from the above surveys have been supplemented by site reconnaissance conducted by Navy and Air Force personnel and contractors during the preparation of this EA.

The following sections describe general vegetation and wildlife habitat features of the site; the occurrence of wetlands and other Section 404 CWA jurisdictional Waters of the U.S.; and the occurrence of rare, threatened, and endangered species.

3.3.2 VEGETATION AND WILDLIFE HABITAT

The Burke Property was used as a sandstone quarry until 25 to 30 years ago and is currently used for grazing. Figure 3-2 shows the distribution of habitats on the site. The most extensive habitat on the project property is annual grassland, which tends to be dominated by non-native species but is frequently interspersed with native grasses and herbs. Weedy, mostly non-native species, including barleys (*Hordeum* spp.), bromes (*Bromus* spp.), medusa head grass (*Taeniatherum caput-medusae*), spiny cocklebur (*Xanthium spinosum*), and yellow star thistle (*Centaurea solstitialis*) are abundant. Native plants, such as turkey mullein (*Eremocarpus setigerus*), butter-and-eggs (*Tryphisaria eriantha* ssp. *eriantha*), valley castles (*Catilleja attenuata*), blue dicks (*Dichelostemma capitatum* ssp. *capitatum*), blue-eyed grass (*Sisyrinchium bellum*), harvest brodiaea (*Brodiaea elegans* ssp. *elegans*), and crown brodiaea (*B. coronaria*), are also occasionally present.

Seasonal and perennial wetland habitats have developed within borrow areas and excavations resulting from previous quarrying activities. These wetland habitats are discussed in more detail in section 3.3.1 below. At the top of a central hill in the center of the project site are two large water tanks. These water tanks are flushed periodically into some of the wetlands on the east side of the project site (see section 3.3.1). The hill slopes are flanked with five stock ponds, which

occupy the former borrow pits of the quarrying activities, and support willow (*Salix* sp.) and Fremont's cottonwood (*Populus fremontii*). The south side of the hill supports a stand of eucalyptus (*Eucalyptus globulus*). One of these eucalyptus bears a large raptor nest. West of the eucalyptus grove is a potable water treatment facility. In addition to eucalyptus, other planted trees on the site include plum (*Prunus domestica*), apricot (*Prunus armeniaca*), and velvet ash (*Fraxinus velutina*).

The grassland and Trees on the site provide habitat similar to what exists elsewhere on Travis AFB and in surrounding undeveloped areas (USAF 1994a). These habitats support insect and small mammal populations and thus provide foraging habitat for larger predators. Common mammals found in the area include California ground squirrel (*Citellus beecheyi*), Suisun shrew (*Sorex sinuosus*), valley pocket gopher (*Thomomys bottae*), house mouse (*Mus musculus*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), and coyote (*Canis latrans*). Reptiles and amphibians known to inhabit Travis AFB and likely to occur on the Burke Property include western toad (*Bufo boreas*), bullfrog (*Rana catesbeiana*), common garter snake (*Thamnophis sirtalis*), California horned lizard (*Phrynosoma coronatum*), and western skink (*Eumeces skiltonianus*). Noteworthy observations of wildlife on the site include six raptor species: American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), great horned owl (*Bubo virginianus*), northern harrier (*Circus cyaneus*), and golden eagle (*Aquila chrysaetos*) (Earth Tech 1998a).

3.3.3 WETLAND AND AQUATIC HABITATS

Wetlands and other "Waters of the U.S." are protected under Section 404 of the Clean Water Act, which requires a permit from the Corps of Engineers for the placement of fill in these habitats. Four types of wetland habitats, totaling 8.08 acres (3.27 hectares), and 6.26 acres (2.53 hectares) of open water habitat have been identified and mapped within the project site, as shown on Figure 3-3. These habitats are described below. Acreages of wetland and open water habitats are provided in Table 3-2. Appendix B provides additional detail on these areas.

Table 3-2. Acreage of Wetlands and Other Waters of the United States on the Burke Property

Habitat Type	SIZE	
	Acres	Hectares
Wetlands		
Freshwater marsh	1.18	0.48
Seasonal marsh	2.16	0.87
Vernal swale	3.03	1.23
Vernal pool	1.71	0.69
Total wetland acreage	8.08	3.27
Open water	6.26	2.53
Total	14.34	5.80

3. Affected Environment

1 3.3.3.1 Freshwater Marsh

2 Freshwater marsh occurs within former rock quarry basins in persistently flooded areas and is
3 dominated by bulrushes (*Scirpus* spp.), cattails (*Typha latifolia*), sword plant (*Echinodorus berteroi*),
4 umbrella plant (*Cyperus eragrostis*), and duckweed (*Lemna minor*), with an overstory of willow and
5 Fremont's cottonwood. Clover (*Trifolium* sp.) was also present but was not identifiable because of
6 an absence of flowers.

7 Freshwater marsh is found in all five ponds and on the south side of Pond 1. There are 1.18 acres
8 (0.48 hectare) of freshwater marsh within the project boundaries.

9 3.3.3.2 Seasonal Marsh

10 Seasonal marsh habitat is present around the edges of the ponds on the project site. This habitat is
11 drier than freshwater marsh and supports vegetation of lower stature, including spike rush
12 (*Eleocharis macrostachya*), Bermuda grass (*Cynodon dactylon*), curly dock (*Rumex crispus*), salt grass
13 (*Distichlis spicata*), and pennyroyal (*Mentha pulchella*). There are 2.16 acres (0.87 hectare) of
14 seasonal marsh within the project boundaries.

15 3.3.3.3 Vernal Pool

16 Vernal pools are wetlands that occur in shallow depressions where an underlying clay pan or
17 bedrock prevents drainage, resulting in a seasonally ponded habitat that fills during the rainy
18 season but becomes completely dry during the normal summer dry season. Isolated wetlands and
19 waters such as vernal pools may provide habitat for migratory birds and hence fall under the
20 regulatory jurisdiction of the Corps under the Clean Water Act. Vernal pools were originally
21 delineated by Earth Tech in May 1998 when the pools were still moist (Earth Tech 1998a). There
22 are roughly 42 vernal pools (some are connected and may therefore be considered a single pool),
23 providing 1.71 acres (0.69 hectare) of vernal pool habitat on the site. Characteristic species include
24 woolymarbles (*Psilocarphus* sp.), coyote thistle (*Eryngium vaseyi*), hyssop loosestrife (*Lythrum*
25 *hyssopifolium*), cat's ear (*Hypochoeris* sp.), popcorn flower (*Plagiobothrys* sp.), and hair grass
26 (*Deschampsia danthonioides*). Additional vernal pool species were observed in these pools by Earth
27 Tech during their May 1998 survey, including Fremont's goldfields (*Lasthenia fremontii*), two
28 individual plants of the federally listed endangered Contra Costa goldfields (*Lasthenia conjugens*),
29 and downingia (*Downingia* sp.). Appendix B provides additional information on the plant species
30 associated with individual vernal pools.

31 3.3.3.4 Vernal Swale

32 Vernal swales are temporary drainage areas, amounting to 3.03 acres (1.23 hectares) on the
33 northern and eastern portions of the proposed project area. The vernal swales are dominated by
34 Italian ryegrass (*Lolium multiflorum*), toad rush (*Juncus bufonius*), and cat's ear. Additional plants
35 observed in the vernal swales by Earth Tech (1998a) during their late wet season survey are listed
36 in Appendix B.

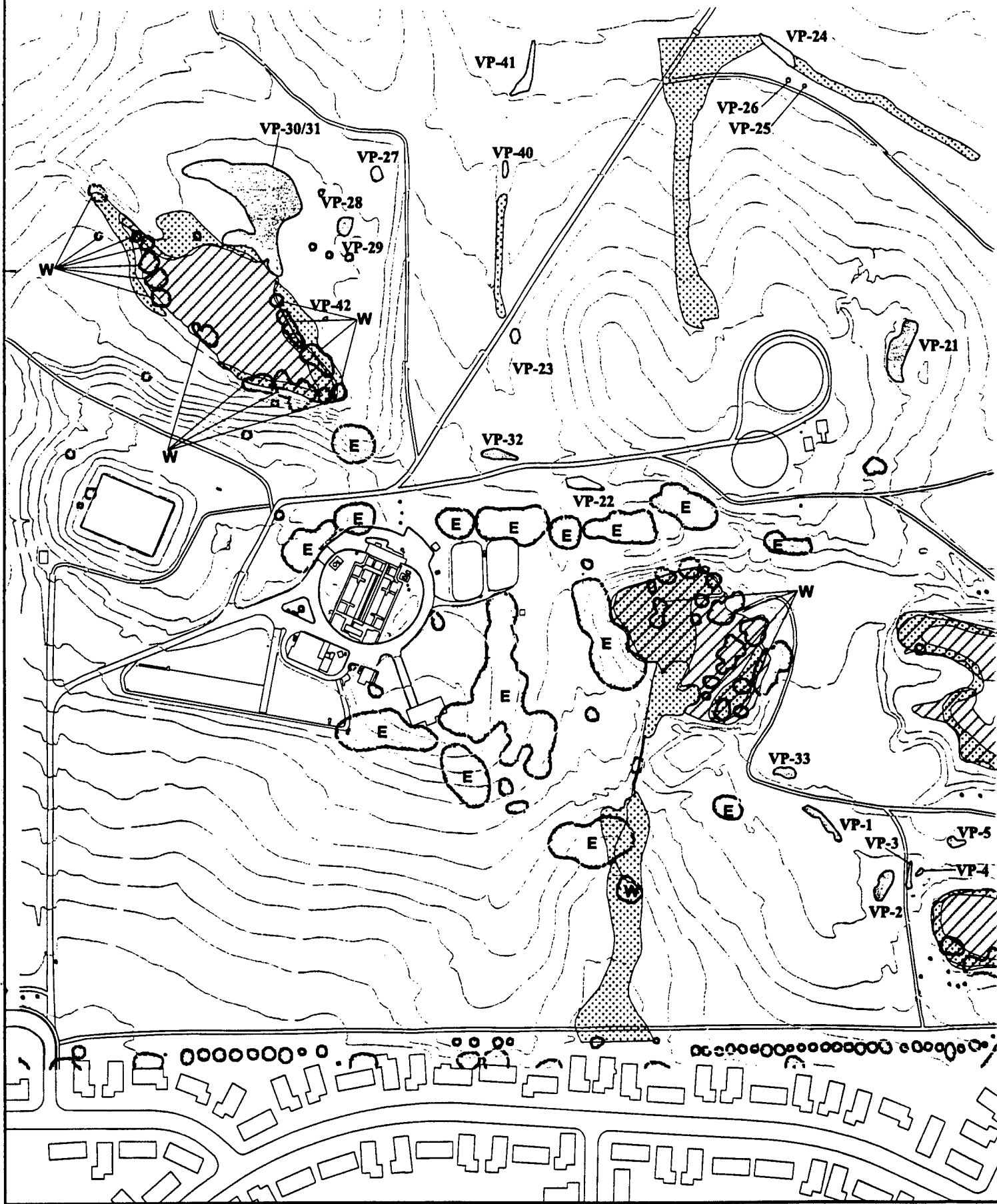
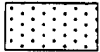
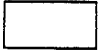
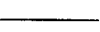


Figure 3-2

Biological Resources on the Burke Property, Travis AFB

-  Wetlands
-  Water
-  Vernal Pools (P#)
-  Major Contours
-  Trees
- E = Eucalyptus, Other
Planted Trees
- W = Willows,
Cottonwoods



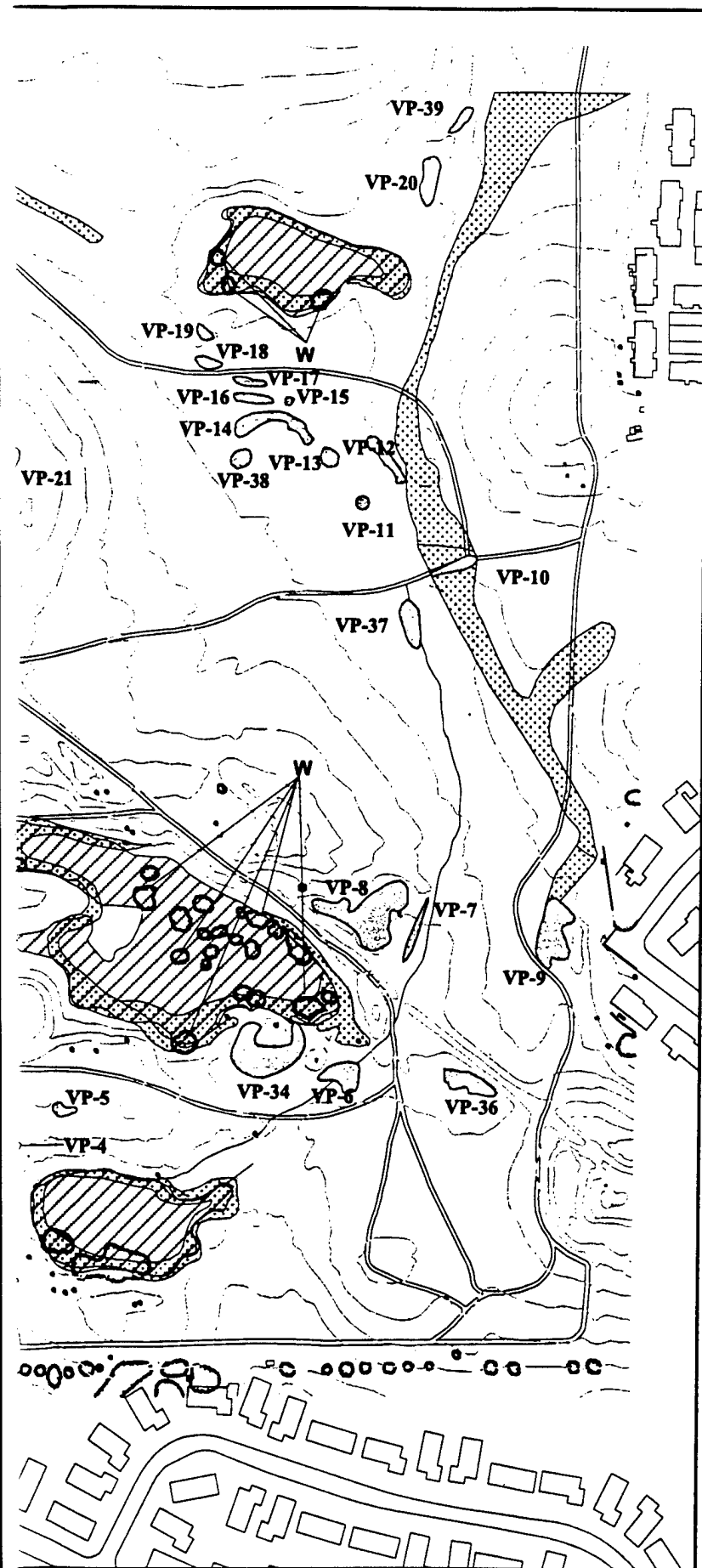
30 0 30 60 Meters



200 0 200 400 Feet



Source: ASL Consulting Engineers, 1998



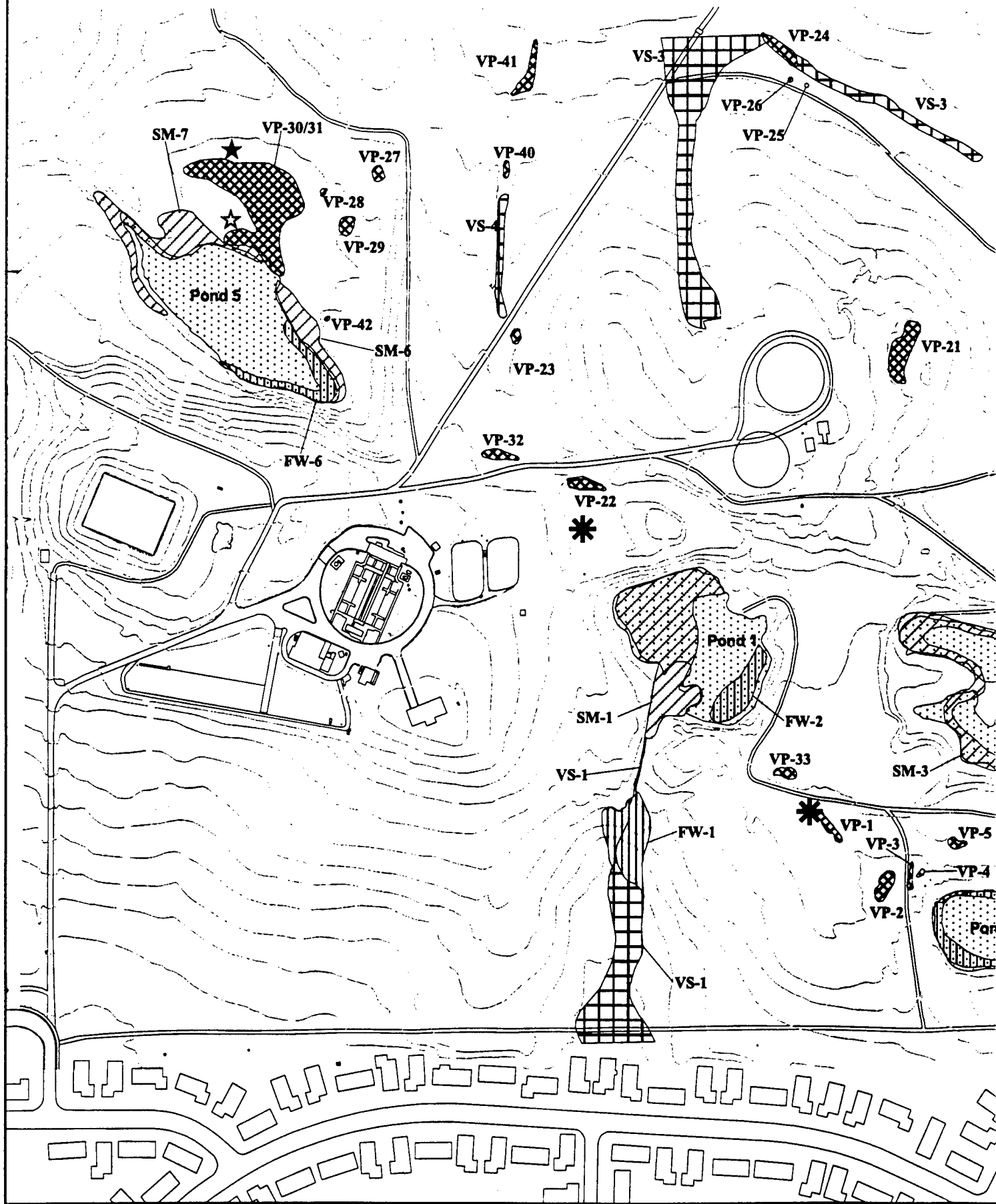


Figure 3-3

Wetlands and Other Waters of the US and Associated Threatened and Endangered Species

-  VS - Vernal Swale
-  SM - Seasonal Marsh
-  VP - Vernal Pools
-  Open Water
-  FM - Freshwater Marsh
-  Major Contours
-  Contra Costa Goldfields (two individual plants)
-  Possible Vernal Pool Fairy Shrimp (cysts)
-  Vernal Pool Fairy Shrimp Adults Identified (VP-8, VP-9, VP-30)



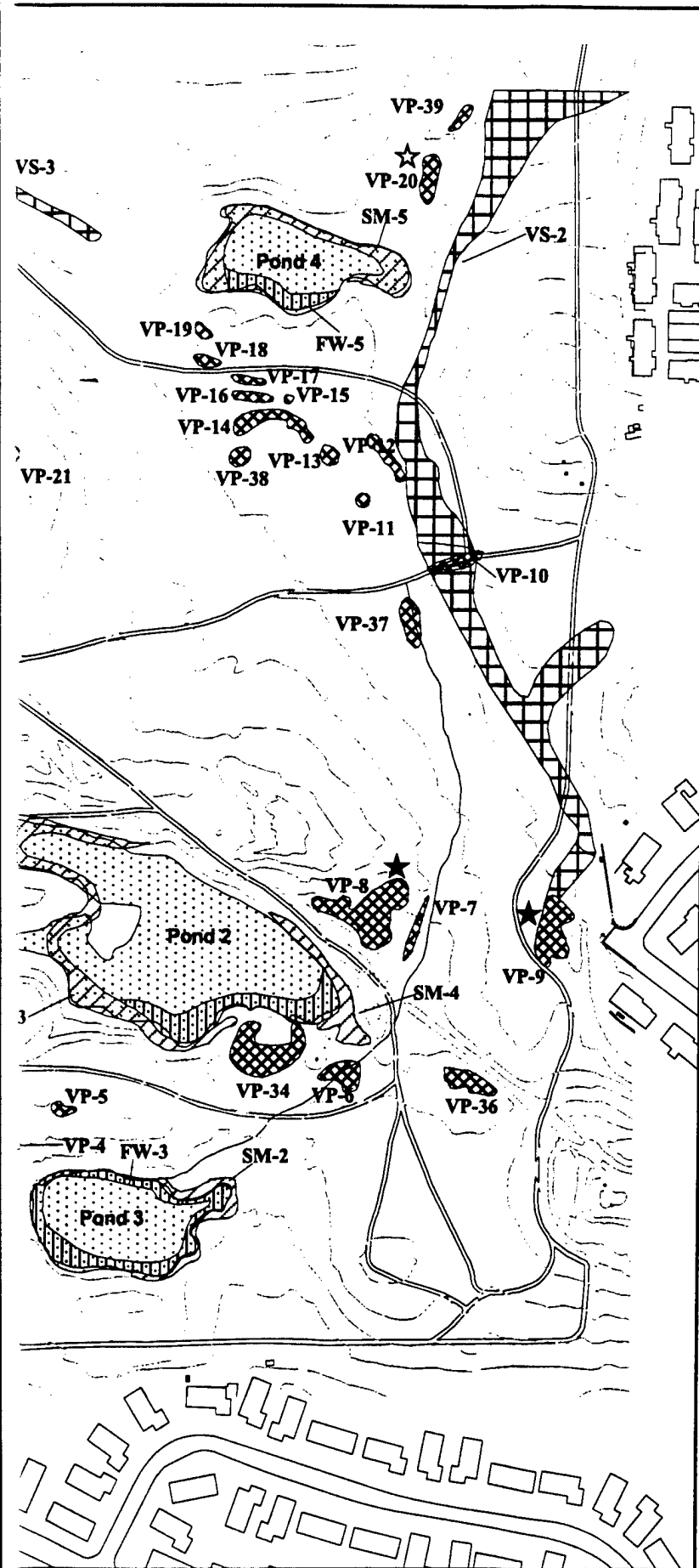
30 0 30 60 Meters



200 0 200 400 Feet



Source: ASL Consulting Engineers, 1998



1 The vernal pool and swale habitats discussed above, about 1.53 acre (0.62 hectare) of vernal pool
2 and vernal swale on the east side of the hill is subject to intermittent inundation from the flushing
3 of waterlines at the water tanks on top of the hill (see Figure 3-3, VS-2, VP-13, VP-10, VP-37, and
4 VP-11). These vernal pools and swales were observed holding water that was 1.5 feet (0.5 meter)
5 deep on September 16, 1998. Many of the vernal pools and swales on the site have developed in
6 areas previously affected by quarrying activities.

7 3.3.3.5 Open Water Habitat

8 The five ponds have a combined total of 6.26 acres (2.53 hectares) of open water. Water levels in
9 these ponds decline during the dry season. The areas exposed by the receding water are
10 unvegetated in 1998 after a season of extraordinarily high precipitation except for small patches of
11 clover and Bermuda grass near the margins. These sites would be expected to develop more
12 extensive emergent vegetation in normal years, typical of a freshwater marsh. Isolated waters
13 such as these provide habitat for migratory birds and hence fall within the jurisdiction of the
14 Corps of Engineers as Waters of the United States.

15 3.3.4 THREATENED AND ENDANGERED SPECIES

16 This section addresses the occurrence of federally listed threatened and endangered species.
17 These species are protected under the Endangered Species Act (16 U.S.C. Section 1538), which
18 requires the Air Force to consult with the U.S. Fish and Wildlife Service regarding actions that
19 could adversely affect listed or proposed species. Although not legally protected, species that are
20 formally listed as "candidates," based on eligibility for listing, are considered in this section. A
21 final section below considers the occurrence of other sensitive species, including those listed under
22 the California Endangered Species Act, or recognized by the U.S. Fish and Wildlife Service and
23 California Department of Fish and Game as "species of concern," on the site.

24 Based on the review of existing information on threatened and endangered species in the vicinity
25 of Travis AFB (USAF 1994a), the results of site surveys, including focused surveys for endangered
26 plants and animals (Earth Tech 1998a; JSA and Earth Tech 1998b), and site reconnaissance, the
27 following species were either known to occur on site, or required further investigation to
28 determine their presence/absence. Additional investigations were then conducted, with results as
29 follows.

30 3.3.4.1 Contra Costa Goldfields

31 The May 1998 survey (Earth Tech 1998a) revealed the presence of two individual plants of Contra
32 Costa goldfields (*Lasthenia conjugens*, federally listed as endangered), in two separate locations on
33 the property. This is an annual plant species that grows in vernal pools and mesic grasslands in
34 Napa and Solano counties. Contra Costa goldfields was observed in one vernal pool and in a
35 grassland area near disturbance but not associated with its normal habitat (Figure 3.3-2). During
36 spring of 1999, no individuals of this species were found at either site or elsewhere on the property
37 despite extensive searches of the property.

1 3.3.4.2 California Tiger Salamander

2 The California tiger salamander (*Ambystoma californiense*), a candidate (= eligible) for federal
3 listing, was initially considered possible on the site because of that species' affinity for vernal
4 pools and occurrence in similar habitats in other areas (USAF 1994a). The occurrence of this
5 species on the site was confirmed during a February 1999 site review with the U.S. Army Corps of
6 Engineers, when a single dead individual was found. During 1999, wet season sampling of all
7 water bodies onsite was conducted to detect California tiger salamander. No larvae or additional
8 adults were found.

9 3.3.4.3 Giant Garter Snake

10 The giant garter snake is federally and state listed as a threatened species. Historically, it was
11 found from Butte County to Kern County (Hansen and Brode 1980). This snake is endemic to
12 contiguous lowland marsh and swamp habitat, including sloughs, ponds, marshes, streams, and
13 irrigation canals on the Central Valley floor. Giant garter snakes feed on small fish, tadpoles, and
14 frogs. The closest known population to the project site is along the eastern fringes of the
15 Sacramento-San Joaquin Delta from Laguna Creek Grove to Stockton, and along the western
16 border of the Yolo Bypass. The freshwater marsh habitat on the site is discontinuous with existing
17 giant garter snake habitat and has been present for only about 20 years; therefore, it has never
18 been contiguous with other giant garter snake habitats. It is outside of the species' historic
19 distribution and no individuals were observed at the project site. These considerations indicate
20 that the Burke Property does not support the giant garter snake or provide habitat for it (JSA and
21 Earth Tech 1998a [Appendix B]). The USFWS agrees with the USAF and its contractors that this
22 snake will not be found on the Burke Property (personal communication, Robert Holmes 1999).

23 3.3.4.4 Vernal Pool Fairy Shrimp

24 A "dry season survey" to assess the occurrence of rare, threatened, and endangered species of
25 invertebrates in vernal pools on the site was conducted during September 1998 (JSA and Earth
26 Tech 1998b). The survey included collection of cores from the bottom of most of the vernal pools
27 on the site, careful screening of the soil and microscopic examination for *Branchinecta* resting cysts.
28 The results, included in Appendix B, indicate the possible occurrence of one listed species, the
29 vernal pool fairy shrimp (*Branchinecta lynchi*), a federally listed threatened species, in five locations
30 on the site, at VP-8, VP-9, VP-20, VP-30, and VP-31, as shown on Figure 3-3. This preliminary
31 determination is based on the confirmed occurrence of resting stages (cysts) of fairy shrimp of the
32 genus *Branchinecta* in these pools. These cysts may be those of a common, non-protected species,
33 *Branchinecta lindahli*. The occurrence of the threatened species remains could not be confirmed or
34 ruled out without additional "wet season" sampling, which occurred during the winter and spring
35 of 1998-99 and revealed adult vernal pool fairy shrimp at three locations onsite (VP-8, VP-9, and
36 VP-30). Adult fairy shrimp were not detected at VP-20 and VP-31, at which unidentified
37 *Branchinecta* cysts had been found during dry season surveys. Despite the fact that adult *B. lynchi*
38 were not identified from two of the 5 pools at which *Branchinecta* cysts were found, all five sites
39 are considered to represent potential habitat for the species. No evidence was found of another
40 listed species, the endangered vernal pool tadpole shrimp (*Lepidurus packardii*), and the occurrence

of another listed species of *Branchinecta*, the endangered *B. conservatio*, is considered unlikely to occur based on the absence of pools with the site characteristics that species requires (Appendix B).

3.3.4.5 Other Species of Concern

As described previously, a golden eagle was observed on the site during the May 1998 survey, and a large raptor nest was found in one of the eucalyptus on the site. Golden eagles are legally protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). An additional study was conducted to assess the possibility of nesting on the site by golden eagles (JSA and Earth Tech 1998a, provided in Appendix B). The nest in question was carefully evaluated and found to belong to another species, most likely a raven. Hence the occurrence of golden eagles on the site is limited to transient foraging, which is to be expected given their sporadic occurrence in surrounding areas (Appendix B).

3.4 CULTURAL RESOURCES

This section addresses the cultural resources in the area of the proposed construction of family housing for Travis AFB. Both prehistoric and historic resources (including architectural resources) are addressed in this discussion.

3.4.1 CULTURAL RESOURCES STATUTES AND SIGNIFICANCE CRITERIA

The National Historic Preservation Act (NHPA), Executive Order 11593, Archeological and Historic Preservation Act (AHPA), and Archeological Resources Protection Act (ARPA) are the primary statutes requiring federal agencies to protect cultural resources. The federal criteria for defining if a cultural resource is significant are stated in the eligibility requirements for nomination to the National Register of Historic Places (36 CFR § 60.4), maintained by the National Park Service, Department of the Interior. In order to qualify for the National Register, a property must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following eligibility criteria:

- A. Association with events that have made a significant contribution to the broad patterns of history; or
- B. Association with the lives of persons significant in the past; or
- C. Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or
- D. Has yielded, or may be likely to yield, information important in prehistory or history.

3. Affected Environment

1 The Native American Graves Protection and Repatriation Act (NAGPRA) provides for the
2 disposition of any American Indian human remains and associated grave goods found on federal
3 property to descendants, and requires a 30-day period for assessment in the event human remains
4 are discovered during the course of a federal construction project.

5 3.4.2 CULTURAL SETTING

6 Travis AFB lies within the area of central California occupied at the time of European contact by
7 Penutian speaking groups. This area is considered within the range of the Suisun and Talenas
8 tribelets of the Southern Patwin (or Wintuan), although little is known ethnographically about
9 these groups. Many of the early inhabitants of this area established villages adjacent to freshwater
10 marshes and subsisted by hunting, gathering, and fishing. By the time of Spanish contact, the
11 foundations of an agricultural system had already been developed (Earth Tech 1998b). Eventually,
12 the Patwin fell subject to missionization, disease, and disruption by miners and settlers. After
13 malaria and smallpox epidemics of 1833 and 1837 that decimated the indigenous populations, the
14 Southern Patwin had largely abandoned the area. The remaining few descendants of the group
15 are located in the northern part of their former range, in the Sacramento Valley.

16 Much of the area surrounding the Burke property was cultivated for agricultural products and
17 grazing livestock, first by Mission fathers during the Spanish Mission Period and later by
18 individuals during the Mexican Period and early American Period. The acreage around Travis
19 AFB was not considered prime farmland and was historically used for sheep and cattle ranching
20 and irrigated farming (Earth Tech 1998b). The first Hispanic settlement in Solano County was in
21 1840, and the first recorded Anglo-American family settled near Travis AFB in approximately
22 1848. Various homesteads were established in this area until 1942, when the U.S. government
23 selected the property of the present-day Travis AFB as the site for an Army Air Corps base (Earth
24 Tech 1998b). The facility was commissioned as the Fairfield-Suisun Army Air Base in 1943, and
25 was renamed Travis Air Force Base in 1950 in honor of Brigadier General Robert Falligant Travis,
26 former commander of the 9th Heavy Bomb Wing.

27 The Burke Property is a 101-acre (41-hectare) parcel of unimproved agricultural land located
28 immediately north of Travis AFB. It has been owned by the Burke family since 1872 (Earth Tech
29 1998b). Maps dating from 1908 to 1941 demonstrate that at least three structures were constructed
30 on the property during the first half of the century (Earth Tech 1998b). The county records and
31 aerial photos of the area indicate that the property has been used for cattle and horse grazing and
32 cropland since the early 1920s. There has also been some mining of soils and sandstone from the
33 property for use as construction fill (Earth Tech 1998b), and the site was used as a landfill by
34 Kaweah Construction Company in 1993 (USAF 1994c). The property is currently being used for
35 livestock grazing (Earth Tech 1998b).

36 3.4.3 BURKE PROPERTY RESOURCES

37 There are no known NRHP-listed or eligible prehistoric or historic sites on the Burke Property. A
38 100-percent archeological reconnaissance investigation of the Burke Property was conducted by
39 Earth Tech personnel in 1998. The resulting report (Earth Tech 1998b) is included as Appendix C

to this document. The reconnaissance identified the remains of a burned structure as well as tools, a windmill or possible water wheel, introduced trees, and historic debris within the Burke Property (Earth Tech 1998b). No visible remains of the mapped structures built between 1908 and 1941 could be identified. The location of the burned structure corresponds with the location of a "burned house" on a 1953 map, but no information is available regarding the history or occupants of the house (Earth Tech 1998b). Construction, plowing, grazing, quarrying, dumping, fire, and possibly looting have compromised the integrity of the site. Due to its lack of integrity, the site of the burned structure is not considered to qualify for inclusion in the National Register (Earth Tech 1998b).

3.5 ENVIRONMENTAL JUSTICE

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was issued by the President on February 11, 1994. Objectives of the EO, as it pertains to this EA, include development of federal agency implementation strategies, identification of minority and low-income populations where proposed federal actions have disproportionately high and adverse human health and environmental effects, and participation of minority and low-income populations. The Air Force approach for conducting an environmental justice analysis is presented in "Guide for Environmental Justice Analysis with the Environmental Impact Analysis Process (EIAP)" (USAF 1997). This analysis has been prepared in accordance with this approach.

The 1990 Census of Population and Housing (U.S. Census Bureau 1990) provides counts of both minority and poverty residents. Minority populations are identified in the census by race (Black; American Indian, Eskimo, or Aleut; Asian or Pacific Islander; and Other) and as Persons of Hispanic Origin. Poverty status (used in this EA to identify low-income populations) is reported in the census as the number of households with income below the poverty level (\$12,764 for a household of four persons in 1989).

The 1990 population of Solano County was 340,421 persons. Whites comprised 66 percent of the population and minority races comprised 34 percent (Blacks, 14 percent; American Indians, Eskimos, or Aleuts, 1 percent; Asians or Pacific Islanders, 13 percent; and Others, 6 percent). Persons of Hispanic Origin comprised 13 percent of the population. Approximately 12 percent of the 113,637 households in the County had incomes that placed them below the poverty level. (U.S. Census Bureau 1990)

The Burke property is located in census tract 2523.09. The 1990 the population of the tract was 7,248 persons. The percentages of minority and low-income populations in the census tract closely parallel those of the County as a whole. Whites comprised 63 percent of the population and minority races comprised 37 percent (Blacks, 12 percent; American Indians, Eskimos, or Aleuts, 1 percent; Asians or Pacific Islanders, 19 percent; and Others, 4 percent). Persons of Hispanic Origin comprised 11 percent of the population. Approximately 7 percent of the 2,234 households in the tract had incomes that placed them below the poverty level. (U.S. Census Bureau 1990)

The Burke property itself is uninhabited, hence it has no minority or low-income populations.

3. Affected Environment

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4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

4.1 INTRODUCTION

This chapter discusses environmental consequences and mitigation measures for those resources described in Chapter 3, including Soil, Groundwater, and Air Quality (section 4.2), Biological Resources (section 4.3), Cultural Resources (section 4.4), and Environmental Justice (section 4.5). In addition, this chapter discusses Indirect and Cumulative Impacts (section 4.6), Unavoidable Adverse Impacts (section 4.7), Relationship between Short-term Uses and Enhancement of Long-term Productivity (section 4.8), and Irreversible and Irretrievable Commitments of Resources (section 4.9).

For resource and issue areas other than those discussed below, the reader is referred to the EIS for Realignment of Travis AFB and Record of Decision (ROD) (USAF 1994a,b), which addressed the other resource/issue areas. Appendix A of this document contains a summary of impacts and mitigation measures from the EIS and ROD.

4.2 SOIL, GROUNDWATER, AND AIR QUALITY

4.2.1 IMPACTS OF HOUSING ALTERNATIVES

4.2.1.1 *Soil and Groundwater*

Known past site use does not indicate the likelihood for soil or groundwater contamination to be present on the subject property. In addition, potential off-site sources of contamination are all located hydrologically downgradient or cross-gradient from the site, therefore, the potential for contamination associated with off-site sources of contamination is low. This includes the tracks of the Sacramento Northern Railroad which is located at an elevation 20 to 30 feet (6 to 9 m) lower than the Burke property at its lowest point and is hydrologically downgradient of the property. For these reasons, if there had been a spill of a hazardous or toxic material along the railroad line it would not have affected the Burke property. Development of either alternative design for residential housing on the site would not introduce significant sources of soil or groundwater contamination. Based on these findings, no significant impacts related to soil and groundwater contamination are anticipated and no mitigation measures would be required. These conclusions would apply to either of the alternatives being considered.

4.2.1.2 *Air Quality*

Criteria to determine the significance of air quality impacts are based on federal, state, and local air pollution standards and regulations. Impacts would be significant if project emissions (1) increase ambient pollutant levels from below to above an ambient air quality standard, (2) exceed annual thresholds that trigger a conformity analysis under the 1990 Clean Air Act (100 tons of NO_x or CO or 50 tons of VOCs), or (3) exceed thresholds the Bay Area Air Quality Management District

4. Environmental Consequences and Mitigation Measures

(BAAQMD) recommends for the determination of significance for NEPA analyses. The BAAQMD does not consider combustive emissions from construction activities to be significant for the purpose of NEPA review, as these emissions have already been considered in the regional attainment planning process. However, the BAAQMD requires the implementation of fugitive dust (PM₁₀) control measures from construction activities, to ensure that PM₁₀ emissions remain insignificant. Operational emissions would be significant if they exceeded 80 pounds per day or 15 tons per year of VOC, NO_x, or PM₁₀ (BAAQMD 1995).

CONSTRUCTION

Air quality impacts associated with the construction of the family housing project would occur from combustive emissions due to heavy equipment usage and PM₁₀ emissions in the form of fugitive dust due to ground-disturbing and earth-moving activities. Impacts due to combustive emissions from these sources would be insignificant, since most construction emission sources would be mobile and intermittent in nature and pollutant impacts from these sources would not be large enough in a localized area to cause an exceedance of an ambient air quality standard. Emissions of fugitive dust (PM₁₀) due to ground-disturbing and earth-moving activities would be potentially significant. Since the disturbed area under construction would exceed four acres, proper implementation of the BAAQMD enhanced fugitive dust control measures would mitigate the impact of these emissions to insignificance. Air quality impacts from construction of either the 281-unit or 226-unit designs would be short-term and would only last for the duration of construction activities.

OPERATION

Impacts associated with the operation of the family housing project mainly would occur from combustive emissions due to the use of personal on-road vehicles. Fewer housing units would be developed on the Burke Property as part of the proposed action, compared to the number evaluated in the 1994 *Realignment of Travis AFB FEIS* (USAF 1994a). Fifty-two additional units have been built elsewhere on base and a 28-unit project slated for the base is in the design process. In combination these projects fully meet the BRAC housing requirement. Development of the proposed action would enable personnel that would live in the family housing project to either walk to work on-base or to drive a much shorter distance to work, compared to commuting a further distance from the communities surrounding Travis AFB. As a result, the proposed action would reduce vehicle miles traveled (VMT) and associated vehicle emissions from existing conditions and air quality impacts from the action would be insignificant.

CONFORMITY APPLICABILITY ANALYSIS

To make a determination of conformity under the 1990 CAA for the construction of the proposed family housing project, equipment usage and associated emissions were obtained from the Air Emissions Calculation and Tracking System (AECATS) (Tetra Tech, Inc. 1999). The total annual emissions associated with the proposed construction activities would be (1) 2.6 tons of VOC, (2) 18.9 tons of CO, and (3) 28.4 tons of NO_x. These emissions would be below the 50 tons of VOC or 100 tons of NO_x or CO annual thresholds that are needed to show conformity under the 1990 CAA.

4. Environmental Consequences and Mitigation Measures

Emissions from construction of the proposed action also would not represent 10 percent of the area's total emissions budget for any nonattainment pollutant. Consequently, construction of the proposed action would conform to the most recent federally-approved State Implementation Plan (SIP).

Since the net change in operational emissions associated with the proposed action would decrease from existing conditions, operations would not trigger a conformity analysis under the 1990 CAA and the action would conform to the most recent federally-approved SIP.

MITIGATION MEASURES

Proper implementation of the BAAQMD enhanced fugitive dust control measures will ensure that fugitive dust (PM₁₀) impacts from the proposed construction activities will remain insignificant (BAAQMD 1995):

4.2.2 NO-ACTION ALTERNATIVE

4.2.2.1 Soil and Groundwater

Under the No-Action Alternative, there would be no impacts related to soil and groundwater on the Burke Property. The site is not known or expected to be a source of contamination, and existing conditions on the site would continue for the foreseeable future.

4.2.2.2 Air Quality

Under the No-Action Alternative, development of the proposed family housing project would not occur on base. As a result, personnel that would live on base in the proposed family housing project would have to commute a greater distance from their present residences in the surrounding communities to work at Travis AFB. As a result, adoption of the no action alternative would prevent a reduction in vehicle emissions associated with these existing vehicle trips.

4.3 BIOLOGICAL RESOURCES

4.3.1 IMPACTS OF THE HOUSING ALTERNATIVES

This section will discuss impacts common to both housing alternatives, followed by an evaluation of project specific impacts of the 281 unit and 226 unit housing alternatives. Section 4.3.3 provides a full list of mitigation measures applicable to the housing alternatives. The individual measures in section 4.3.4 are referenced in the appropriate impact sections.

4.3.1.1 Vegetation and Wildlife Habitat

For either of the two alternatives, the housing development would be constructed primarily on the elevated, upland portions of the site, which support grassland disturbed by livestock grazing, and planted trees, mostly eucalyptus. Given the abundance of similar habitat in the region (USAF 1994a) and the absence of protected species, the loss of these areas to housing is considered a less-

4. Environmental Consequences and Mitigation Measures

than-significant impact. Some upland areas of the site will remain undeveloped, but will experience noise and activity during construction, and be subject to increasing passive recreational use when the housing is occupied. For the same reasons cited previously, the increased disturbance of these areas that would result from constructing either alternative is considered less than significant.

Construction of the housing project would necessitate grading portions of the site, and the resulting bare soil would be temporarily susceptible to erosion. Eroded sediment could be transported downslope into vernal pools and other wetland habitats, adversely affecting resident plants and invertebrates and potentially reducing the area of ponding. These erosion impacts are mitigable to insignificance, however, through the incorporation of erosion control measures and other best management practices as described below under section 4.3.4 "Mitigations" (Measure C-1 and HP-2).

4.3.1.2 Wetland and Aquatic Habitat

The impacts of the two alternatives on wetlands and other jurisdictional Waters of the U.S. have been calculated by overlaying the perimeter "footprints" of rough grading for each alternative onto the habitats mapped in Figure 3-3. Impacts of the two alternatives differ, as discussed below, although most of the areas of wetlands and other waters would be avoided by either alternative. Small areas where construction-related filling cannot be avoided (see discussion under each alternative below) are unlikely to be ecologically significant, but will require mitigation in conjunction with Section 404 permitting. The project's final design will provide sufficient mitigation by increasing and enhancing remaining wetland acreage on the site. This is included as a mitigation measure C-4 below, although the impacts may be less than significant.

Once the housing project is completed and Air Force families move in, the vernal pools and other wetland habitats would likely be visited by residents interested in nature or engaged in hiking, mountain biking, or other activities. Wildlife use of these areas could be reduced as wildlife may be disturbed by recreational activity. Elimination of cattle grazing on the property and resultant trampling of the wetlands (measure HP-3) would help offset this impact and measure HP-6 would further reduce the potential for impacts by directing foot traffic away from the most sensitive habitats while providing nature watching opportunities.

Construction of the housing project could also modify drainage patterns, resulting in the reduction of runoff or infiltration in some areas, but an increase in other areas. These types of alterations might affect vernal pool species that are adapted to seasonal cycles of inundation and drying, but it is not expected that the larger ponds and associated wetlands that are established in old quarry holes would be strongly affected. Impacts will be avoided or mitigated to insignificance through the development of site grading and drainage plans that retain existing hydrology for vernal pools (see Mitigation Measures C-3, HP-4 and HP-5, below).

4.3.1.3 Threatened and Endangered Species

Contra Costa goldfields, a federally listed endangered species, has been identified from two locations on site. The vernal pool fairy shrimp, a federally listed threatened species, has been identified as occurring at five locations on site. This is based on the collection of resting stages (cysts) belonging to the genus *Branchinecta* at five locations and confirmed in wet sampling at three of the locations by collection and identification of adult vernal pool fairy shrimp (*B. lynchi*) rather than its unlisted relative *B. lindahli*. The housing alternatives differ in their potential for impacts on the Contra Costa goldfields and vernal pool fairy shrimp, as evaluated in the following sections.

As discussed in section 3.3.4, the only other listed or candidate species that would be impacted by construction of either housing alternative is the California tiger salamander, a federal candidate species that has been identified on the site and normally exists in association with vernal pools. As a result, impacts on vernal pools, and related mitigations, are also applicable to this species.

4.3.2 281 UNIT HOUSING DEVELOPMENT

The following discussion identifies impacts specific to this alternative in addition to those described in the preceding sections (4.3.1.1-4.3.1.3), which describe impacts common to both housing alternatives.

4.3.2.1 Vegetation and Wildlife Habitat

Based on an overlay of the rough grading footprint, the 281-unit alternative would require the grading of about 58 acres (23.5 hectares), the vast majority of which consists of grassland and eucalyptus trees. Impacts on these habitats are not significant, as discussed previously.

4.3.2.2 Wetland and Aquatic Habitat

As shown in Table 4-1, a total of 3.9 acres (1.58 hectares) of wetlands and other jurisdictional Waters of the U.S. would be eliminated. Most of the site's vernal pools and other wetlands and aquatic habitats would be avoided (Table 4-1).

Applicable mitigation measures, which include on-site or off-site compensation for affected habitat (measures C-4 and C-5), and measures to protect the sites from direct and indirect impacts (C-1, C-3, HP-1, HP-3, HP-4, HP-5, and HP-6), would mitigate impacts on wetlands to insignificant levels.

4.3.2.3 Threatened or Endangered Species

Several vernal pools would be eliminated by the 281-unit alternative, including number VP-8, at which the threatened vernal pool fairy shrimp was found, and number VP-1, at which the endangered Contra Costa goldfields was found (Figure 3-3). The other location at which Contra Costa goldfields was found would also be eliminated. Impacts on vernal pool fairy shrimp could be mitigated to non-significance by implementation of the Habitat Protection, Management, and Enhancement measures (Measures HP-1 through HP-6) and species conservation measures

4. Environmental Consequences and Mitigation Measures

adopted through Section 7 Consultation (Appendix E). Impacts on Contra Costa goldfields could be mitigated to non-significance by implementation of Measure C-2, which provides for a resurvey of the site for Contra Costa goldfields and collection of seed from impacted areas for use in on-site or off-site replanting, consistent with input from USFWS.

**Table 4-1. Impacts of the 281-Unit Housing Project
on Wetlands and other Waters of the U.S.**

<i>Habitat Type</i>	<i>Total Acreage on Site</i>	<i>Impact Acreage (hectares), % of On-Site Acreage Impacted</i>		<i>Affected Areas (see Figure 2-2)</i>
Freshwater Marsh	1.18 (0.48)	0.42 (0.17)	36%	FW-1, 2
Seasonal Marsh	2.16 (0.87)	0.77 (0.31)	36%	SM-1
Vernal Swale	3.03 (1.23)	0.95 (0.38)	31%	VS-1, 3, 4
Vernal Pool	1.71 (0.69)	0.41 (0.17)	24%	VP-1, 7, 8*, 21, 22, 23, 33, 36
Open Water	6.26 (2.53)	1.30 (0.53)	21%	Pond 1
(Total)	14.34 (5.80)	3.90 (1.58)	27%	
* Vernal pool fairy shrimp location				

4.3.3 226 UNIT HOUSING ALTERNATIVE

The following discussion identifies impacts specific to this alternative in addition to those described above in sections 4.3.1.1-4.3.1.3, which describe impacts common to both housing alternatives.

4.3.3.1 Vegetation and Wildlife Habitat

The 226-Unit Housing Alternative would require grading on a smaller portion of the site, about 45 acres (18.2 hectares). As for the Proposed Action, most of this is grassland and eucalyptus trees, the loss of which is not considered significant.

4.3.3.2 Wetland and Aquatic Habitat

This alternative avoids the construction of housing in several areas that support vernal pools and other wetland and aquatic habitats. Thus this alternative has a much smaller impact, impacting 1.40 acres (0.57 hectare) (Table 4-1) of these habitats, compared to the Proposed Action.

Applicable mitigation measures, which include on-site or off-site compensation for affected habitat (measures C-4 and C-5), and measures to protect the sites from direct and indirect impacts (C-1, C-3, HP-1, HP-3, HP-4, HP-5, and HP-6), would mitigate impacts on wetlands to insignificant levels.

**Table 4-2. Impacts of the 226-Unit Alternative Housing Project
on Wetlands and other Waters of the U.S.**

<i>Habitat Type</i>	<i>Total Acreage (hectares) on Site</i>	<i>Impact Acreage (hectares), % of On-Site Acreage Impacted</i>	<i>Affected Areas (see Figure 2-3)</i>
Freshwater Marsh	1.18 (0.48)	0.26 22% (0.10)	FW-1
Seasonal Marsh	2.16 (0.87)	0.10 4.6% (0.04)	SM-1
Vernal Swale	3.03 (1.23)	0.87 28.7% (0.35)	VS-1, 3, 4
Vernal Pool	1.71 (0.69)	0.17 9.9% (0.07)	VP-1, 7, 21, 22, 23, 36
Open Water	6.26 (2.53)	0.00 0% (0.00)	None impacted
(Total)	14.34 (5.80)	1.40 9.8% (0.57)	

4.3.3.3 Threatened or Endangered Species

This alternative avoids all of the pools, including VP-8, that support the threatened vernal pool fairy shrimp. Both locations where Contra Costa goldfields was found (one individual at each location) would be impacted by this project as well as by the 281-unit project. Indirect impacts on vernal pool fairy shrimp, if present, could be mitigated to non-significance by implementation of the Habitat Protection, Management, and Enhancement measures (Measures HP-1 through HP-6). Impacts on Contra Costa goldfields could be mitigated to non-significance by implementation of Measure C-2, which provides for a resurvey of the site for Contra Costa goldfields and collection of seed from impacted areas for use in on-site or off-site replanting, consistent with input from USFWS. (Surveys during March 22-26, 1999 and follow up visits in April and May 1999 did not locate any individuals of Contra Costa goldfields at the previously discovered locations or elsewhere on the site).

4.3.4 MITIGATION MEASURES

The principal means of mitigating the loss of environmental resources at the Burke site is avoidance. Impacts that cannot be avoided would be mitigated by resource replacement or enhancement. The layouts of the 281-unit and 226-unit designs evaluated in this EA have been configured to minimize the impacts on vernal pools, wetlands, and other aquatic habitat. The 281-unit design would occupy about 57 percent of the property but would impact 3.90 acres (1.58 hectares) of wetlands and other Waters of the U.S., representing about 27 percent of total acreage of these resources on site (see above Table 4-1).

The 226-unit design would reduce impacts on wetlands even further, affecting about 45 percent of the property and 1.4 acres (0.57 hectare) (9.8 percent) of the wetlands and other Waters of the U.S. on site. Significantly, the 226-unit design allows avoidance of virtually all the vernal pool habitat including VP-8, a site where vernal pool fairy shrimp was identified. It also enables avoidance of

4. Environmental Consequences and Mitigation Measures

Pond 1, a large former quarry site that supports willows and cottonwoods. To mitigate direct or indirect impacts on vernal pools and associated species, mitigation on a one-to-one basis is proposed. This could be accomplished by on-site wetland creation or enhancement, by contribution to a wetland mitigation bank in the region, or by a combination of these approaches.

A detailed proposed Vernal Pool Mitigation Plan developed by the Air Force in consultation with the USFWS and the Corps of Engineers has been submitted to USFWS for their review and concurrence. The proposed plan, which addresses and incorporates the mitigation strategies outlined below, is included in Appendix E. When finalized with agency concurrence, it will become part of the Air Force's commitment for resource protection and mitigation. This proposed mitigation plan encompasses construction measures that will be stipulated in construction contracts, mitigation measures, management and impact avoidance measures, enhancement measures, and monitoring. The following mitigation measures apply to both the 281-unit and 226-unit housing designs and will be superseded by measures developed in consultation with the USFWS and Corps of Engineers.

CONSTRUCTION-RELATED MITIGATION

C-1 Prior to construction, a Stormwater Pollution Prevention Plan for construction, meeting the requirements of the Clean Water Act, will be prepared incorporating best management practices to minimize wind and water erosion from the site and deposition of sediment in wetlands. This plan will incorporate requirements identified as necessary to protect especially sensitive areas by the Corps of Engineers and USFWS. The plan will be finalized after approval by the Regional Water Quality Control Board.

C-2 A resurvey of the site has been made during the spring season prior to construction to verify the location, areal extent, and population size of the Contra Costa goldfields (which may vary considerably from year to year due to its annual habit). Consistent with input from USFWS, seedbank will be collected from these sites for use in inoculating suitable habitat on site or at a mitigation site at Travis Air Force Base. Because surveys during March 22-26, 1999 and follow up visits in early April did not locate any individuals of Contra Costa goldfields at the previously discovered locations or other locations that would be impacted, the Air Force currently proposes to remove, save, and relocate the soil from around where the two individual plants of *Lasthenia conjugens* had been found in order to conserve any seed stock in the soil.

C-3 Where new road construction would interfere with vernal pool water sources, culverts or other suitable devices will be placed in the roads to allow unimpeded drainage. The project will use rolled curbs to provide unimpeded access to amphibians.

C-4 On-site wetland creation will be incorporated into project design to offset unavoidable impacts on wetlands. For example, because the drainage swale below pond #1 will be filled to allow development of both the proposed and alternative projects, it is proposed that the outlet of pond #1 be shifted away from its current position by excavating a broad, flat channel that drains eastward into pond #2 during high rainfall events. This will allow

4. Environmental Consequences and Mitigation Measures

development of a constructed vernal swale/wetland mitigation area on the east side of the pond. This new drainage will be designed to maximize the vernal swale wetland habitat created. Three artificial seasonal pools will be constructed in the new swale area as well.

C-5 Wetland habitat impacts that cannot be compensated for by wetland creation or restoration on site, will be mitigated by contribution to a regional mitigation bank.

HABITAT PROTECTION, MANAGEMENT AND ENHANCEMENT

HP-1 Weed and insect control will be conducted consistent with management goals to protect vernal pool resources. Use of herbicides and insecticides in common areas outside of fenced yards will be conducted exclusively by the Air Force or contractors directed by the Air Force. All such use will be subject to evaluation and approval by the base entomologist and will be consistent with the protection of wetland values, especially the protection of vernal pool species. Should mosquito or other insect pest control be required it will be implemented using the best management practices consistent with vernal pool protection. Pest management practices will be identified consistent with protection of fairy shrimp and the pools found to contain them. Recommended practices will be provided to USFWS for review.

HP-2 Revegetation and erosion control plantings outside the housing landscaping footprint will maximize the use of native plant species drawn from the site's "natural" plant community. Some non-native "naturalized species" common to the area may be used for initial erosion control. No new exotic invasive grasses or other plants will be used. A planting list of species native to the local region and offering wildlife habitat values such as native perennial grasses, oaks (*Quercus* spp.), willows, cottonwoods, wild buckwheat (*Eriogonum* spp.), ceanothus (*Ceanothus* spp.), toyon (*Heteromeles arbutifolia*), and manzanita (*Arctostaphylos* spp.) species will be developed with USFWS. Plantings will be concentrated near the swale areas in the north and northeastern portion of the site and adjacent to the ponds to enhance habitat value. Plantings of native trees will also be made in proximity to existing eucalyptus as part of a long-term management plan to eventually replace the eucalyptus trees with mature native tree species such as oaks and gray (=digger) pine (*Pinus sabiniana*). Appropriate native plants will be incorporated into the landscape plans.

HP-3 Cattle grazing will be excluded from the pools and from the site in order to allow the undeveloped portion of the site to develop a more natural plant cover.

HP-4 The current practice of discharging the water tanks directly into the vernal pools will be discontinued. Discharged water will be collected and routed to pond #2 or a combination of pond #2 and the created swale area.

HP-5 Unnatural sources of water that have the potential to enter any vernal pools will be minimized. Landscaping practices will emphasize water savings and trickle or drip irrigation to conserve water and reduce runoff from artificial irrigation.

4. Environmental Consequences and Mitigation Measures

HP-6 To direct foot or bike traffic away from the most sensitive sites while providing some nature watching opportunities, a jogging/bike/foot trail will be constructed through the undeveloped portion of the property. Trails may be paved with asphalt, gravel, wood chip, pine bark, or similar materials for stability. Elevated boardwalks will be provided where low seasonally wet areas are crossed (e.g., vernal swales) allowing unimpeded drainage while minimizing impact of foot and bike traffic on sensitive wetlands. Use of off-road vehicles will be prohibited within all undeveloped areas of this housing development.

4.3.5 NO-ACTION ALTERNATIVE

With the No-Action Alternative, the Burke Property would remain as undeveloped land. The Air Force has no plans or alternative uses for the site other than housing. As such, existing habitats on the site would be expected to remain in their current condition for the foreseeable future, at least until an alternative use other than housing is identified and implemented. Future decisions regarding alternative land uses would be subject to review under NEPA.

4.4 CULTURAL RESOURCES

4.4.1 IMPACTS OF HOUSING ALTERNATIVES

Impacts on cultural resources are considered significant if a property listed on or eligible for listing on the National Register of Historic Places would be physically damaged or altered, would be isolated from its historic context or setting, or if elements of the project would introduce elements out of character with the property or its setting.

The archaeological investigation for the Burke Property (Appendix C) was forwarded to the SHPO on November 18, 1998. Based on the site survey and background research (Appendix C), the report concluded that no NRHP-listed or eligible prehistoric or historic resources are located on the Burke Property. Consequently, construction of family housing on the Burke Property would not have any significant impacts on cultural resources and no mitigation measures would be required.

This impact assessment applies for both the 281-unit and 226-unit housing designs.

4.4.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no action would be taken to develop housing on the Burke Property, and there would be no impacts related to cultural resources.

4.5 ENVIRONMENTAL JUSTICE

The only adverse environmental impacts identified in the analyses conducted for this EA are the direct impacts on biological resources located *within* the boundaries of the Burke property. The Burke property is uninhabited, hence no minority or low-income populations would be affected by on-site biological impacts. Furthermore, no adverse environmental impacts would occur *outside*

the Burke property. Hence, no adverse effects on minority and low-income populations would occur as a result of implementation of either alternative, and no mitigation measures would be required.

4.6 INDIRECT AND CUMULATIVE IMPACTS

Indirect and cumulative impacts associated with the realignment action as a whole were addressed in the EIS for the Realignment of Travis AFB and found to be beneficial in the case of certain types of socioeconomic impacts, and otherwise insignificant with the implementation of several mitigations as identified in Appendix A of this document (USAF 1994a). Beneficial socioeconomic impacts were anticipated in the areas of population, employment, and housing, but this conclusion assumed that new housing would be constructed on the Burke Property. For the new issue areas examined in this EA, resource-specific impacts conclusions are as follows:

- There are no indications of site contamination on the Burke Property, and consequently, no potential indirect or cumulative effects. Construction of housing on the property would not contribute significantly to base-wide contamination problems.
- Construction emissions from the development of the family housing project would be insignificant, as implementation of BAAQMD fugitive dust control measures would adequately mitigate potentially significant PM₁₀ emissions. Therefore, proposed construction emissions, in combination with reasonably foreseeable future emissions, would be insignificant. Operation of the proposed action would reduce emissions compared to baseline conditions within the Travis AFB region. As a result, cumulative air quality impacts from the operation of the proposed family housing project would be insignificant.
- Mitigation for site-specific biological resource impacts would take into account and mitigate for any on- and off-site indirect impacts, as well as regional cumulative impacts on the affected resources—wetlands and associated endangered species, based on input from the U.S. Fish and Wildlife Service and Corps of Engineers.
- There are no site-specific direct, indirect, or cumulative impacts associated with cultural resources on the Burke Property.

4.7 UNAVOIDABLE ADVERSE IMPACTS

There are no significant unavoidable adverse impacts. All potentially significant impacts would be mitigated to less-than-significant levels.

1 **4.8 RELATIONSHIP BETWEEN SHORT-TERM USES AND**
2 **ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

3 Implementation of the proposed or alternative project designs would have a positive effect on
4 long-term productivity by enabling Air Force personnel to live more closely to Travis AFB and
5 reducing the costs and inefficiencies associated with commuting from off-base locations.

6 **4.9 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS**
7 **OF RESOURCES**

8 Implementation of the proposed or alternative project designs would irreversibly commit portions
9 of the Burke Property to residential development, while leaving significant areas as undeveloped
10 open space that would continue to support valuable wetland habitats.

5 REFERENCES

5.1 REFERENCES CITED

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APPENDIX A
Previous EIS Analysis of
Burke Property Housing Project (USAF 1994a,b)

APPENDIX A

PREVIOUS EIS ANALYSIS OF BURKE PROPERTY HOUSING PROJECT (USAF 1994a,b)

1 In 1993, the Defense Base Closure and Realignment Commission recommended the realignment
2 of aircraft, missions, and personnel from March Air Force Base (AFB) to Travis AFB. The
3 environmental consequences of the resulting "BRAC" actions, including the construction of
4 new family housing for relocated personnel, were evaluated in an environmental impact
5 statement (EIS) (USAF 1994a). The BRAC actions and EIS findings and mitigation measures
6 were adopted in the subsequent Record of Decision (ROD) by the Air Force (USAF 1994b).

7 The family housing (FH) project on the Burke Property that was evaluated as part of the BRAC
8 EIS was a conceptual plan that consisted of 384 units that would, together with infrastructure
9 and ancillary facilities, have occupied about 75 percent of the Burke Property. The FH
10 alternative projects currently proposed would have fewer units and smaller development
11 footprints than were analyzed in the BRAC EIS. As a result, impacts are generally reduced
12 relative to the BRAC EIS analysis.

13 The following is a summary of the environmental impacts and mitigation measures previously
14 identified in the BRAC EIS and Record of Decision (ROD) for the construction of FH on the
15 Burke Property (USAF 1994a,b), as part of the BRAC relocation action. Additional information
16 contained in these documents is hereby incorporated by reference.

17 GEOLOGICAL RESOURCES

18 No significant site-specific or cumulative impacts to soils, topography, or from seismicity are
19 expected to occur. Approximately 50 acres of land would be disturbed to construct proposed
20 FH facilities. Soils would be displaced during construction and be susceptible to erosion until
21 vegetation is reestablished on disturbed areas. Erosion by water or wind would be mitigated
22 through the use of standard best management practices during construction. Although the
23 proposed site has slightly steeper slopes than other areas of the base, only minor leveling would
24 be required and impacts to the topography would be insignificant. Excavated soil will not be
25 stockpiled in areas where runoff from stockpiles could impact vernal pools. The design of
26 structures would be required to meet all of the building codes established for this area,
27 minimizing the risk of earthquake damage.

28 WATER RESOURCES

29 Impacts to surface and subsurface water resources could occur due to construction of facilities,
30 paved surfaces and increased demand for potable water. Construction of FH would alter
31 natural drainage of the site. Impacts to surface water during construction would not be
32 significant with mitigation for sediment impacts such as storm water management plans,
33 erosion control methods, and spill prevention and response plans. Less than 0.1 percent of the

groundwater basin, would be disturbed and covered for FH, which would have an insignificant impact on the groundwater recharge system. The construction contractor would be responsible for providing water for construction uses. Construction activities would create a short-term adverse, insignificant impact on water resources.

Addition of new FH would result in an increase in a local increase in domestic water use. The increase in domestic water use is small when compared with the increase in industrial water use associated with the realignment action as a whole. The City of Vallejo, which provides water to Travis AFB, has indicated that there is ample raw water supply to cover the additional demand of 226 new homes. The Travis Water Treatment Plant, which was expanded and upgraded in 1995, has excess capacity built in to cover the additional demand (City of Vallejo 1999).

WASTEWATER MANAGEMENT

The construction of new housing would not have a significant adverse effect on sewage treatment. All sewage generated on Travis AFB is conveyed off the base and treated at a facility owned and operated by the Fairfield-Suisun Sewer District (FSSD), which was found to have adequate capacity to accommodate the increased demand associated with the realignment. An existing contract between the Air Force and the FSSD provides for all sewerage from Travis AFB to be treated by the district. Peak daily flow rates from Travis AFB have exceeded the rates covered by the existing contract and Travis AFB and the FSSD are currently finalizing an agreement that will change daily flow rates and treatment charges. The proposed new housing project is being considered in the agreement currently being negotiated and the Sewer District anticipates no unmitigated impacts to the sewer system (Fairfield-Suisun Sewer District 1999). Unlike most private housing developments, the Burke Property Housing project includes the construction, operation, and maintenance of all sanitary sewer lines and connections by the Air Force. Thus, costs incurred by the FSSD will be substantially less per housing unit than would be the case in a similarly designed and constructed private development.

NOISE AND LAND USE

No significant site-specific or cumulative impacts were identified for the BRAC action, including new FH construction. Construction of the new FH would take place within 200 feet of existing base residences and would occur during daytime hours when on-base ambient noise levels are generally higher. At a distance of 200 feet, the construction noise would attenuate to approximately 78 dBA, consistent with noise levels associated with aircraft operations. Additionally, buildings normally attenuate 20 to 30 dBA with windows closed. With this level of noise attenuation, construction noise levels in these buildings would be consistent with ambient or baseline levels, thus, having no significant adverse impacts.

Potential control measures would include the placement of noise barriers or temporary berms around construction sites to further attenuate noise generated from construction equipment.

ENVIRONMENTAL PROGRAMS

The construction of new housing could temporarily increase the use of hazardous materials and the amount of hazardous waste being generated at the base. These increases would contribute to cumulative increases associated with the BRAC actions, but would not be significant.

Residential solid waste would increase proportionately with the increase in on-base resident personnel. Increase in solid waste disposal associated with BRAC actions individually and cumulatively was determined to not have a significant impact on the amount of waste received by the local landfill. Therefore the increase in residential solid waste, which represents a small percentage of the overall increase in solid waste disposal, would not be significant. The Air Force will establish a curbside recycling program or designation of a recycling drop-off point in the FH area to mitigate the increase in solid waste.

The construction and use of additional housing would increase the amount of wastewater generated by the base. A revised wastewater contract with the Fairfield-Suisun Treatment Plant will be required to accommodate the expected increase, but no significant impact on wastewater treatment facilities would occur.

SOCIOECONOMICS

Construction of additional FH units would help alleviate on- and off-base housing pressures, a beneficial impact. Based on the ROD, potential impacts on local school districts from relocating Air Force personnel to new FH on the Burke Property could be mitigated through notifying local school district managers as far in advance as possible of enrollment increases or decreases. No adverse cumulative impacts are associated with the BRAC actions.

TRANSPORTATION

Impacts to transportation at and around Travis AFB could be caused by the movement of construction equipment and the increase in traffic from construction workers and additional base personnel. An adverse and locally significant short-term impact, which is a cumulative result of current and past changes in the base workforce, would result from increased peak-hour traffic causing inconvenience in accessing the base. Measures proposed to mitigate impacts to the transportation network include implementation of ride-share programs (Regulation 13 Transportation Control Measures) and encouraging construction workers to use alternate entrance gates. After construction of additional on-base housing is complete, the impacts from traffic accessing the base would be insignificant and vehicle trips would be reduced since additional personnel would be residing on the base.

1

APPENDIX B
Surveys for Selected Wildlife Species,
Wetland Delineation, and Plants Associated with Vernal
Pools at Travis AFB, California

**Dry Season Surveys for Special-Status Shrimp Species at
Travis Air Force Base, California**

January 1999

ABSTRACT

Soil samples collected in September 1998 from 34 potential habitat sites were analyzed to assess the presence of special-status fairy shrimp and tadpole shrimp species at Travis Air Force Base, near Fairfield, Solano County, California. Soil samples were collected only from habitat judged to be suitable for special-status shrimp species. Some vernal pools and swales present were not sampled because of short ponding durations, permanent inundation, or water flow that would not support special-status shrimp species. Soil samples were examined in the laboratory by sieving the material through screens. The portion of each sample retained in the screens was dissolved in a brine solution to separate the organic material, which was then examined under a microscope to identify shrimp cysts. Cysts from the fairy shrimp genus *Branchinecta* were found in samples from five vernal pools, and no tadpole shrimp cysts were found. Cysts from the genus *Branchinecta* were identifiable only to genus level because of the cyst character overlap among species. Wet season sampling surveys were initiated in December 1998 to provide species-level identification in accordance with U.S. Fish and Wildlife Service protocol.

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1.0 INTRODUCTION

Travis Air Force Base (AFB), south of Fairfield, Solano County, California, is proposing construction of housing facilities on the Burke property, a recently acquired parcel of land north of the base (Figure 1). The 101-acre property is a hilly area dominated by non-native grassland vegetation. The area also supports a number of vernal pools previously identified in a May 1998 survey by Earth Tech (Earth Tech, 1998) and delineated in a September 1998 wetland delineation by Jones & Stokes Associates (Jones & Stokes and Earth Tech 1998). Vernal pools are seasonally inundated pools that can support habitat for fairy and tadpole shrimp, including several sensitive species.

In support of the planning process for the proposed construction, Earth Tech contracted Jones & Stokes Associates to perform a dry season shrimp survey that would assess the potential presence of special-status shrimp.

Jones & Stokes Associates analyzed soil samples collected on September 18, 1998 from 34 potential habitat sites to assess the presence of special-status shrimp. Jones & Stokes Associates will submit this report and all other pertinent materials and information to the U.S. Fish and Wildlife Service (USFWS), the California Academy of Sciences, and the California Department of Fish and Game, as required by the USFWS guidelines for a protocol-level survey.

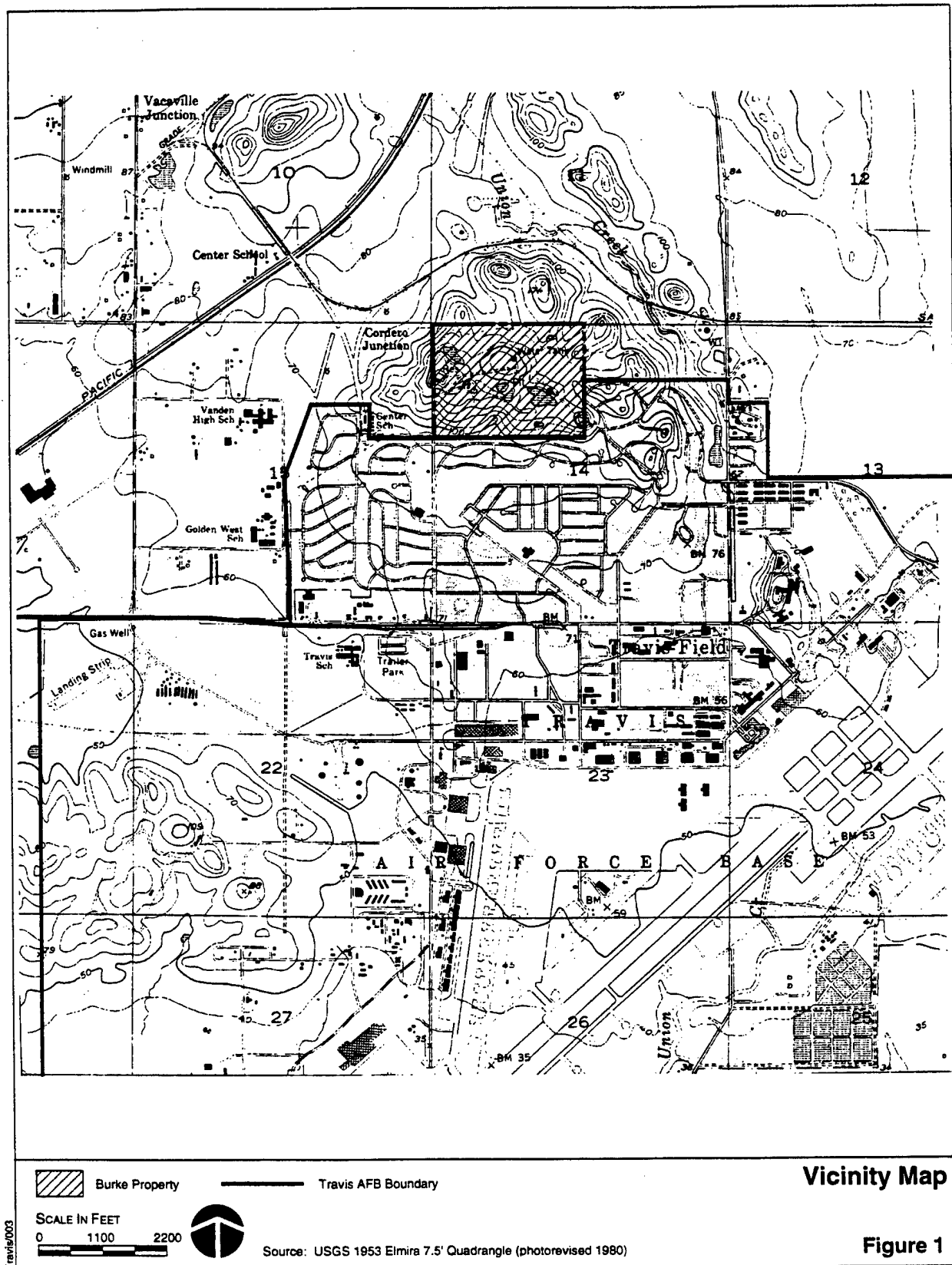
2.0 BACKGROUND

2.1 DEFINITIONS

For the purpose of this report, special-status shrimp are defined to include shrimp species in the following categories:

- Shrimp listed as threatened or endangered under the federal Endangered Species Act (50 Code of Federal Regulations [CFR] Part 17.11 for listed animals and various Federal Register notices for proposed species) and
- Other shrimp species meeting the definition of rare or endangered species under the California Environmental Quality Act (CEQA) (CEQA Guidelines, Section 15380).

For the purpose of this study, potential special-status shrimp habitat is defined as seasonal wetlands of sufficient size (depth and area) or supporting specific vegetation that indicate the potential for ponding for a sufficient duration to allow special-status shrimp species to complete their life cycles and to maintain water temperatures conducive to special-status shrimp species.



2.2 SPECIES ACCOUNTS

Three special-status shrimp species (*Branchinecta conservatio*, *B. lynchi*, and *Lepidurus packardi*) have the potential to occur at the proposed project site. In addition, one other species likely to be listed (*Branchinecta* "mid-valley") and two non-listed species (*B. lindahli* and *Linderiella occidentalis*) are known from the proposed project vicinity.

Branchinecta conservatio

Branchinecta conservatio is federally listed as an endangered species. This species is reported from large (greater than 5,000 square meters [m²]) and deep (greater than 15 centimeters [cm]) turbid alkaline pools. This species of fairy shrimp has an extremely disjunct distribution; *Branchinecta conservatio* is known from Tehama and Butte counties, in the northern part of the Sacramento Valley, Solano County at the Jepson Prairie, and Merced County in the San Joaquin Valley near Haystack Mountain.

Branchinecta lynchi

Branchinecta lynchi is federally listed as a threatened species. This shrimp species is found in vernal pools throughout the Central Valley and western Riverside County in California and near Medford, Oregon. This fairy shrimp species occurs in neutral to slightly alkaline vernal pools and rock outcrop pools along the interior Coast Ranges.

***Branchinecta* "mid-valley"**

Branchinecta "mid-valley" is a recently discovered fairy shrimp species that is currently being described by Dr. Denton Belk and Dr. Michael Fugate (Belk pers. comm.). This species has been collected in eastern Solano County, southern Sacramento County, and northeastern San Joaquin County, with isolated populations in Merced, Madera, and Fresno counties. This species can complete its life cycle in as little as 9 days; consequently, it can use smaller vernal pools. This species meets the California Environmental Quality Act definition of rare or endangered species. Although it has no official federal status at this time, this species may be listed as threatened or endangered by the USFWS after the formal species description is published (Goettle pers. comm.).

Lepidurus packardi

Lepidurus packardi is federally listed as an endangered species. This tadpole shrimp species is found in vernal pools throughout the Sacramento Valley and is documented to occur in Solano County. Typically, *Lepidurus packardi* is green in color, but may be mottled with brown in highly turbid water. *Lepidurus packardi* is omnivorous and generally forages on the bottoms of pools in dense vegetation.

Tadpole shrimp tend to be slow growing and are usually collected after the vernal pool has been ponded for 30 days.

Branchinecta lindahli

Branchinecta lindahli is a common fairy shrimp with no legal status. This fairy shrimp is common in alkaline habitats throughout the western United States and northern Mexico. It typically occurs in pools that are turbid, alkaline or slightly saline, and often ringed with salt grass (*Distichlis* sp.). *B. lindahli* may be opportunistic, as it is common in a wide variety of artificial habitats, such as bulldozer scrapes, roadside ditches, and railroad toe-drains.

Linderiella occidentalis

Linderiella occidentalis is a common fairy shrimp from vernal pools throughout the Central Valley and Coast Ranges of California. Unlike most *Branchinecta*, which are typically white, *L. occidentalis* is white and green with red markings. *L. occidentalis* tends to emerge later than the *Branchinecta* species and is typical of vernal pools that are inundated for at least 30 days. The cysts of *L. occidentalis* are densely spinose and accumulate debris, making detection of the cysts from soil samples difficult. *L. occidentalis* was originally proposed for listing under the Endangered Species Act and was withdrawn from the proposal in 1995.

3.0 METHODS

3.1 FIELD METHODS

Soil samples were collected from potential special-status shrimp habitats at the proposed project site according to USFWS (1996) Interim Survey Guidelines to Permittees. A hand trowel was used to collect approximately 1 liter of soil total from two transect lines through each potential habitat and from the deepest portion of each potential habitat.

Potential habitat for fairy and tadpole shrimp in California includes vernal pools, ponded areas within vernal swales, rock outcrop ephemeral pools, playas, alkali flats, and salt lakes (Eng et al. 1990). Other types of depressions that hold water of a similar volume, depth, area, and for a similar duration and seasonality as vernal pools and swales also may be potential habitat. However, these other depressions are typically artificial habitats and are unvegetated. Examples include railroad toe-drains, roadside ditches, abandoned agricultural drains, ruts left by heavy construction vehicles, and depressions in fire breaks (Eng et al. 1990).

Pool volume is important in determining potential shrimp habitat because deeper pools with a large surface area can more easily maintain their dissolved oxygen levels. Similarly, deep pools will pond long enough to allow the shrimp to

complete their life cycle. The species that are of concern in this study require a mean ponding depth of 15.0 to 19.7 cm and a mean ponding area of at least 67 m² (Helm 1998) (Table 1).

Table 1. Duration, Depth, and Area Requirements for Special-Status Shrimp Species with Potential to Occur in Study Areas

Species	Mean Days to Maturity	Mean Ponding Depth (cm)	Ponding Area (m ²)
<i>Branchinecta lynchi</i>	18	15.0	527
<i>Branchinecta conservatio</i>	36.5	19.7	27,865
<i>Branchinecta "mid-valley"</i>	26.3	10.1	67
<i>Lepidurus packardii</i>	38.1	15.2	1,828

cm = centimeter
m² = square meter

Source: Helm 1998

Common wetland plant species that co-occur with the shrimp species, which have potential to occur within the proposed project areas, generally require the same hydrological conditions. Therefore, the presence of these plant species within a potential habitat would imply a greater potential for a population of these shrimp to be present. These plants include *Eryngium vasei*, *Downingia* sp., *Lasthenia* sp., *Eleocharis macrostachya*, *Psilocarphus* sp., *Isoetes* sp., *Lilaea* sp., and *Gratiola* sp.

Pools that are dominated by vernal pool plant species that require short inundation periods will have hydrology that cannot support shrimp. These plants include *Hordeum geniculatum*, *H. leporinum*, *Juncus bufonius*, *Lasthenia freemontii*, *Leontodon* sp., *Pogogyne* sp., *Ranunculus muricatus*, *Poa annua*, *Lolium multiflorum*, and *Trifolium* sp. Vernal pools and swales at the Travis AFB project site that were judged not to pond long enough or to be sufficiently deep to support special-status shrimp species were not sampled. These sites were VP-15, VP-25, VP-26, VP-28, VP-38, VP-40, VS-1, VS-3, and VS-4 (Figure 2).

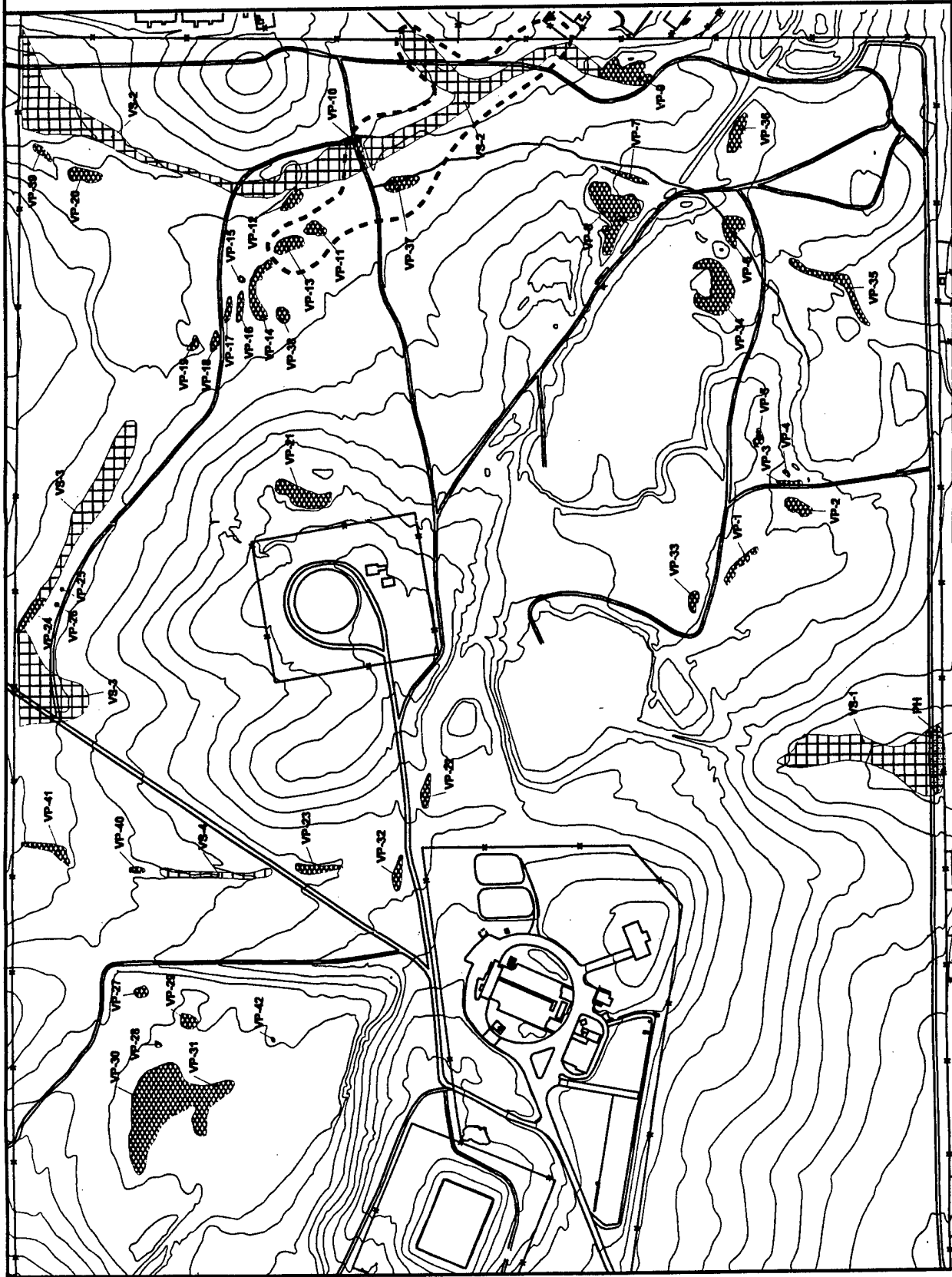
Conversely, wetland habitats that support plant species that need water year-round cannot support special-status shrimp species because the shrimp's cysts must dry out before they can hatch. These plants include *Typha* sp., *Salix* sp., *Populus* sp., *Lemna minor*, and *Cypera* sp.

Vernal swale VS-2 was not sampled because the substrate is scoured. Scouring indicates that the flow in the swale is so strong that tadpole shrimp and fairy shrimp could not inhabit that habitat, because the shrimp would be carried away in the current to ponded areas. Because tadpole shrimp and fairy shrimp are so

Figure 2
Potential Special-Status
Shrimp Habitat

Legend

-  Disturbed Vernal Pool and Swale Area
-  VS - Vernal Swale
-  VP - Vernal Pools
-  PH - Other Potential Habitat



Dry Season Surveys for Special-Status Shrimp Species at

soft bodied, strongly flowing water would be harmful to them. Typically tadpole shrimp and fairy shrimp are not found in flowing swales.

Vernal pools VP-10, VP-11, VP-13, and VP-37 were not sampled because they held water at the time of the soil collection. These vernal pools are on the east side of the hill and are subject to intermittent inundation from the flushing of waterlines at the water tanks on top of the hill and are identified as "disturbed vernal pools" in Figure 2. These vernal pools were observed holding water 0.5 meter deep on September 16, 1998. Dry sampling was not possible in these wetlands because wet special-status shrimp cysts at warm temperatures are susceptible to fungal infection and disintegration during collection.

All sampled potential habitats identified according to the numbers assigned to them by Earth Tech (Earth Tech 1998) and additional habitats identified and numbered by Jones & Stokes Associates (Jones & Stokes Associates 1998, Earth Tech 1998) are depicted in Figure 2.

3.2 LABORATORY ANALYSIS

Soil samples were prepared for examination in the laboratory by dissolving the clumps of soil in water and sieving the material through 500-, 300-, and 150-micrometer pore size screens. The small size of these screens ensures that the eggs from the shrimp species will be retained. The portion of each sample retained in the screens was dissolved in a brine solution to separate the organic material from the inorganic material. The organic fraction was then examined under a microscope.

Scanning electron micrographs and reference specimens were used to identify shrimp cysts to the lowest justifiable taxon. Cysts from the genus *Branchinecta* were identifiable to genus level only because of the cyst character overlap among species and the potential for four species, *B. conservatio*, *B. lindahli*, *B. lynchi*, and *Branchinecta* "mid-valley", to occur in this region. Cysts from the tadpole shrimp *Lepidurus packardii* can be superficially confused with flatworm cocoons. However, by breaking the cyst and examining the cross section of the cyst shell, *Lepidurus* cysts can be separated by their thicker shell and the columnar middle layer that is lacking in the thinner shelled flatworm cocoons.

4.0 RESULTS AND DISCUSSION

4.1 SITE DESCRIPTION

The proposed project site is a former sandstone quarry that has been abandoned for 25 to 30 years. The site, dominated by upland, non-native weedy grasses and large patches of medusa head grass (*Taeniatherum caput-medusae*), yellow starthistle (*Centaurea solstitialis*), turkey mullein (*Eremocarpus setigerus*), and spiny cocklebur (*Xanthium spinosum*), is currently used for grazing.

At the top of a hill in the center of the project site are two large water tanks. The hill supports a stand of eucalyptus trees (*Eucalyptus* sp.) on the north side. The hill slopes are flanked with five stock ponds, which occupy the former borrow pits of the quarrying activities and support groves of willows (*Salix* sp.) and Fremont's cottonwoods (*Populus fremontii*).

Vernal Pools

Vernal pools on site were originally identified by Earth Tech in May 1998 when the pools were still moist (Earth Tech 1998). The pools were delineated in September 1998 by Jones & Stokes Associates to total 1.86 acres of vernal pool habitat on the site. Vernal inundated areas supported characteristic species, including woollymarbles (*Psilocarphus* sp.), coyote thistle (*Eryngium vaseyi*), hyssop loosestrife (*Lythrum hyssopifolium*), cat's ear (*Hypochoeris* sp.), popcorn flower (*Plagiobothrys* sp.), and hair grass (*Deschampsia danthonioides*). Additional vernal pool species observed in these pools during the May 1998 survey include Fremont's goldfields (*Lasthenia fremontii*), the federally listed as endangered Contra Costa goldfields (*Lasthenia conjugens*), and downingia (*Downingia* sp.).

Vernal Swales

Vernal swales are seasonally inundated drainages that hydraulically link wetlands. The site supports 2.81 acres of vernal swale habitat on the north and eastern portions of the proposed project area. The vernal swales are dominated by toad rush (*Juncus bufonius*), Italian ryegrass (*Lolium multiflorum*), and cat's ear (*Hypochoeris* sp.). Additional plants were observed in the vernal swales by Earth Tech (1998) during their late wet season survey, including hyssop loosestrife, willow-herb (*Epilobium* sp.), red maids (*Calandrinia ciliata*), knotweeds (*Polygonum* sp.), and docks (*Rumex* sp.).

4.2 SURVEY RESULTS

Shrimp cysts were identified from five vernal pools of the 34 potential habitat sites sampled on the proposed project site. All cysts were identified as the genus *Branchinecta*. No *Lepidurus* cysts were found in any of the samples. The specific findings are shown in Table 2. The occupied pools are VP-8 and VP-9 in the southeast corner of the proposed project site, VP-20 in the northeast corner, and VP-30 and VP-31 in the northwest corner.

Table 2. Shrimp Cysts Found in Pools Sampled in Study Area
Page 1 of 3

Site Number	<i>Branchinecta</i> (cysts/100 milliliters)	Co-occurrent Vegetation
Vernal Pool (VP)		
VP-1	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-2	0	<i>Eryngium vasei</i> <i>Psilocarphus</i> sp.
VP-3	0	<i>Eryngium vasei</i>
VP-4	0	<i>Hordeum</i> sp. <i>Juncus bufonius</i> <i>Lasthenia</i> sp. <i>Leontodon</i> sp. <i>Lolium multiflorum</i>
VP-5	0	<i>Hordeum</i> sp. <i>Juncus bufonius</i> <i>Lasthenia</i> sp. <i>Leontodon</i> sp. <i>Lolium multiflorum</i>
VP-6	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-7	0	<i>Eryngium vasei</i>
VP-8	20	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-9	5	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-10	Not sampled due to inundation	Not sampled
VP-11	Not sampled due to inundation	Not sampled
VP-12	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-13	Not sampled due to inundation	Not sampled
VP-14	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-15	Not sampled due to insufficient ponding period	<i>Hordeum</i> sp. <i>Juncus bufonius</i> <i>Lasthenia</i> sp. <i>Leontodon</i> sp. <i>Lolium multiflorum</i>

Table 2. Shrimp Cysts Found in Pools Sampled in Study Area
Page 2 of 3

Site Number	<i>Branchinecta</i> (cysts/100 milliliters)	Co-occurrent Vegetation
VP-16	0	<i>Eryngium vasei</i>
VP-17	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i>
VP-18	0	<i>Eryngium vasei</i> <i>Psilocarphus</i> sp.
VP-19	0	<i>Eryngium vasei</i>
VP-20	5	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-21	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-22	0	<i>Eryngium vasei</i>
VP-23	0	<i>Hordeum</i> sp. <i>Juncus bufonius</i> <i>Leontodon</i> sp. <i>Lolium multiflorum</i>
VP-24	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-25	Not sampled due to insufficient ponding period	<i>Hordeum</i> sp. <i>Lolium multiflorum</i>
VP-26	Not sampled due to insufficient ponding period	<i>Hordeum</i> sp. <i>Leontodon</i> sp. <i>Lolium multiflorum</i>
VP-27	0	<i>Eryngium vasei</i> <i>Psilocarphus</i> sp.
VP-28	Not sampled due to insufficient ponding period	<i>Juncus bufonius</i> <i>Leontodon</i> sp. <i>Lolium multiflorum</i>
VP-29	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-30	35	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-31	25	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-32	0	<i>Eryngium vasei</i>
VP-33	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.

Table 2. Shrimp Cysts Found in Pools Sampled in Study Area
Page 3 of 3

Site Number	<i>Branchinecta</i> (cysts/100 milliliters)	Co-occurrent Vegetation
VP-34	0	<i>Eryngium vasei</i>
VP-35	0	<i>Hordeum</i> sp. <i>Leontodon</i> sp. <i>Lolium multiflorum</i>
VP-36	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-37	Not sampled due to inundation	Not sampled
VP-38	Not sampled due to insufficient ponding period	<i>Hordeum</i> sp. <i>Juncus bufonius</i> <i>Lasthenia</i> sp. <i>Leontodon</i> sp. <i>Lolium multiflorum</i>
VP-39	0	<i>Eryngium vasei</i> <i>Eleocharis macrostachya</i> <i>Psilocarphus</i> sp.
VP-40	Not sampled due to insufficient ponding period	<i>Hordeum</i> sp. <i>Juncus bufonius</i> <i>Leontodon</i> sp. <i>Lolium multiflorum</i>
VP-41	0	<i>Hordeum</i> sp. <i>Lolium multiflorum</i>
VP-42	0	<i>Lolium multiflorum</i>
Vernal swale (VS)		
VS-1	Not sampled due to insufficient hydroperiod	<i>Hordeum</i> sp. <i>Juncus bufonius</i>
VS-2	Not sampled due to scouring	<i>Hordeum</i> sp.
VS-3	Not sampled due to insufficient hydroperiod	<i>Hordeum</i> sp. <i>Juncus bufonius</i>
VS-4	Not sampled due to insufficient hydroperiod	<i>Hordeum</i> sp. <i>Juncus bufonius</i>
Other potential habitat (PH)		
PH	0	No botanical indicators of hydrology present

It cannot be determined from observation of the cysts if these samples contain a federally listed species. It is unlikely that *Branchinecta conservatio* occurs at this site. *B. conservatio* generally requires large, turbid vernal pools, such as Olcott Lake at the Jepson Prairie Preserve near the south east side of TAFB. However, sites where the cysts were recovered are considered suitable for *Branchinecta* "mid-valley", *B. lindahli*, and *B. lynchi*. A wet season survey to collect and identify adult shrimp species was initiated in December 1998, in accordance with the USFWS survey protocol guidelines (1996).

5.0 REFERENCES

- Bates, L., 1977. *Soil survey of Solano County, California*. U.S. Department of Agriculture and University of California Agricultural Experiment Station.
- Earth Tech, 1998. *Vernal Pool Endangered Plants Survey and Vernal Pool Delineation for Northern Parcel (Burke Property), Travis Air Force Base, California*.
- Helm, B.P., 1998. Biogeography of eight large branchiopods endemic to California. Pages 124-139 in C.W. Witham, E.T. Bauder, D. Belk, W.F. Ferrin, Jr., and R. Ornduff (editor), *Ecology, Conservation, and Management of Vernal Pool Ecosystems-Proceedings from a 1996 Conference*. California Native Plant Society.
- Jones & Stokes Associates and Earth Tech, 1998. *Wetland Delineation and Surveys for Selected Wildlife Species on a Proposed Project Site for Travis Air Force Base, California*.
- U.S. Fish and Wildlife Service, 1996. *Interim survey guidelines to permittees for recovery permits under the Endangered Species Act for the listed vernal pool branchiopods*.

APPENDIX A

DATA FORMS

U.S. Fish and Wildlife Service
Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ☒ no ☐ yes

Required color slides and/or photographs for the project site are included: ☒ no ☐ yes

Date: 9/18/98 Time: 8:23 AM County: Solano Quad: E1m12

Collector(s): D. Christopher Rogers Permit #: PRT-795934

Site/Project Name: Travis AFB Pool #: see subsequent sheets

Township: T5N Range: R1W Section: 14 31°5' lat. 122°5' long.

Habitat Condition: (circle where appropriate)

- undisturbed ☒ disturbed: tire tracks garbage discing/plowing

- ungrazed ☐ grazed: ☒ cattle horses sheep other ☐
light ☒ moderate heavy

- land use of habitat: Grazed by cattle; former sandstone quarry

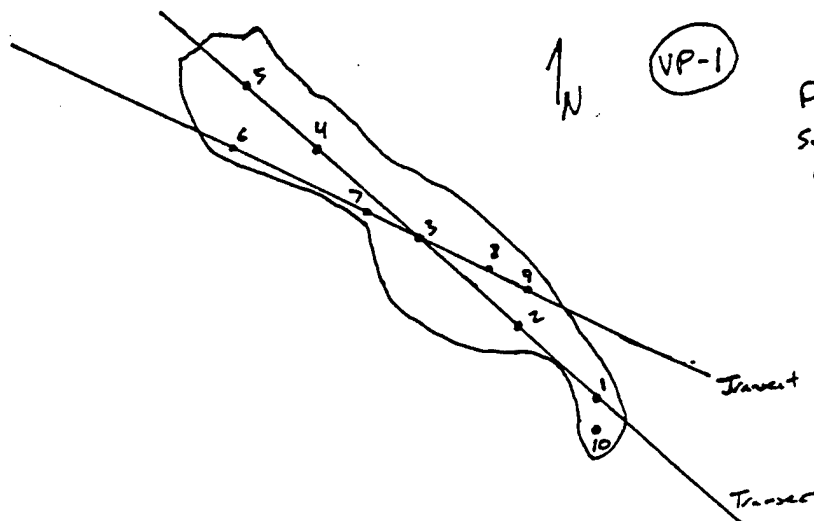
Pool Bottom Surface: (circle where appropriate)

hardpan ☒ claypan cobbly/rocky lava flow other ☐

Pool Depth: see subsequent sheets cm (estimated maximum) Surface Area: m² (estimated maximum)

Sketch of pool and transects showing:

- scale
- indication of North
- sampling locations



Depth ~ 10cm
Surface Area ~ 0.03 acres
• = sample site

Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis

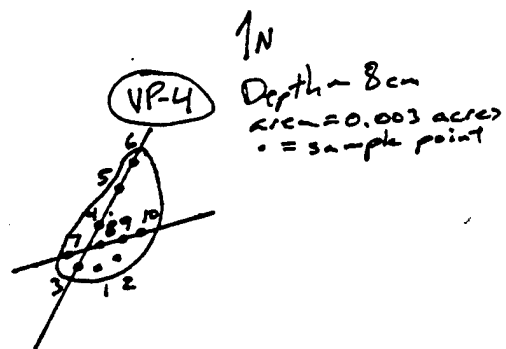
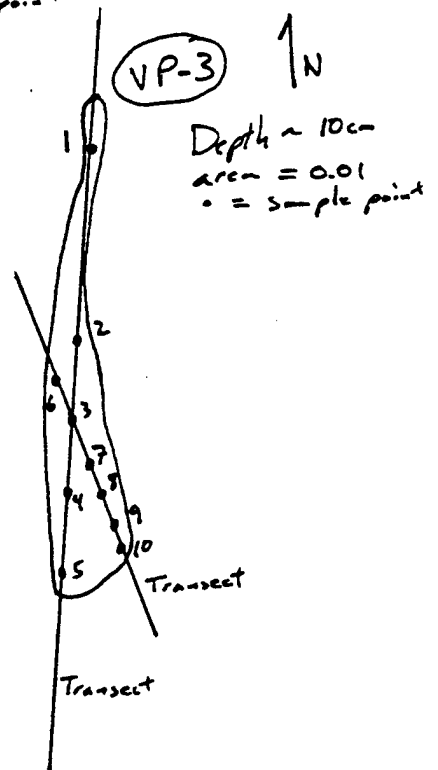
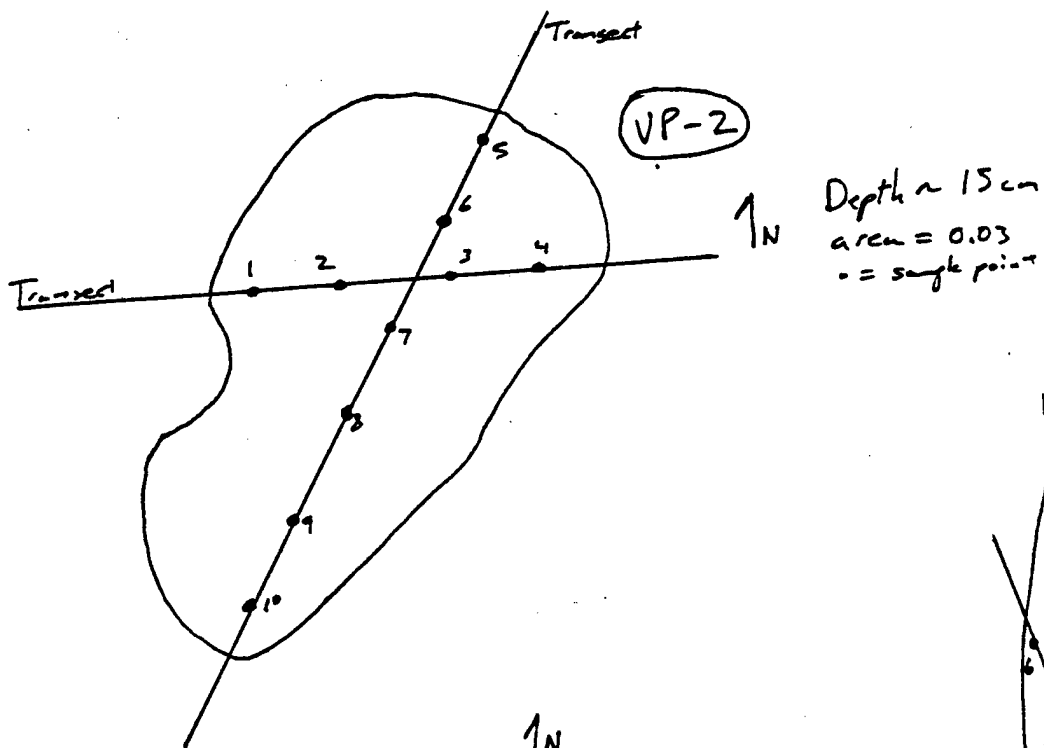
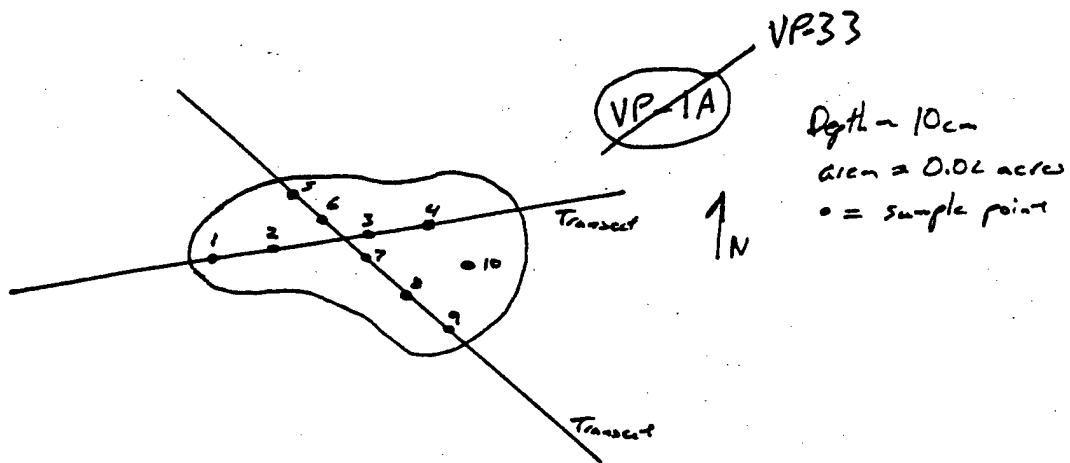
Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Dens (#/100ml)
VP-8-6	5 ml	Branchinecta sp.	4	20
VP-9(11)	100 ml	Branchinecta sp.	5	5
VP-20(11)	100 ml	Branchinecta sp.	5	5
VP-30-8	6.5 ml	Branchinecta sp.	2	35
VP-30-9	25 ml	Branchinecta sp.	9	35
VP-30-4	40 ml	Branchinecta sp.	14	35
VP-31-9	40 ml	Branchinecta sp.	10	25
VP-31-9	40 ml	Branchinecta sp.	9	25
<u>No other soil samples contained shrimp cysts</u>				

Voucher Specimens

Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

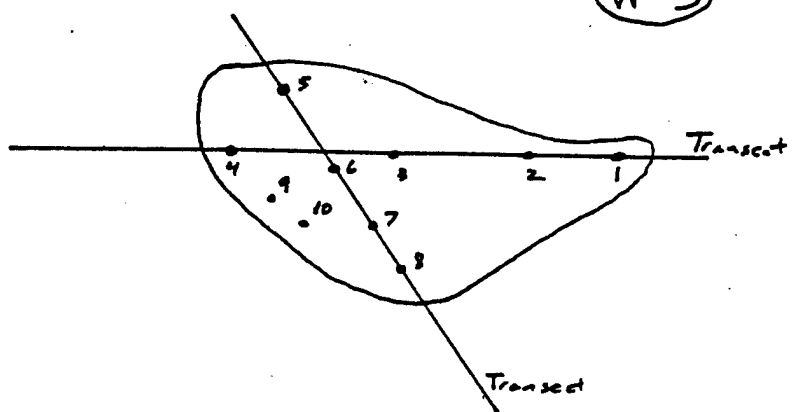
Genus (/species)	# Cysts	Catalog/Accession #	Pool #
Branchinecta sp	4	Not yet available from Museum	6
"	5	"	9
"	5	"	20
"	35	"	30
"	19	"	31



VP-5

1N

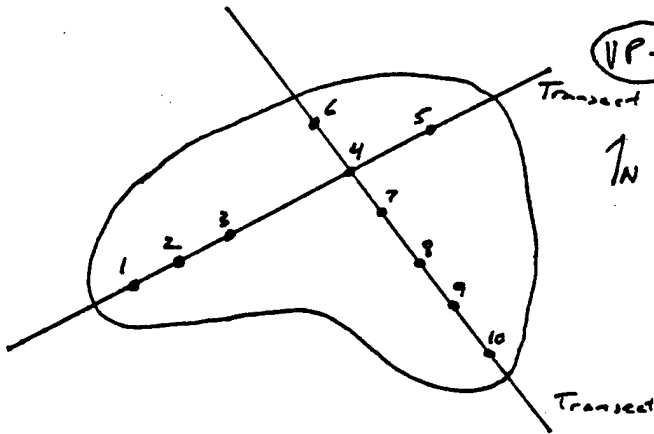
Depth ≈ 10 cm
 Area = 0.01 acres
 • = sample point



VP-6

1N

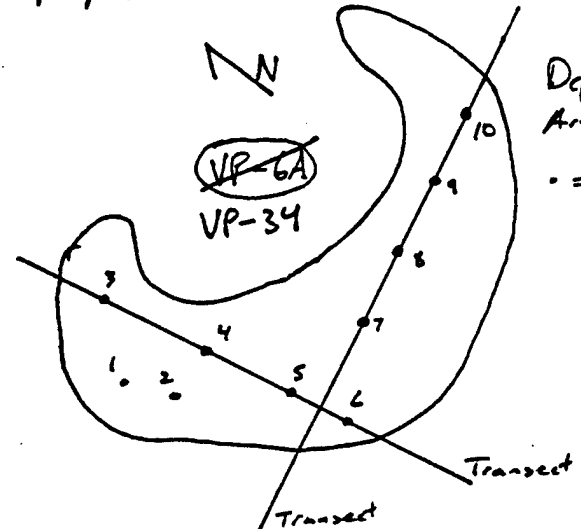
Depth ≈ 30 cm
 Area = 0.05 acres
 • = sample point



1N

~~VP-6A~~
 VP-34

Depth ≈ 1 ft
 Area = 0
 • = sample point

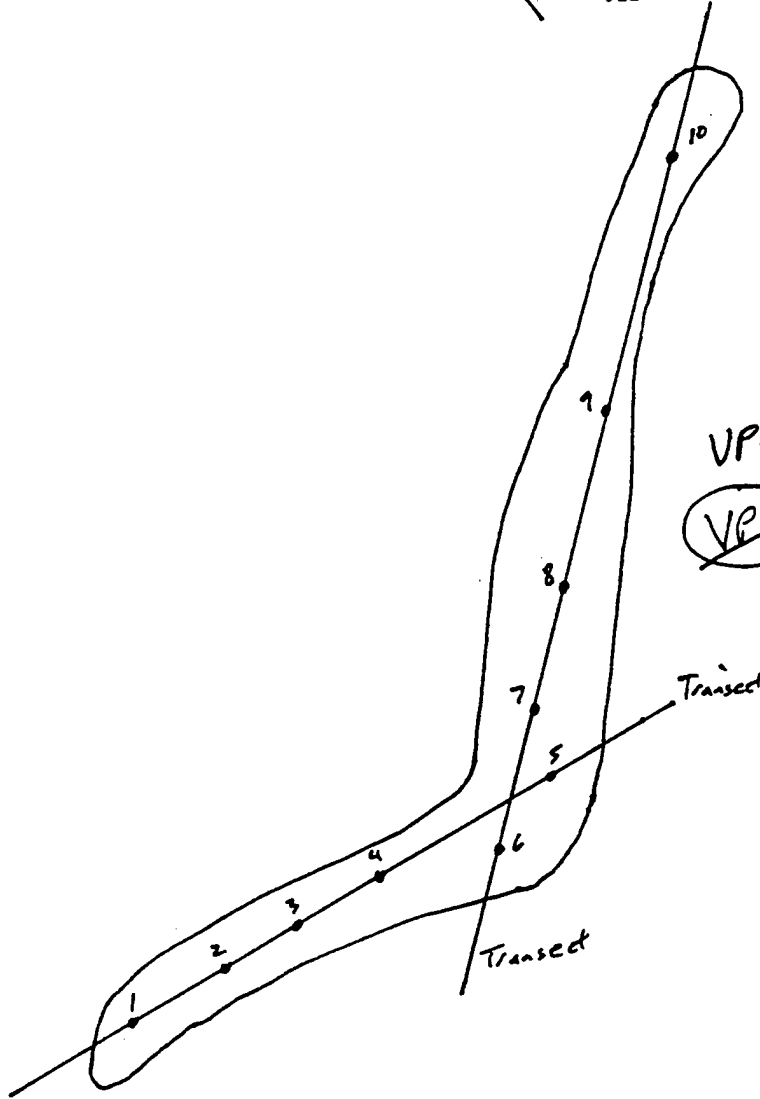


VP-35

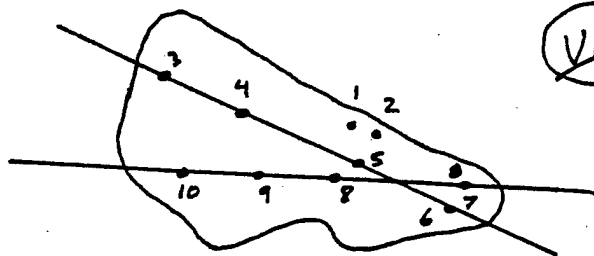
~~VP-6B~~

1N

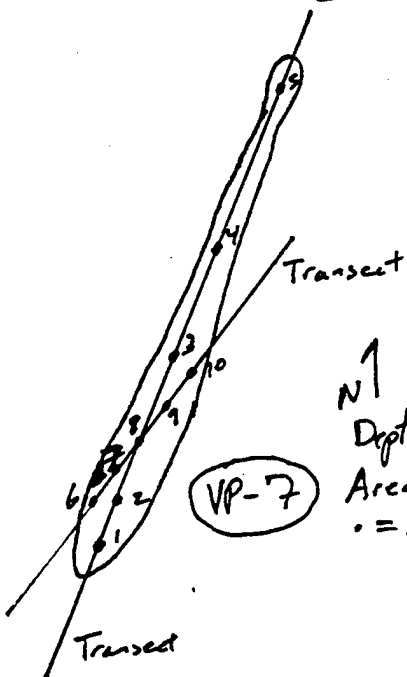
Depth ≈ 8 cm
 Area = 0.08 acres
 • = sample point



VP-36
~~VP-6C~~

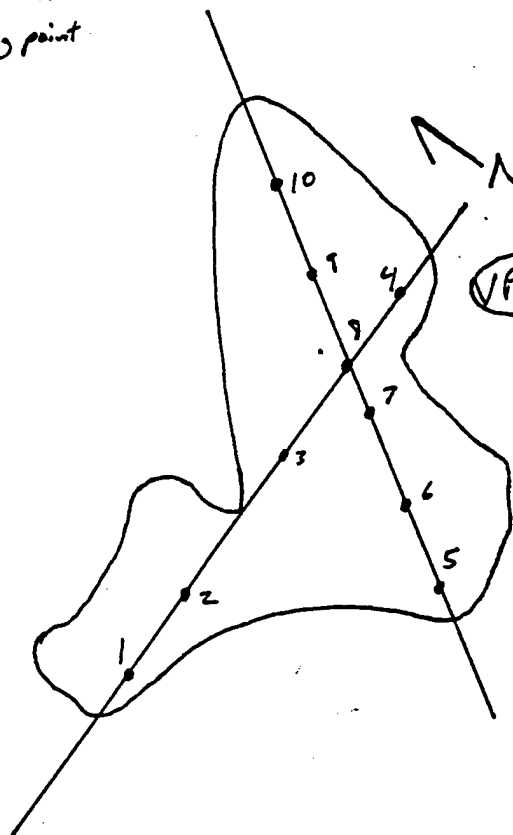


N
 Depth ≈ 15 cm
 Area ≈ 1.78 acres
 • = sampling point



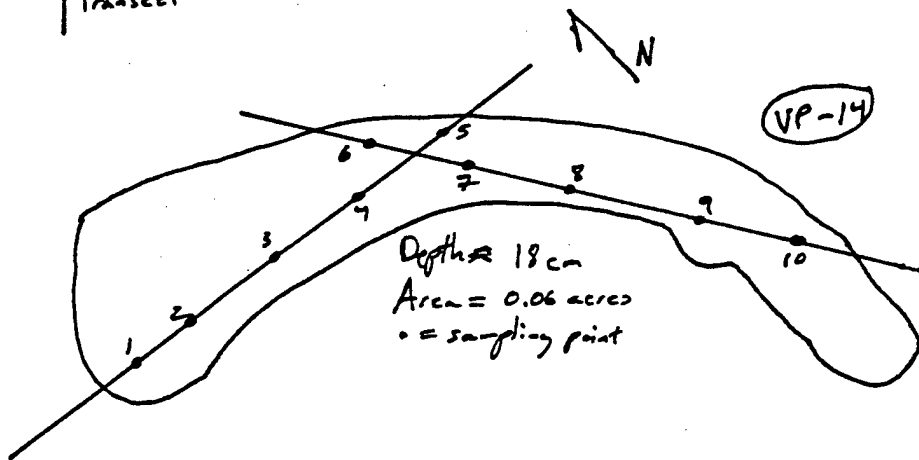
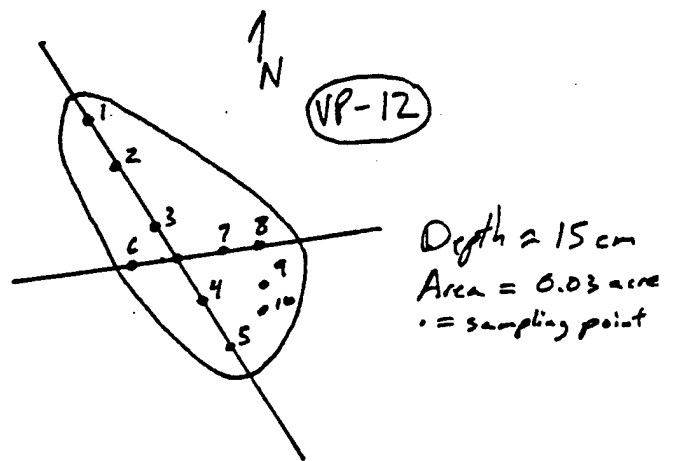
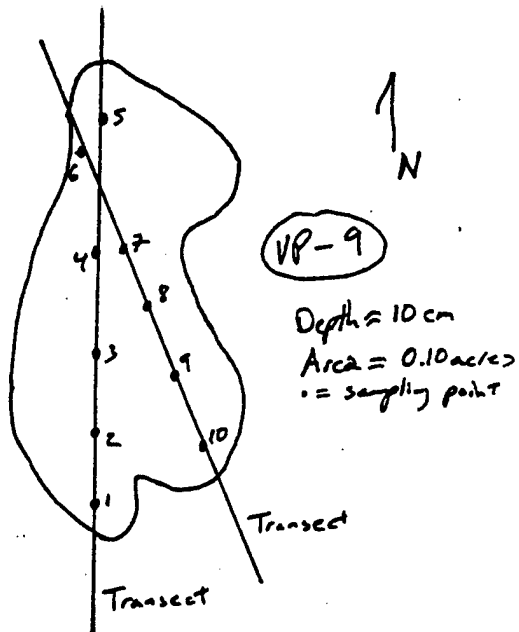
VP-7

N
 Depth ≈ 12 cm
 Area = 0.02 acres
 • = sampling point

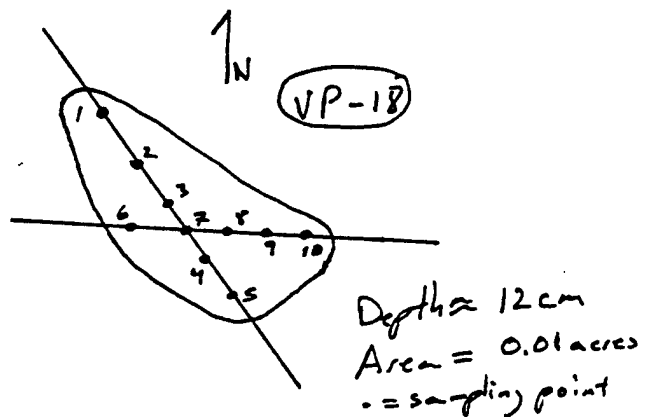
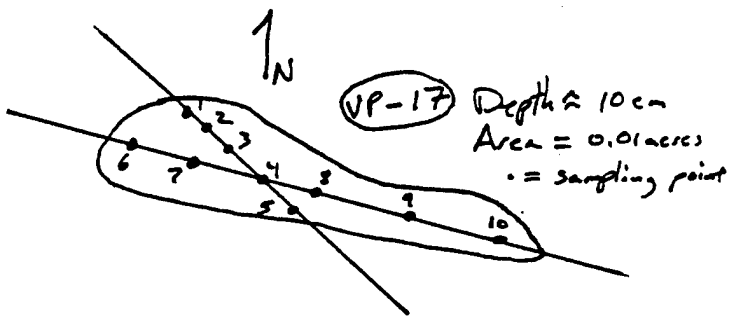
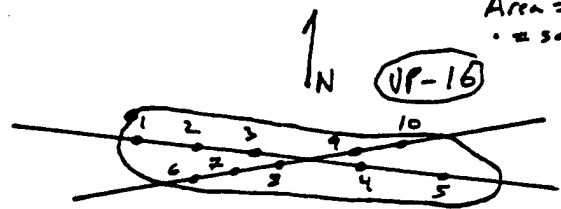


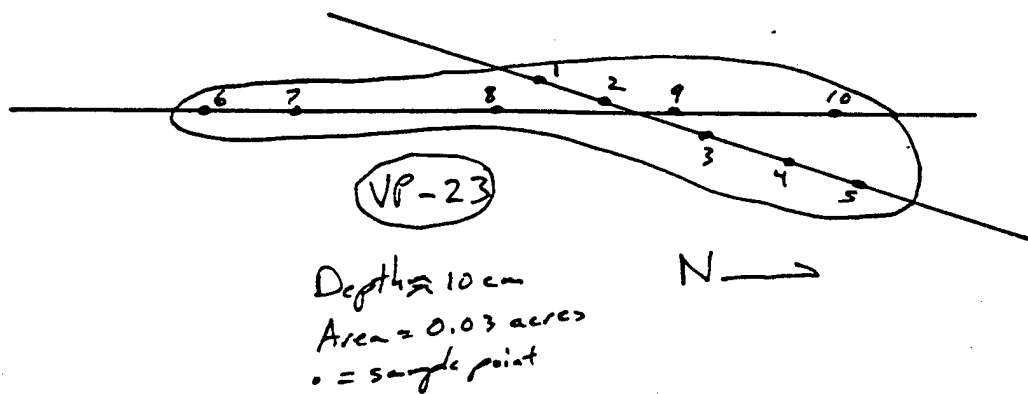
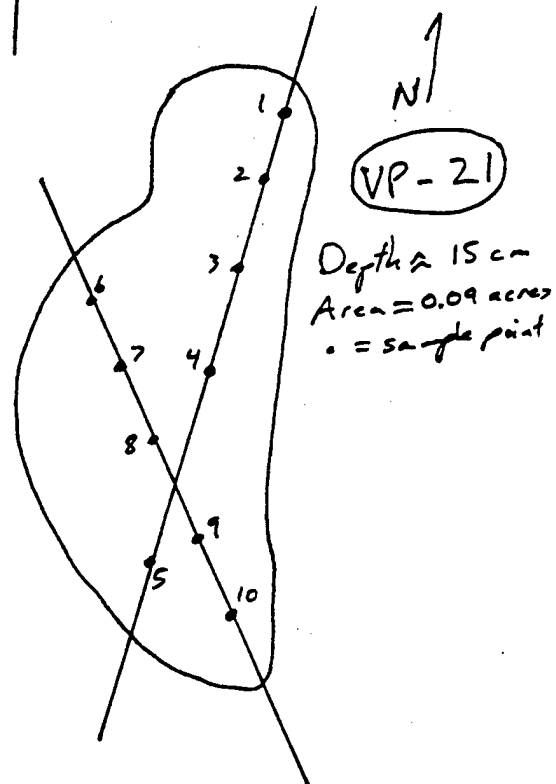
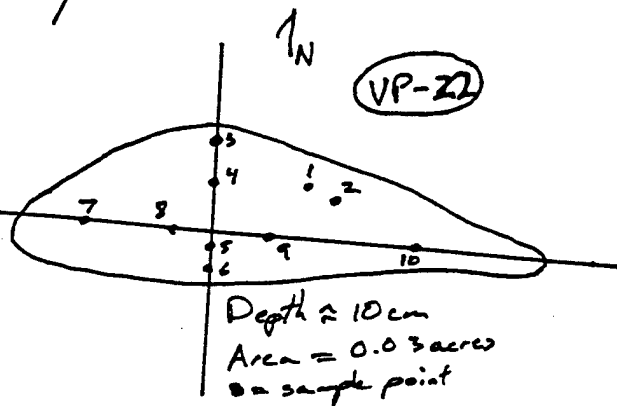
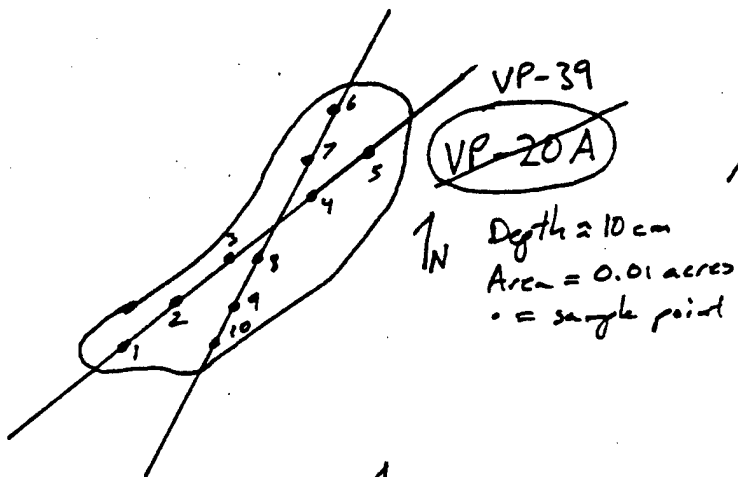
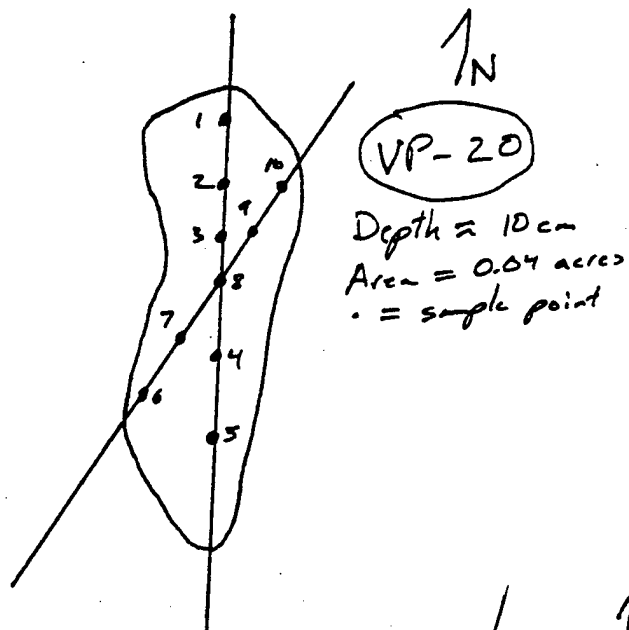
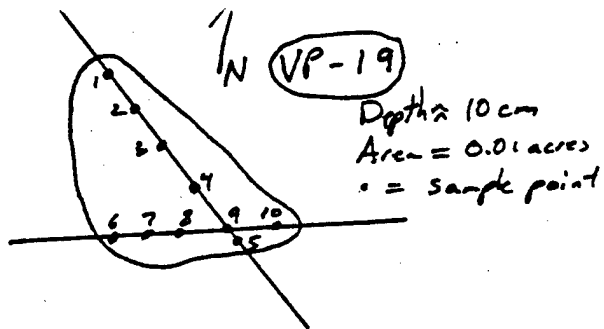
VP-8

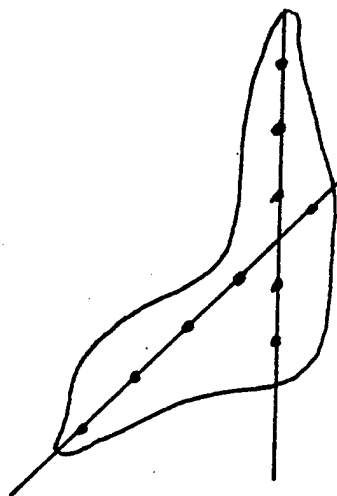
N
 Depth ≈ 10 cm
 Area = 0.17 acres
 • = sampling point



Depth ≈ 10 cm
 Area = 0.02 a
 • = sampling point

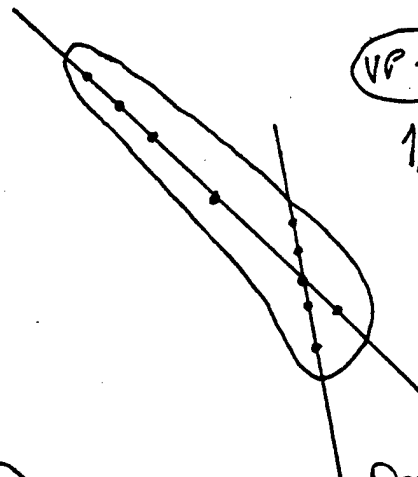






VP-23B

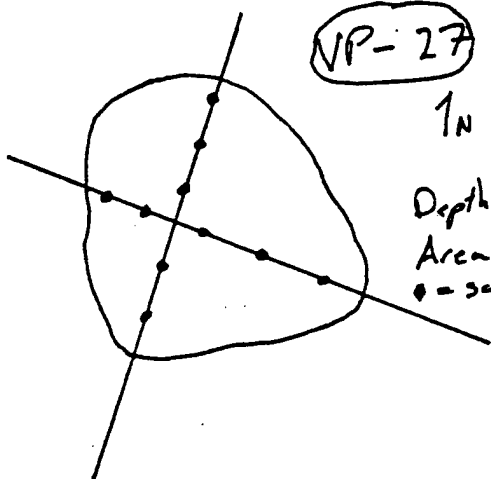
1N
Depth ≈ 15 cm
Area = 0.04 acres
• = sample point



VP-24

1N

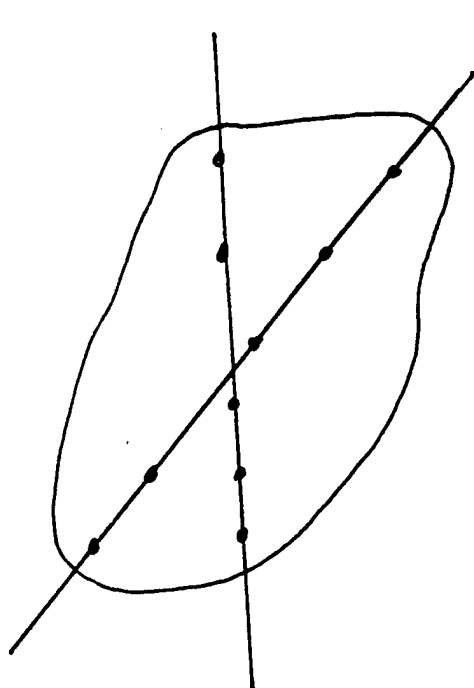
Depth ≈ 10 cm
Area = 0.04 ac
• = sample point



VP-27

1N

Depth ≈ 8 cm
Area = 0.01 acres
• = sample point



1N

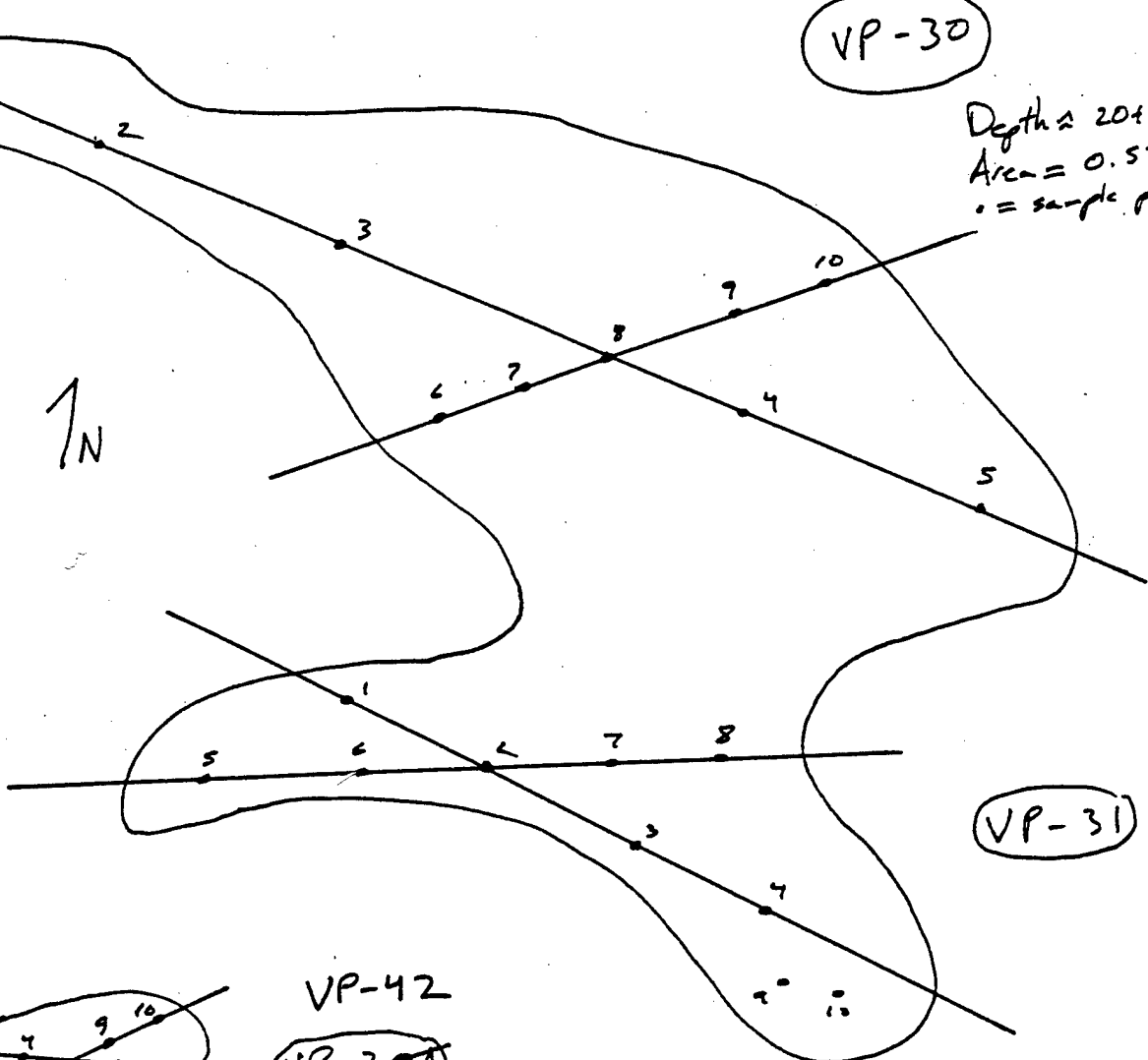
VP-29

Depth ≈ 10 cm
Area = 0.02 acres
• = sample point

VP-30

Depth $\approx 20 \pm$ cm
 Area ≈ 0.52 acres
 • = sample point

↑ N



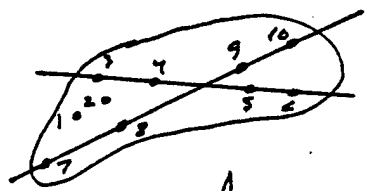
VP-31

VP-42

~~VP-30A~~

Depth ≈ 10 cm
 Area ≈ 0.002 acres
 • = sample point

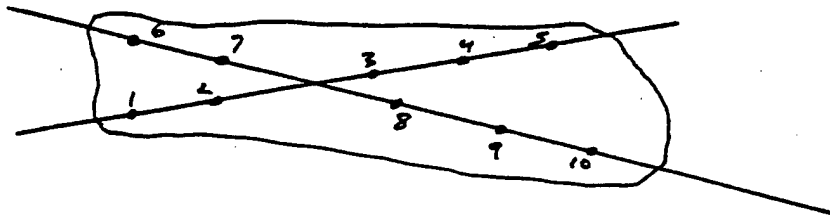
↑ N



1
N

PH-1

Depth $\approx$ 10 cm
Area $\approx$ 0.004 acres
• = sample point



**Revised Wetland Delineation on a Proposed
Project Site for Travis Air Force Base, California**

April 1999

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1.0 INTRODUCTION

In September 1998 and March 1999, wetlands were delineated at a proposed housing development site for Travis Air Force Base (AFB) south of Fairfield, Solano County, California (Figure 1). The delineation was performed in support of development of a constraints analysis for the proposed construction of housing facilities at the site. The project area, known as the Burke Property, is a 101-acre parcel in the Cordero Hills on the north side of Travis AFB between Cordero Junction and North Gate Road (Figures 2 and 3). The total wetland acreage at the site is 8.08.

The Burke Property is situated in Section 14, Township 5 North, Range 1 West, U.S. Geological Survey (USGS) Elmira, California, 7.5' Quadrangle (photorevised 1980). It is recorded in the Solano County Assessor's Office as Parcel Number 4, Book 174. The property may be accessed via a gated entrance to the northwest of the Travis AFB/City of Vallejo Water Treatment Plant property.

2.0 METHODS

A biologist performed a wetland delineation on September 8 and 16, 1998. Jurisdictional wetlands and other Waters of the United States were delineated according to the routine on-site determination procedure from the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (Environmental Laboratory, 1987). Jurisdictional wetlands are defined for regulatory purposes as areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 Code of Federal Regulations [CFR] Part 328.3, 40 CFR Part 230.3). Sites qualifying for USACE regulatory jurisdiction as wetlands must meet criteria for three parameters: hydric soils, wetland hydrology, and hydrophytic vegetation.

Sample plots were selected within representative wetland communities and associated upland habitats. Representative sample plots were used instead of transects. The 101-acre parcel is predominantly uplands, with small, isolated wetlands scattered across the site. Because transect sampling would be inefficient and because there were only four wetland habitat types with distinct wetland/upland boundaries, representative sample plots were used to characterize that habitat type for the entire site.

The wetland indicator status of plant species present was taken from Reed (1988). Non-hydric soils were inferred from indicator plants and lack of hydrology indicators in the uplands. In accordance with the requirements in the 1987 Wetland Delineation Manual, data forms were completed for each wetland and upland habitat type encountered on the project site (Appendix A).

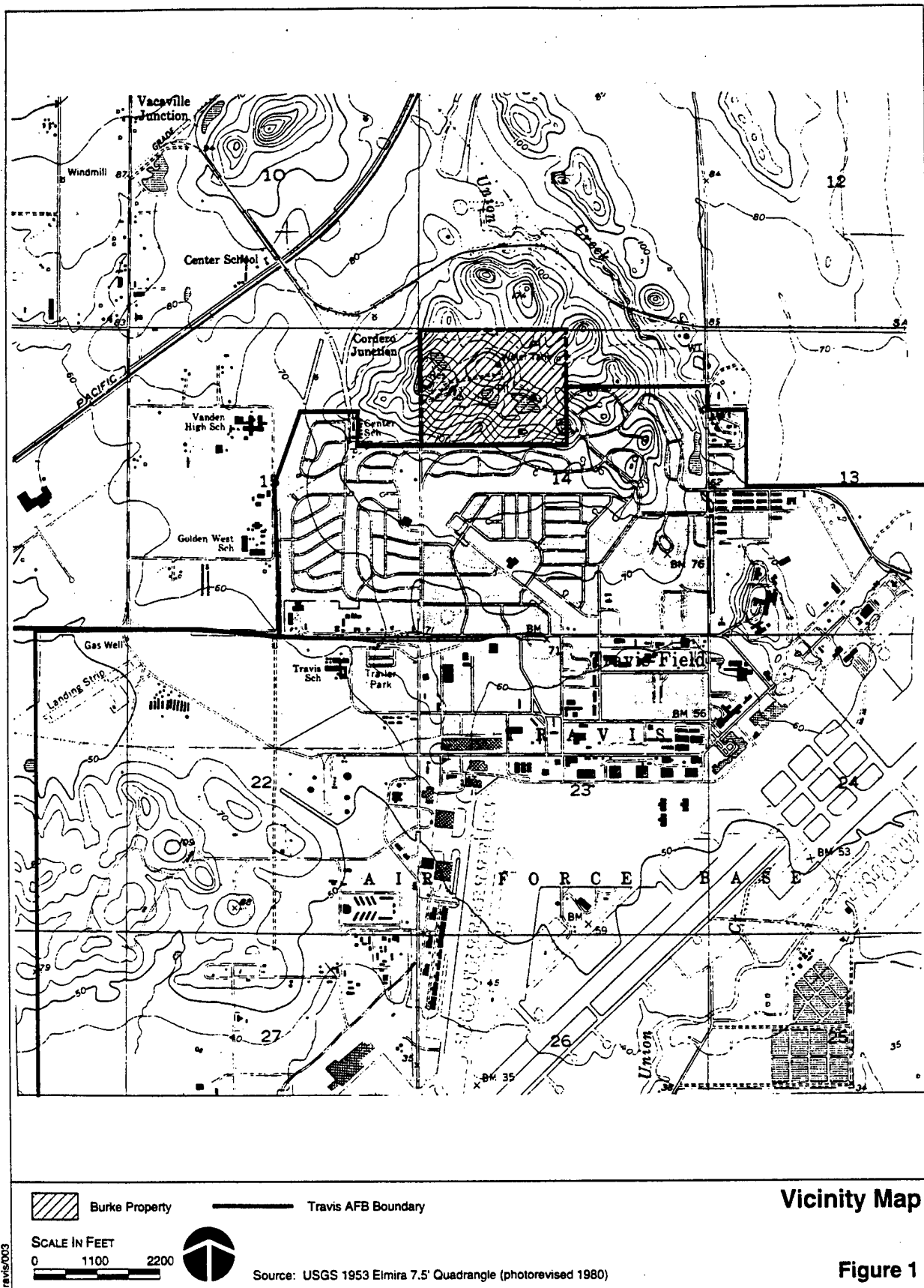


Figure 2
Wetland Resources

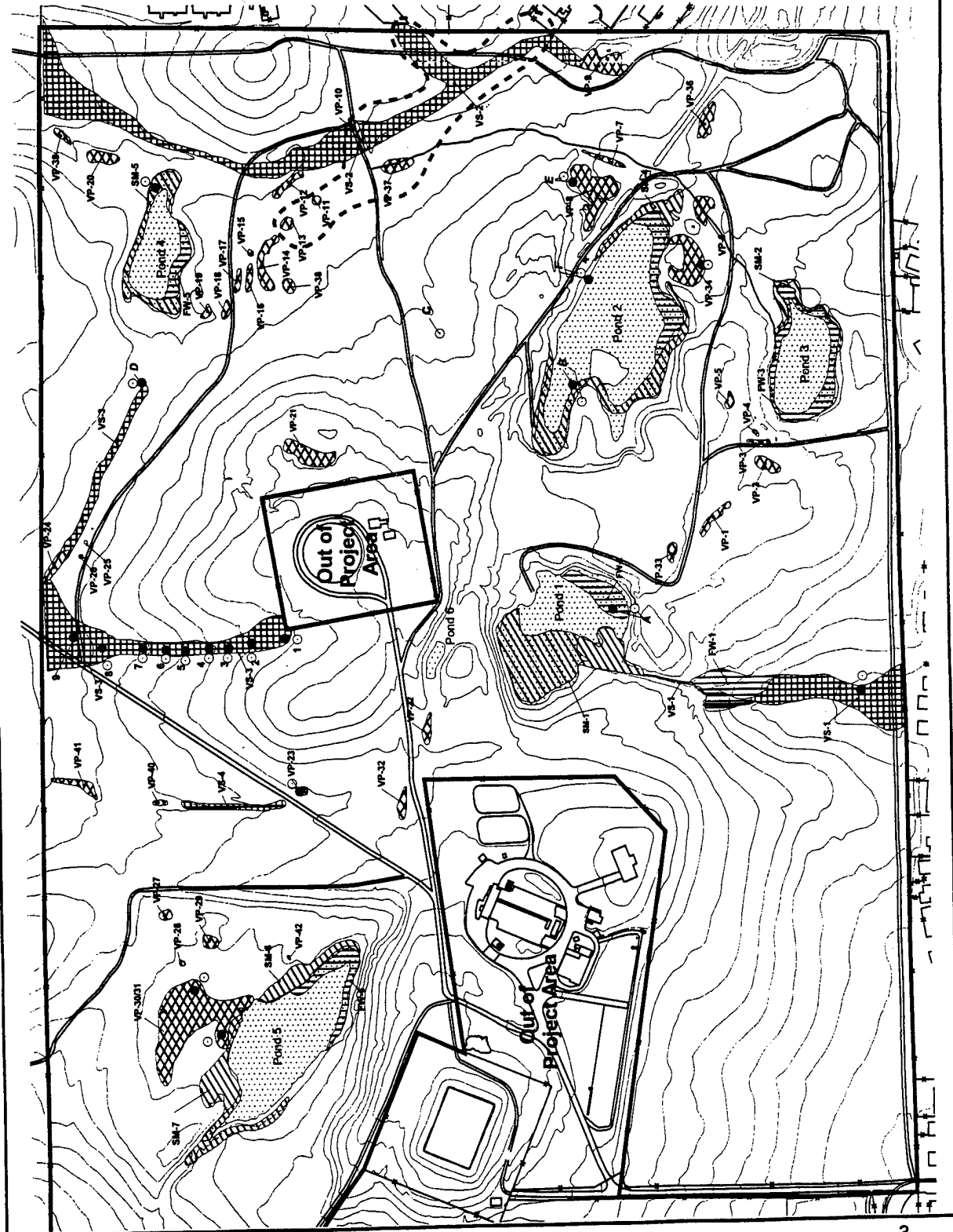


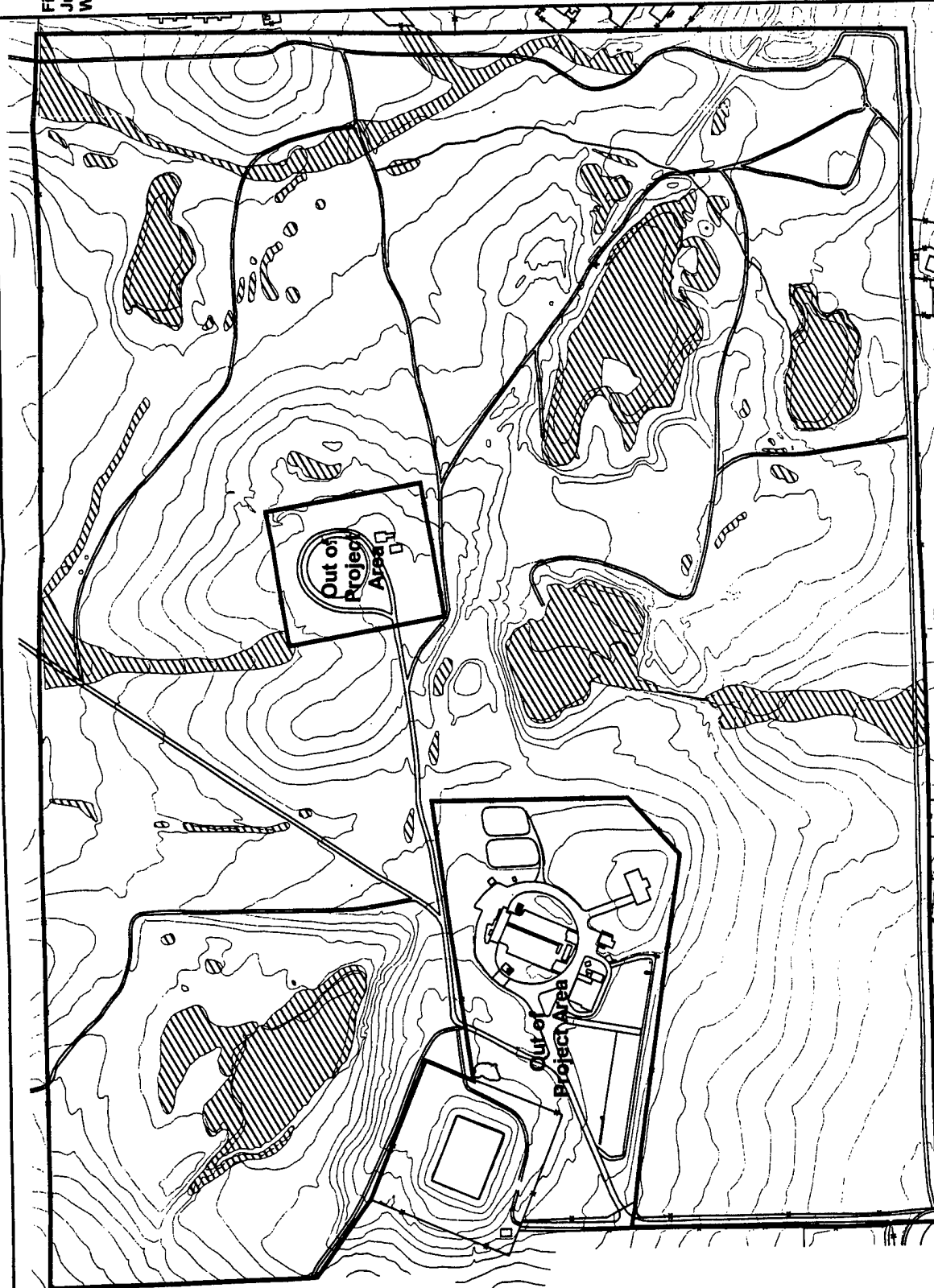
Figure 3
Jurisdictional Wetland and Other
Waters of the United States

Legend

- Project Boundary
- Jurisdictional Areas (14.90 acres)



100 0 100 200 Feet



The specific location of each jurisdictional wetland was recorded using global positioning units. The data points were imported into ARC/INFO software to generate a geographic information systems coverage of jurisdictional wetland resources at the proposed project site.

The USACE conducted a wetland delineation verification visit on February 10, 1999. Following this visit, USACE requested that additional sampling be performed on the site to further characterize the wetlands and to revise the boundaries of several wetlands. These additional data were collected by a wetland ecologist on March 23 and 25, 1999.

3.0 RESULTS

3.1 SETTING

The proposed project site is a former sandstone quarry that has been abandoned for 25 to 30 years. The site is dominated by upland, non-native weedy grasses and large patches of medusa head grass (*Taeniatherum caput-medusae*), yellow starthistle (*Centaurea solstitialis*), turkey mullein (*Eremocarpus setigerus*), and spiny cocklebur (*Xanthium spinosum*). Seasonal and perennial wetland habitats have developed within borrow areas and excavations resulting from previous quarrying activities. At the top of a central hill in the center of the project site are two large water tanks (Figures 2 and 3). These water tanks are flushed infrequently into some of the wetlands on the east side of the project site. The hill slopes are flanked with five stock ponds that occupy the former borrow pits of the quarrying activities and support groves of willows (*Salix* sp.) and Fremont's cottonwoods (*Populus fremontii*). The hill supports a stand of eucalyptus trees (*Eucalyptus* sp.) on the north side. One of these eucalyptus trees bears a large nest. West of the eucalyptus grove is a potable water treatment facility.

Three soil series are represented on the proposed project site (Bates 1977). The southwest corner (approximately 12 percent) of the property is mapped as Dibble-Los Osos clay loam, 2 to 9 percent slopes. Within this complex, Dibble clay loam occurs on ridges and south-facing slopes, and Los Osos clay loam occurs on north-facing slopes. The large southern swale borders the eastern extent of this soil. Most (approximately 61 percent) of the site is mapped as Corning gravelly loam, 2 to 15 percent slopes. A small area (approximately 6 percent) of Millsholm loam, 15 to 30 percent slope, is mapped at the northeast corner of the site. These soils are well drained, and none are on the hydric soils list. Two large areas (approximately 21 percent combined) on the site are mapped as borrow pits.

The characteristics of soils on the project site do not match those mapped by the soil survey. No Corning soils were observed. Hydric soils were observed in the wetland areas. Hydric soil indicators observed included gleying, mottling in association with a low chroma, and the presence of a sulfidic odor.

3.2 WATERS OF THE UNITED STATES

3.2.1 Wetlands

Four distinct types of wetland habitats, totaling 8.08 acres, were identified within the project site: freshwater marsh, seasonal marsh, vernal pools, and vernal swales (Figure 2; Appendix B). Seasonal marsh habitat is present at the margins of the five ponds. Freshwater marsh is present in the ponds and on the south side of the central hill. Both the isolated freshwater marsh and ponds appear to be supported by a perched water table within the hill. Considering the porosity of the sandstone substrate, capillary action could pull water to the surface.

3.2.1.1 Freshwater Marsh (FW).

Freshwater marsh habitat, defined as palustrine, emergent, persistent wetlands (Cowardin et al. 1979), was dominated by a prevalence of hydrophytic vegetation, including cattails (*Typha latifolia*), sword plant (*Echinodorus berteroi*), umbrella plant (*Cyperus eragrostis*), and duckweed (*Lemna minor*), with an overstory of willow and Fremont's cottonwood. Clover (*Trifolium* sp.) was also present but was not identifiable to species because of an absence of flowers.

During the field visit, all freshwater marsh habitat was inundated from 8 to 15 inches. Soil data were not collected because standing water was present, demonstrating an aquatic moisture regime. In addition to the presence of standing water, other primary and secondary hydrology indicators were present. Freshwater marsh habitat within the ponds all bore drift lines at the pond margins. Water stains were evident on cattail leaves, watermarks were present up to 3 feet above the ground on the trunks of willows and cottonwoods, and the willows bore adventitious roots below the watermarks.

Freshwater marsh on the project site qualifies as a wetland based on the presence of positive indicators of all three wetland parameters. Freshwater marsh is found in all five ponds and on the south side of Pond 1, where the water table is near the surface (see FW-1 on Figure 2). There are 1.18 acres of freshwater marsh within the project boundaries.

3.2.1.2 Seasonal Marsh (SM).

Seasonal marsh habitat occurs with all ponds on the project site. This habitat is defined as intermittently flooded, palustrine, emergent, persistent wetlands (Cowardin, et al. 1979) and is dominated by a prevalence of hydrophytic vegetation, including spike rush (*Eleocharis macrostachya*), Bermuda grass (*Cynodon dactylon*), curly dock (*Rumex crispus*), salt grass (*Distichlis spicata*), and pennyroyal (*Mentha pulchella*). Clover, also occurring in the seasonal marsh, was present.

None of the seasonal marsh habitat was ponded during the field visit. However, watermarks were evident on stones and pieces of wood. Similarly, sediment deposits on the surface of stones, drift lines, and water-stained saltgrass and curly dock leaves provided evidence of extended ponding. Therefore, hydric

soils were not determined on the basis of soil indicators but inferred from the fact that soils within seasonal marsh are ponded for long or very long duration, which meets the hydric soil definition (Environmental Laboratory 1987). The Wetland Delineation Manual provides that, under atypical situations, the delineator's "... basic knowledge of the ecology of the particular community types(s) and environmental conditions associated with the community type" can be used to make a determination (Environmental Laboratory 1987). All seasonal marsh habitat was observed to be inundated during the March 1999 site visit, confirming the previous conclusions. There are 2.16 acres of seasonal marsh within the project boundaries.

3.2.1.3 Vernal Pool (VP).

Vernal pools were originally delineated by Earth Tech in May 1998 when the pools were still moist (Earth Tech 1998). This habitat is defined as temporarily flooded, palustrine, emergent, persistent wetlands (Cowardin et al. 1979) and is dominated by a prevalence of hydrophytic vegetation, including woollymarbles (*Psilocarphus* sp.), coyote thistle (*Eryngium vaseyi*), hyssop loosestrife (*Lythrum hyssopifolium*), cat's ear (*Hypochoeris* sp.), popcorn flower (*Plagiobothrys* sp.), and hair grass (*Deschampsia danthonioides*). Additional vernal pool species were observed in these pools by Earth Tech during their May 1998 survey, including Fremont's goldfields (*Lasthenia fremontii*), the federally listed as endangered Contra Costa goldfields (*Lasthenia conjugens*), and downingia (*Downingia* sp.).

Primary indicators of wetland hydrology observed were water marks on stones, swales leading into the pools, and drift lines of debris near margins of excurrent swales. In addition, oxidized root channels were observed in cracked soil at the bottoms of the pools. The 1998 Earth Tech report also noted the presence of wetland hydrology in the vernal pools. All vernal pools were observed to be inundated during the March 1999 site visit, confirming the previous conclusion that wetland hydrology was present.

Vernal pools are "atypical" situations in summer months because the soils oxidize when they dry; therefore, they do not display typical hydrologic soil indicators (U.S. Department of Agriculture 1996). Hydric soils were not determined on the basis of soil indicators but were inferred from the fact that soils within vernal pools are ponded for a long or very long duration. Hydric soil indicators observed in vernal pools during the March 1999 site visit included gleying, mottling in association with a low chroma, and the presence of a sulfidic odor. There are 1.71 acres of vernal pool habitat on the site.

3.2.1.4 Vernal Swale (VS).

Vernal swales are classified as temporary flooded, palustrine, emergent wetlands (Cowardin et al. 1979). The site supports 3.03 acres of vernal swale habitat on the northern, eastern, and southern portions of the proposed project area. The vernal swales are dominated by toad rush (*Juncus bufonius*), Italian ryegrass (*Lolium multiflorum*), and cat's ear. Additional plants observed in the vernal swales by Earth Tech (1998) during their late wet season survey included hyssop

loosestrife, willow- herb (*Epilobium* spp.), red maids (*Calandrinia ciliata*), knotweeds (*Polygonum* spp.), and docks (*Rumex* spp.). The vegetation meets the hydrophytic vegetation criteria.

Similar to vernal pools, vernal swales do not have hydric soil indicators during the dry season; therefore, hydric soils were inferred under the same rationale used for vernal pools. Steeper portions of the vernal swales bore secondary hydrology indicators in the form of sediment deposits, were slightly incised, and drainage patterns were also evident in the vernal swale systems. These conclusions were confirmed during the March 1999 site visit. Hydric soil indicators observed in vernal swales included gleying and mottling in association with a low chroma. The soil was saturated at the surface, indicating that wetland hydrology was present.

Disturbed Wetlands. Of the habitats discussed above, there is 0.84 acre of vernal pool and vernal swale on the east side of the hill that is subject to intermittent inundation from the flushing of waterlines at the water tanks on top of the hill and are identified as "disturbed vernal pools and swales" (see Figure 2, VS-2, VP-13, VP-10, VP-11, and VP-37). These vernal pools and swales were observed holding water that was 0.5-meter deep on September 16, 1998. With normal vernal pool and swale hydrology, these habitats would be expected to be dry at this time of year.

3.2.2 Other Waters of the United States

The five ponds have a combined total of 6.26 acres of open water. These ponds dry down during the dry season. The areas exposed by the receding water are unvegetated except for small patches of clover and Bermuda grass near the margins. These ponds are not wetlands because they are unvegetated; however, they are Waters of the United States.

4.0 CONCLUSIONS

Approximately 8.08 acres were delineated as wetlands on the project site, subject to USACE jurisdiction under Section 404 of the Clean Water Act. Acreages per wetland type are summarized in Table 1.

Table 1. Acres of Wetlands and Other Waters of the United States by Habitat Type

Habitat Type	Size (Acres)
Freshwater marsh	1.18
Seasonal marsh	2.16
Vernal pool	1.71
Vernal swale	3.03
Open water	6.26
Total	14.34

5.0 REFERENCES

- Bates, L., 1977. Soil survey of Solano County, California. U.S. Department of Agriculture and University of California Agricultural Experiment Station.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe, 1979. Classification of wetlands and deepwater habitats of the United States. (FWS/OBS-79/31.) Fish and Wildlife Services, Office of Biological Services. U.S. Department of the Interior. Washington, DC.
- Earth Tech, 1998. Vernal pool endangered plants survey and vernal pool delineation for northern parcel (Burke property), Travis Air Force Base, California. Colton, California.
- Environmental Laboratory, 1987. Corps of Engineers wetlands delineation manual. (Technical Report Y-87-1.) U.S. Army Corps of Engineers Experiment Station. Vicksburg, Mississippi.
- Reed, P.B., 1988. National list of plant species that occur in wetlands: California (Region 0). (Biological Report 88 [26.10].) U.S. Fish and Wildlife Service Research and Development. Washington, DC. Prepared for National Wetlands Inventory, U.S. Fish and Wildlife Service, Washington, DC.
- U.S. Department of Agriculture, 1996. Field indicators of hydric soils in the United States. A guide for identifying and delineating hydric soils. Natural Resources Conservation Service. Wetland Science Institute and Soils Division, Fort Worth, Texas.

APPENDIX A
DATA FORMS

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Travis</u> Applicant/Owner: <u>Travis Air Force Base</u> Investigator: <u>D.C. Rogers</u>	Date: <u>Sept 8 1998</u> County: <u>Salinas</u> State: <u>CA</u>
Do Normal Circumstances exist on the site? ☒ Yes ☐ No Is the site significantly disturbed (Atypical Situation)? ☒ Yes ☐ No Is the area a potential Problem Area? ☐ Yes ☒ No (If needed, explain on reverse.)	Community ID: <u>Freshwater Marsh</u> Transect ID: _____ Plot ID: <u>A</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Populus fremontii</u>	<u>ARB</u>	<u>FACW</u>	9. <u>Lemna minor</u>	<u>Herb</u>	<u>OBL</u>
2. <u>Salix laevigata</u>	<u>ARB</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Eleocharis macrostachya</u>	<u>Herb</u>	<u>OBL</u>	11. _____	_____	_____
4. <u>Typha latifolia</u>	<u>Herb</u>	<u>OBL</u>	12. _____	_____	_____
5. <u>Rumex crispus</u>	<u>Herb</u>	<u>FACW</u>	13. _____	_____	_____
6. <u>Xanthium spinosum</u>	<u>Herb</u>	<u>FAC+</u>	14. _____	_____	_____
7. <u>Cyperus erigastis</u>	<u>Herb</u>	<u>FACW</u>	15. _____	_____	_____
8. <u>Trifolium sp.</u>	<u>Herb</u>	<u>NI</u>	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC+): 88%

Remarks: Trifolium was not identifiable due to a lack of flowers.

HYDROLOGY

Recorded Data (Describe in Remarks): ☐ Stream, Lake, or Tide Gauge ☐ Aerial Photographs ☐ Other ☒ No Recorded Data Available Field Observations: Depth of Surface Water: <u>8-15</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>NA</u> (in.)	Wetland Hydrology Indicators: Primary Indicators: ☒ Inundated ☒ Saturated in Upper 12 Inches ☒ Water Marks ☒ Drift Lines ☒ Sediment Deposits ☐ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ☐ Oxidized Root Channels in Upper 12 Inches ☒ Water-Stained Leaves ☐ Local Soil Survey Data ☐ FAC-Neutral Test ☒ Other (Explain in Remarks)
Remarks: <u>Adventitious roots were present on Salix trunks up to 3 feet above the surface. Water marks were apparent on all tree trunks.</u>	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Travis</u> Applicant/Owner: <u>Travis Air Force Base</u> Investigator: <u>D. C. Rogers</u>	Date: <u>Sept. 8, 1998</u> County: <u>Salinas</u> State: <u>CA</u>
Do Normal Circumstances exist on the site? ☒ Yes ☐ No Is the site significantly disturbed (Atypical Situation)? ☒ Yes ☐ No Is the area a potential Problem Area? ☒ Yes ☐ No (If needed, explain on reverse.)	Community ID: <u>Seasonal Marsh</u> Transect ID: _____ Plot ID: <u>B</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Eleocharis macostachya</u>	<u>Herb</u>	<u>OBL</u>	9. _____	_____	_____
2. <u>Trifolium sp.</u>	<u>Herb</u>	<u>NI</u>	10. _____	_____	_____
3. <u>Mentha pulchella</u>	<u>Herb</u>	<u>OBL</u>	11. _____	_____	_____
4. <u>Cyperus diactylon</u>	<u>Herb</u>	<u>FAC</u>	12. _____	_____	_____
5. <u>Rumex crispus</u>	<u>Herb</u>	<u>FACW</u>	13. _____	_____	_____
6. <u>Distichlis spicata</u>	<u>Herb</u>	<u>FACW</u>	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 83%

Remarks: Trifolium sp. not identified due to lack of flowers.

HYDROLOGY

Recorded Data (Describe in Remarks): ☐ Stream, Lake, or Tide Gauge ☐ Aerial Photographs ☐ Other ☐ No Recorded Data Available Field Observations: Depth of Surface Water: <u>0</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>NA</u> (in.)	Wetland Hydrology Indicators: Primary Indicators: ☐ Inundated ☐ Saturated in Upper 12 Inches ☒ Water Marks ☒ Drift Lines ☒ Sediment Deposits ☒ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ☐ Oxidized Root Channels in Upper 12 Inches ☒ Water-Stained Leaves ☐ Local Soil Survey Data ☐ FAC-Neutral Test ☐ Other (Explain in Remarks)
Remarks:	

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Travis</u> Applicant/Owner: <u>Travis Air Force Base</u> Investigator: <u>D. C. Rogers</u>	Date: <u>Sept 8 1998</u> County: <u>Salinas</u> State: <u>CA</u>
Do Normal Circumstances exist on the site? ☒ Yes ☐ No Is the site significantly disturbed (Atypical Situation)? ☒ Yes ☐ No Is the area a potential Problem Area? Yes ☒ No (If needed, explain on reverse.)	Community ID: <u>Upland</u> Transect ID: _____ Plot ID: <u>C</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Taraxacum officinale</u>	<u>Herb</u>	<u>UPL</u>	9. _____	_____	_____
2. <u>Xanthium spinosum</u>	<u>Herb</u>	<u>FAC-</u>	10. _____	_____	_____
3. <u>Centaurea solstitialis</u>	<u>Herb</u>	<u>UPL</u>	11. _____	_____	_____
4. <u>Bromus</u>	<u>Herb</u>	<u>UPL</u>	12. _____	_____	_____
5. <u>Eriogonum fasciculatum</u>	<u>Herb</u>	<u>UPL</u>	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 0%

Remarks: Upland

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>NA</u> (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Remarks: <u>Not examined</u>	

SOILS

Map Unit Name

(Series and Phase):

Corning Gravelly Loam, 2-15% Slope

Drainage Class: Moderately well drained

Taxonomy (Subgroup):

Typic Rexsols

Field Observations

Confirm Mapped Type? ☒ No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

☐ Histosol

☐ Histic Epipedon

☐ Sulfidic Odor

☐ Aquic Moisture Regime

☐ Reducing Conditions

☐ Gleyed or Low-Chroma Colors

☐ Concretions

☐ High Organic Content in Surface Layer in Sandy Soils

☐ Organic Streaking in Sandy Soils

☐ Listed on Local Hydric Soils List

☐ Listed on National Hydric Soils List

☐ Other (Explain in Remarks)

Remarks:

Not examined

WETLAND DETERMINATION		
Hydrophytic Vegetation Present?	Yes ☒ No ☐ (Circle)	(Circle)
Wetland Hydrology Present?	Yes ☒ No ☐	
Hydric Soils Present?	Yes ☒ No ☐	
Is this Sampling Point Within a Wetland?		Yes ☒ No ☐
Remarks: Upland		
Approved by HQUSACE 3/92		

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Travis</u> Applicant/Owner: <u>Travis Air Force Base</u> Investigator: <u>D. C. Rogers</u>	Date: <u>Sept. 8, 1998</u> County: <u>Salinas</u> State: <u>CA</u>
Do Normal Circumstances exist on the site? ☒ Yes ☐ No Is the site significantly disturbed (Atypical Situation)? ☒ Yes ☐ No Is the area a potential Problem Area? ☒ Yes ☐ No (If needed, explain on reverse.)	Community ID: <u>vernal swale</u> Transect ID: _____ Plot ID: <u>D</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Juncea bufonius</u>	<u>Herb</u>	<u>FACW+</u>	9. _____	_____	_____
2. <u>Hypochaeris sp.</u>	<u>Herb</u>	_____	10. _____	_____	_____
3. <u>Lolium multiflorum</u>	<u>Herb</u>	<u>FAC</u>	11. _____	_____	_____
4. _____	_____	_____	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 67%

Remarks: _____

HYDROLOGY

Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ☒ No Recorded Data Available Field Observations: Depth of Surface Water: <u>0</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>NA</u> (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ☒ Sediment Deposits ☒ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Remarks: <u>Late summer survey - wetland hydrology evident from sediment & debris deposits and slight incising at one margin.</u>	

Map Unit Name (Series and Phase): Corning Gravelly Loam, 2-15Z Sps Drainage Class: Modestly well drained

Taxonomy (Subgroup): Typic Palexeralfs Field Observations Confirm Mapped Type? Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

☐ Histosol	☐ Concretions
☐ Histic Epipedon	☐ High Organic Content in Surface Layer in Sandy Soils
☐ Sulfidic Odor	☐ Organic Streaking in Sandy Soils
☐ Aquic Moisture Regime	☐ Listed on Local Hydric Soils List
☐ Reducing Conditions	☐ Listed on National Hydric Soils List
☐ Gleyed or Low-Chroma Colors	☒ Other (Explain in Remarks)

Remarks: Soils were not examined because seasonal surface often do not exhibit hydric indicators during the dry season. Hydric soils were inferred based on professional experience with vernal swale ecology.

WETLAND DETERMINATION			
Hydrophytic Vegetation Present?	☒ Yes	No (Circle)	(Circle)
Wetland Hydrology Present?	☒ Yes	No	
Hydric Soils Present?	☒ Yes	No	
		Is this Sampling Point Within a Wetland?	☒ Yes No
Remarks: Seasonal (vernal) swale. (Temporary flooded palustrine emergent wetland).			

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Travis</u> Applicant/Owner: <u>Travis Air Force Base</u> Investigator: <u>D.C. Rogers</u>	Date: <u>Sept 8 1998</u> County: <u>Salinas</u> State: <u>CA</u>
Do Normal Circumstances exist on the site? ☒ Yes ☐ No Is the site significantly disturbed (Atypical Situation)? ☒ Yes ☐ No Is the area a potential Problem Area? ☒ Yes ☐ No (If needed, explain on reverse.)	
Community ID: <u>Vernal Pool</u> Transect ID: _____ Plot ID: <u>E</u>	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Eleocharis macrostachya</u>	<u>Herb</u>	<u>OBL</u>	9. _____	_____	_____
2. <u>Eryngium yuccifolium</u>	<u>Herb</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Lithyrum hyssopifolium</u>	<u>Herb</u>	<u>FACU</u>	11. _____	_____	_____
4. <u>Ptilocarpus</u> sp.	<u>Herb</u>	<u>OBL</u>	12. _____	_____	_____
5. <u>Plagiobothrys</u> sp.	<u>Herb</u>	<u>NI</u>	13. _____	_____	_____
6. <u>Hypochaeris</u> sp.	<u>Herb</u>	<u>—</u>	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 672

Remarks: _____

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ☒ No Recorded Data Available Field Observations: Depth of Surface Water: <u>0</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>NA</u> (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ☒ Saturated in Upper 12 Inches ☒ Water Marks ☒ Drift Lines ___ Sediment Deposits ☒ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ☒ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Remarks: <u>Oxidized root channels observed in cinder soil</u>	

[illegible]

Hydrophytic Vegetation Present?	☒ Yes	No (Circle)	(Circle)
Wetland Hydrology Present?	☒ Yes	No	
Hydric Soils Present?	☒ Yes	No	
		Is this Sampling Point Within a Wetland?	☒ Yes No
Remarks: Vernal Pool. (Temporary flooded, palustrine, emergent persistent wetland).			

Approved by HQUSACE 3/92

APPENDIX B

**INDIVIDUAL ACREAGES FOR WETLANDS AND
OTHER WATERS OF THE UNITED STATES**

Appendix B. Individual Acreages for Wetlands and Other Waters of the United States
Page 1 of 2

Habitat Type	Site	Acreage ^(a)
Freshwater marsh (FW)	FW-1	0.25
	FW-2	0.16
	FW-3	0.27
	FW-4	0.26
	FW-5	0.09
	FW-6	0.16
Seasonal marsh (SM)	SM-1	0.77
	SM-2	0.10
	SM-3	0.43
	SM-4	0.12
	SM-5	0.22
	SM-6	0.17
	SM-7	0.35
Vernal swale (VS)	VS-1	0.57
	VS-2	1.45
	VS-3	0.94
	VS-4	0.07
Vernal pool (VP)	VP-1	0.03
	VP-2	0.03
	VP-3	0.01
	VP-4	0.003
	VP-5	0.01
	VP-6	0.05
	VP-7	0.02
	VP-8	0.17
	VP-9	0.10
	VP-10	0.02
	VP-11	0.001
	VP-12	0.03
	VP-13	0.02
	VP-14	0.06
	VP-15	0.004
	VP-16	0.02
	VP-17	0.01

Appendix B. Individual Acreages for Wetlands and Other Waters of the United States
Page 2 of 2

Habitat Type	Site	Acreage ^(a)
	VP-18	0.01
	VP-19	0.01
	VP-20	0.04
	VP-21	0.09
	VP-22	0.03
	VP-23	0.01
	VP-24	0.04
	VP-25	0.002
	VP-26	0.002
	VP-27	0.01
	VP-28	0.003
	VP-29	0.02
	VP-30/31 ^(b)	0.52
	VP-32	0.03
	VP-33	0.02
	VP-34	0.14
	VP-36 ^(c)	0.05
	VP-37	0.04
	VP-38	0.02
	VP-39	0.01
	VP-40	0.01
	VP-41	0.04
	VP-42	0.002
Open water	Pond 1	1.30
	Pond 2	2.05
	Pond 3	0.80
	Pond 4	0.71
	Pond 5	1.40

Note: (a) Sum of values may differ slightly from those presented in text and figures due to variations in rounding.
(b) Site 30/31 was originally delineated as two separate sites (Earth Tech 1998), but no separation between the two was apparent at the time of this study. Therefore, these two sites herein are treated as a single site.
(c) A site 35 was listed as a vernal pool in an earlier version of this report, but was deleted following ACOE recommendations.

**Assessment of Giant Garter Snake (*Thamnophis
couchi gigas*) Habitat on a Proposed Project
Site for Travis Air Force Base, California**

January 1999

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1.0 INTRODUCTION

In September 1998, a survey for habitat of the giant garter snake (*Thamnophis couchi gigas*) was conducted at a proposed housing development site for Travis Air Force Base (AFB) south of Fairfield, Solano County, California (Figure 1). The survey was performed in support of development of a constraints analysis for the proposed construction of housing facilities at the site. The area surveyed was a 101-acre parcel in the Cordero Hills on the north side of Travis AFB between Cordero Junction and North Gate Road.

2.0 METHODS

Field surveys were conducted on September 8 and 16, 1998. Biologists evaluated habitat conditions and assessed the potential for occurrence of the giant garter snake. Surveys for this taxon consisted of walking the site while recording habitat characteristics and the presence of wildlife species. Intensive searches for giant garter snakes were conducted along freshwater marsh habitat.

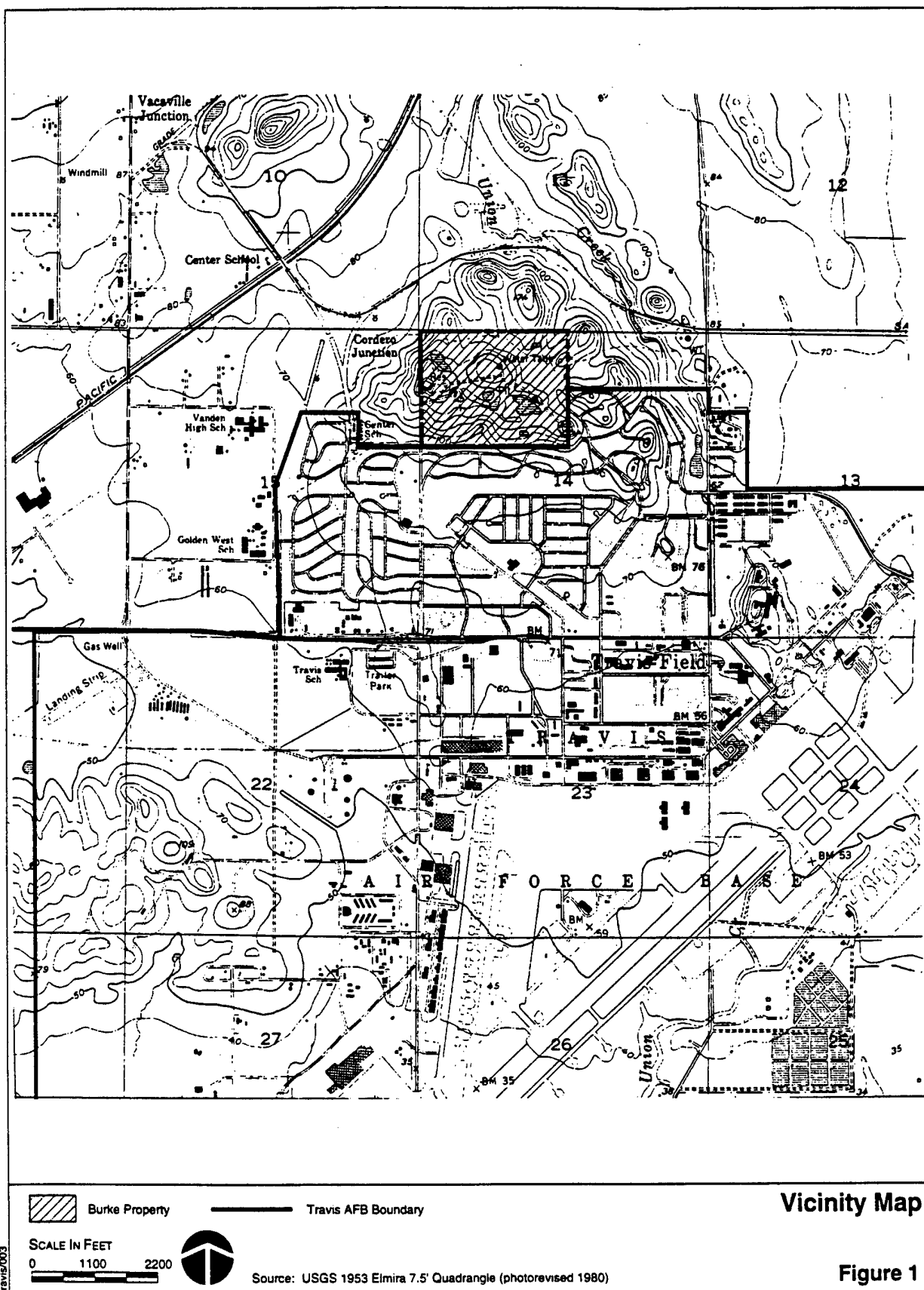
3.0 RESULTS

3.1 SETTING

The proposed project site is a former sandstone quarry that has been abandoned for 25 to 30 years. The site is dominated by upland, non-native weedy grasses and large patches of medusa head grass (*Taeniatherum caput-medusae*), yellow starthistle (*Centaurea solstitialis*), turkey mullein (*Eremocarpus setigerus*), and spiny cocklebur (*Xanthium spinosum*). Seasonal and perennial wetland habitats have developed within borrow areas and excavations resulting from previous quarrying activities. At the top of a central hill in the center of the project site are two large water tanks that are flushed infrequently into some of the wetlands on the east side of the project site. The hill slopes are flanked with five stock ponds that occupy the former borrow pits of the quarrying activities and support groves of willows (*Salix* sp.) and Fremont's cottonwoods (*Populus fremontii*). The hill supports a stand of eucalyptus trees (*Eucalyptus* sp.) on the north side. West of the eucalyptus grove is a potable water treatment facility. The site is currently used for grazing.

3.2 GIANT GARTER SNAKE HABITAT

No giant garter snakes were detected during the surveys. This snake is federally and state listed as a threatened species. Historically, it was found from Butte County to Kern County (Hansen and Brode 1980). This snake is endemic to contiguous lowland marsh and swamp habitat, including sloughs, ponds, marshes, streams, and irrigation canals on the Central Valley floor. Giant garter snakes feed on small fish, tadpoles, and frogs.



The U.S. Fish and Wildlife Service recognizes 13 populations of giant garter snakes. The closest known populations to the project site are along the eastern fringes of the Sacramento-San Joaquin Delta from Laguna Creek Grove to Stockton (20 miles from the project site), and along the western border of the Yolo Bypass (15 miles from the project site). The giant garter snake has been extirpated from the southern one-third of its former range and is known only from scattered localities in the Sacramento Valley. Habitat loss due to wetland reclamation and agricultural development has reduced the range of this snake (Hansen and Brode 1980). Its decline is attributed to habitat fragmentation and loss, introduction of predatory fish and bullfrogs, agricultural and urban development, and flood control projects (Treanor 1983). Existing habitat continues to be degraded by toxic chemicals associated with agricultural and urban runoff.

The freshwater marsh habitat at the study site is discontinuous with existing giant garter snake habitat and has existed only for about 20 years; therefore, it has never been contiguous with other giant garter snake habitats. It is outside of the species' historic distribution, and no individuals were observed at the project site. For these reasons, the study site is not considered to harbor any giant garter snake habitat.

4.0 CONCLUSIONS

No giant garter habitat is present on the project site.

5.0 REFERENCES

- Hansen, G.E., and J.M. Brode, 1980. Status of the giant garter snake, *Thamnophis couchi gigas* (Fitch). (Inland Fisheries Endangered Species Program Special Publication 80-5.) California Department of Fish and Game. Sacramento, California.
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**Assessment of Potential Golden Eagle (*Aquila chrysaetos*) Nesting
on a Proposed Project Site for Travis
Air Force Base, California**

January 1999

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1.0 INTRODUCTION

In September 1998, a survey for nests of the golden eagle (*Aquila chrysaetos*) was conducted at a proposed housing development site for Travis Air Force Base (AFB) south of Fairfield, Solano County, California (Figure 1). The survey was performed in support of development of a constraints analysis for the proposed construction of housing facilities at the site. The area is a 101-acre parcel in the Cordero Hills on the north side of Travis AFB between Cordero Junction and North Gate Road.

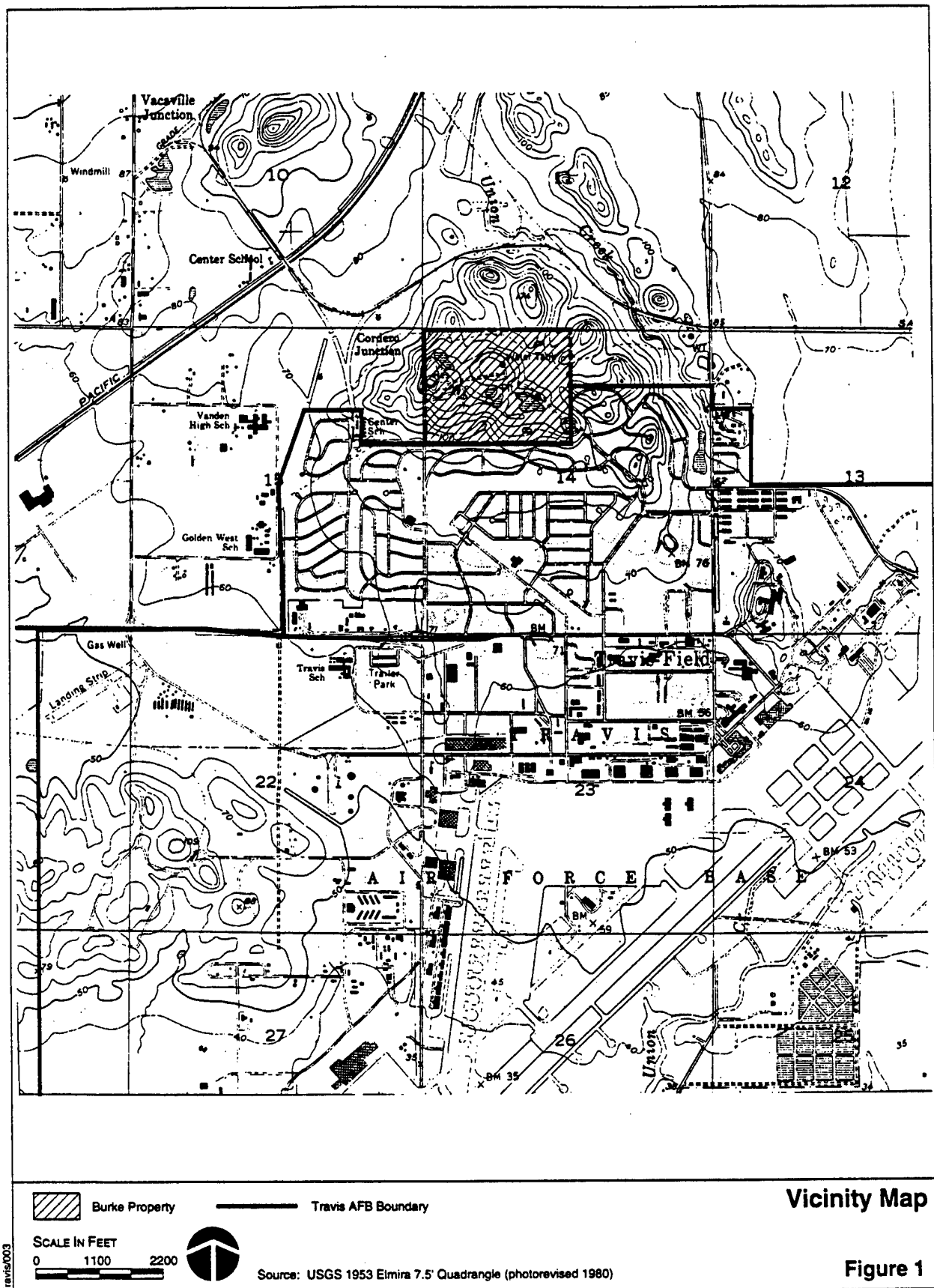
2.0 METHODS

Field surveys were conducted on September 8 and 16, 1998. Biologists evaluated habitat conditions and assessed the potential for golden eagle nests to occur at the site. Surveys included walking the site while recording habitat characteristics and the presence of wildlife species. Intensive searches for golden eagle nests were conducted around the water towers and trees on the site.

3.0 RESULTS

3.1 SETTING

The proposed project site is a former sandstone quarry that has been abandoned for 25 to 30 years. The site is dominated by upland, non-native weedy grasses and large patches of medusa head grass (*Taeniatherum caput-medusae*), yellow starthistle (*Centaurea solstitialis*), turkey mullein (*Eremocarpus setigerus*), and spiny cocklebur (*Xanthium spinosum*). Seasonal and perennial wetland habitats have developed within borrow areas and excavations resulting from previous quarrying activities. At the top of a central hill in the center of the project site are two large water tanks, which are flushed infrequently into some of the wetlands on the east side of the project site. The hill slopes are flanked with five stock ponds that occupy the former borrow pits of the quarrying activities and support groves of willows (*Salix* sp.) and Fremont's cottonwoods (*Populus fremontii*). The hill supports a stand of eucalyptus trees (*Eucalyptus* sp.) on the north side. One of these eucalyptus trees bears a large nest. West of the eucalyptus grove is a potable water treatment facility. The site is currently used for grazing.



3.2 NESTING HABITAT

No golden eagles, or evidence to indicate their presence, were observed on the project site during the field survey. The golden eagle is a state species of special concern and is protected under the federal Bald and Golden Eagle Protection Act. The breeding range of the golden eagle includes the entire western United States. In California, the breeding range includes the Coast Ranges, Sierra Nevada foothills, Great Basin, Transverse Ranges, and the mountains and deserts of southern California. In the interior central Coast Ranges, golden eagles inhabit grassland, shrubland, and oak savannah communities common to this region.

Thelander (1974) identified 64 active golden eagle territories in the central Coast Ranges, and estimated that a minimum of 500 pairs of golden eagles nested in California during the early 1970s. Results of a 1985 California Department of Fish and Game survey suggested that populations in areas less disturbed by human encroachment or other human activities, such as portions of the central Coast Ranges, had remained relatively stable since Thelander's (1974) surveys (Schlorff 1985).

Although the Coast Range breeding population appears to be stable (Thelander 1974, Hunt 1996), statewide populations have declined (Thelander 1974), especially near human population centers. The primary cause for the reduction in golden eagle numbers in California is the loss of foraging habitat due to conversion of native habitats to agriculture and expansion of urban centers.

In the interior central Coast Ranges, golden eagles forage primarily in grazed grasslands, open shrublands, and oak savannah communities supporting large populations of ground squirrels and lagomorphs (i.e., rabbits). Golden eagles use cliff ledges, rocky outcrops, and a variety of tree species as nest substrates (Johnsgard 1990). Although most nesting in the western United States occurs on cliff ledges, trees are used in areas where availability of suitable cliff sites is a limiting factor (Bruce et al. 1982).

In the interior central Coast Ranges, suitable cliff nesting habitat is uncommon, and most known golden eagle nests are found in trees (Hunt 1994). The nests of 14 of 17 golden eagle pairs observed in Alameda, Contra Costa, and Santa Clara counties in the central Coast Ranges were built in trees (Carney 1954). The dominant tree species available, and the species most commonly used by golden eagles in the central Coast Ranges, are the blue oak (*Quercus douglasii*), interior live oak (*Q. wislizenii*), and coast live oak (*Q. agrifolia*). Nests have also been reported in foothill pine (*Pinus sabiniana*) and eucalyptus (*Eucalyptus* sp.). In the central Coast Ranges, golden eagle tree nests are usually found midway up steep slopes (Hunt 1994) that provide a panoramic view of nearby foraging habitat from the nest and may provide important wind lift for flight (Dixon 1937).

The project site supports a stand of eucalyptus (*Eucalyptus* sp.) trees on the south side of the hill, overlooking one of the Travis AFB housing facilities. A single large nest is present in one of the eucalyptus trees. The nest is close to base housing facilities, not typical of preferred golden eagle nesting habitat. The nest, approximately 80 feet up in the tree and 5 feet in diameter, appears to be a raptor's nest. Feathers collected from the base of the tree belonged to a crow or a raven. The contents of the uninhabited nest were examined. Items included feathers that were identified by an ornithologist as being from a variety of small bird species and a corvid. Some feathers appeared to belong to a raptor, although the striped pattern was not indicative of golden eagle feathers. A vertebra belonging to a small mammal was also found.

It is not likely that this nest is currently used by golden eagles. It is more probable that this nest was at one time a raptor's nest, but was most recently used by ravens, which are commonly known to nest throughout the Montezuma and Portero Hills areas. Because the trees are not on a steep cliff, are close to human habitation, and the nearest reported nest site is in the Montezuma Hills overlooking the Sacramento River (Jones & Stokes Associates file information), this site appears to be an unlikely location for any future nesting activity.

4.0 CONCLUSIONS

No golden eagle nests were observed at the time of the field surveys. Considering the extensive human activity and that any potential nest site trees are not on steep slopes, it appears unlikely that golden eagles will nest on the project site in the foreseeable future.

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**Plants Associated with Vernal Pools at Travis AFB, California
(Earth Tech 1998)**

Vernal Pool Number

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<i>Achrynaea mollis</i>	x										x	x																				
<i>Alopecurus saccatus</i>																																
<i>Anagallis arvensis</i>																																
<i>Avena fatua</i>																																
<i>Blennosperma nanum</i> var. <i>nanum</i>																																
<i>Briza minor</i>																																
<i>Bromus diandrus</i>																																
<i>Bromus hordeaceus</i>																																
<i>Bromus tectorum</i>																																
<i>Callandrinia ciliatum</i>																																
<i>Callitriche marginata</i>																																
<i>Castilleja attenuata</i>																																
<i>Centaurea solstitialis</i>																																
<i>Convolvulus arvensis</i>																																
<i>Cotula coronopifolia</i>																																
<i>Crassula aquatica</i>																																
<i>Cyperus eragrostis</i>																																
<i>Deschampsia danthonoides</i>																																
<i>Distichlis spicata</i>																																
<i>Downingia concolor</i>																																
<i>Downingia insignis</i>																																
<i>Downingia pulchella</i>																																
<i>Eleocharis macrostachya</i>																																
<i>Epilobium torreyi</i>																																
<i>Erodium borys</i>																																
<i>Erodium cicutarium</i>																																
<i>Eryngium yaseyi</i>																																
<i>Hemizonia filifolia</i>																																
<i>Hordeum brachyantherum</i>																																
<i>Hordeum marinum</i> ssp. <i>gussonianum</i>																																
<i>Hordeum murinum</i> ssp. <i>glaucum</i>																																
<i>Hypochaeris glabra</i>																																

Vernal Pool Number

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
<i>Juncus bufonius</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Juncus mexicanus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Lasthenia conjugens</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Lasthenia fremontii</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Lasthenia glaberrima</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Layia chrysanthemoides</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Lolium multiflorum</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Louis coniculus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Louis wrangelianus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Lupinus bicolor</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Lythrum hyssopifolium</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Medicago polymorpha</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Melilotus indica</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Plagiobothrys bracteatus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Plagiobothrys leptocladus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Plagiobothrys stipitatus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Plagiobothrys trachycarpus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Plantago coronopus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Plantago elongata</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Plantago lanceolata</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Pleuropogon californicus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Poa annua</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Pogogyne zizyphoroides</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Polygonum arenastrum</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Polygonum maritimum</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Polypogon monspeliensis</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Psilocarphus brevissimus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Psilocarphus oregonus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Psilocarphus tenellus</i> var. <i>globiferus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Ranunculus aquatilis</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Ranunculus muricatus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Rumex acetosella</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Vernal Pool Number

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<i>Rumex crispus</i>																																
<i>Salix lasiolepis</i>																																
<i>Silene gallica</i>																																
<i>Taeniatherum caput-medusae</i>																																
<i>Trifolium campestre</i>																																
<i>Trifolium depauperatum</i>																																
<i>Trifolium fucatum</i>																																
<i>Trifolium hirtum</i>																																
<i>Trifolium microdon</i>																																
<i>Trifolium variegatum</i>																																
<i>Trifolium wildenovii</i>																																
<i>Triphysaria angustifolia</i>																																
<i>Triphysaria versicolor</i>																																
<i>Triteleia hyacinthina</i>																																
<i>Veronica peregrina</i>																																
<i>Vulpia myuros</i>																																

Wet Season Sampling Results at Travis AFB, California

Final
**FEDERALLY LISTED LARGE BRANCHIOPOD WET-SEASON SURVEYS
CONDUCTED AT THE
BURKE PROPERTY, TRAVIS AIR FORCE BASE, SOLANO COUNTY, CALIFORNIA.**

**Prepared for
Travis Air Force Base**

20 May 1999

1.0 SUMMARY

Earth Tech contracted May Consulting Services to conduct wet-season surveys for federally listed large branchiopod species with a potential to occur at the Burke Property, Travis Air Force Base, Solano County, California. The wet-season sampling followed dry-season sampling conducted by Jones and Stokes Associates (1998) at the project site. Two large branchiopod species were observed on site during wet-season surveys: vernal pool fairy shrimp (*Branchinecta lynchi*) and California clam shrimp (*Cyzicus californicus*). The vernal pool fairy shrimp, a federally listed threatened species, was observed in three wetlands onsite: VP-8B, VP9, and VP-30. The California clam shrimp, which has no federal or state protective status, was observed in VP-33.

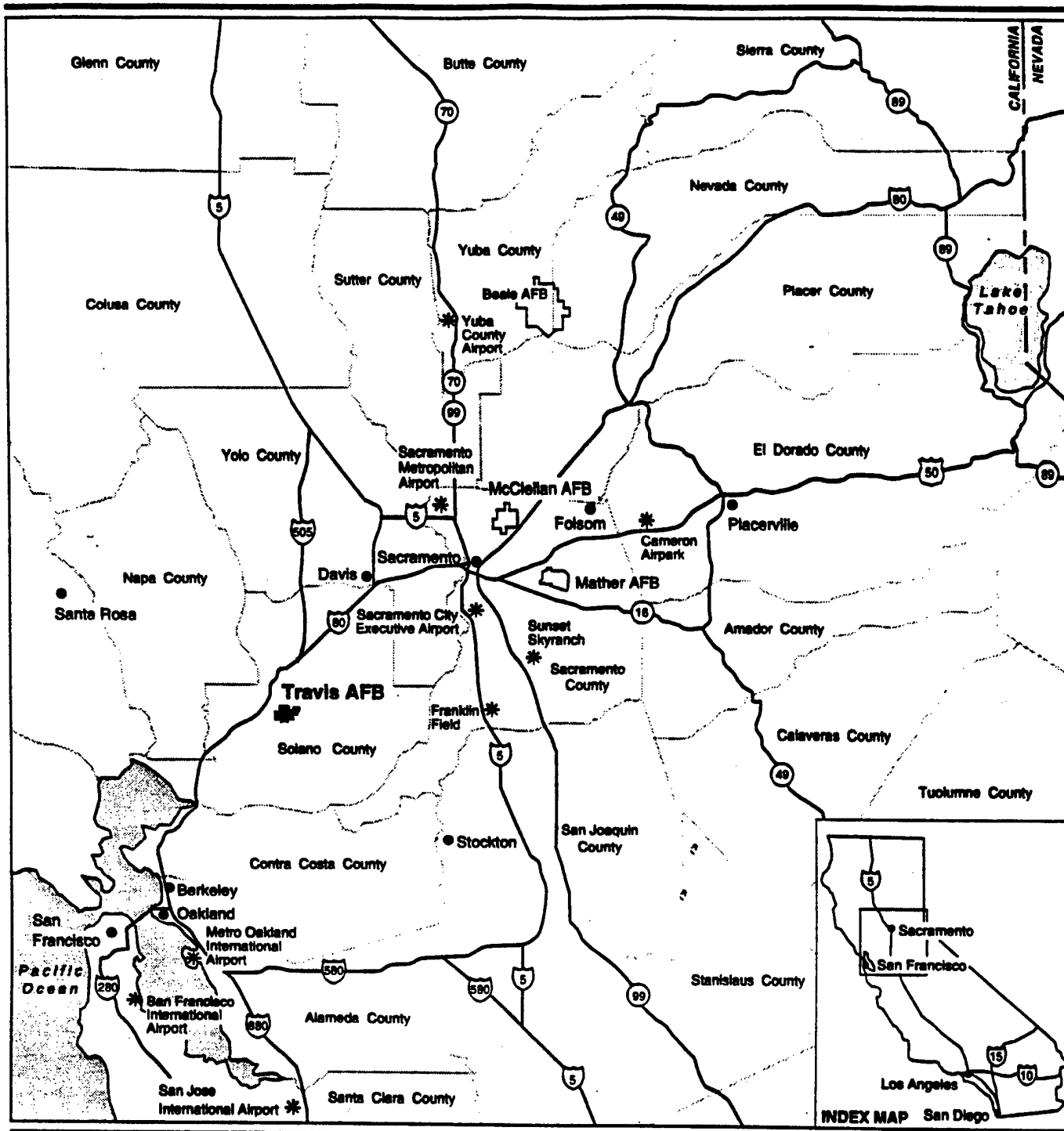
2.0 INTRODUCTION

Earth Tech contracted May Consulting Services to conduct wet-season surveys for federally listed large branchiopod species with a potential to occur on a recently acquired parcel (Burke Property) (referred to hereafter as Project Site) at Travis Air Force Base, Solano County, California. Jones and Stokes Associates had previously conducted dry-season surveys on site in 1998 (Jones & Stokes and Earth Tech 1999).

For the purposes of this report, large branchiopods are defined as any member of the order of fairy shrimp (Anostraca), tadpole shrimp (Notostraca), or clam shrimp (Cochostraca). This report documents the methods and results of these surveys.

2.1 Project Description and Location

The 101-acre Project Site is proposed for housing facility development for Air Force personnel and is adjacent and contiguous with the northern boundary of the base and existing family housing (Figures 1 and 2). Along the western boundary is the City of Vacaville Water Treatment Plant and to the north, the current land use is grazing.



EXPLANATION

* Airports

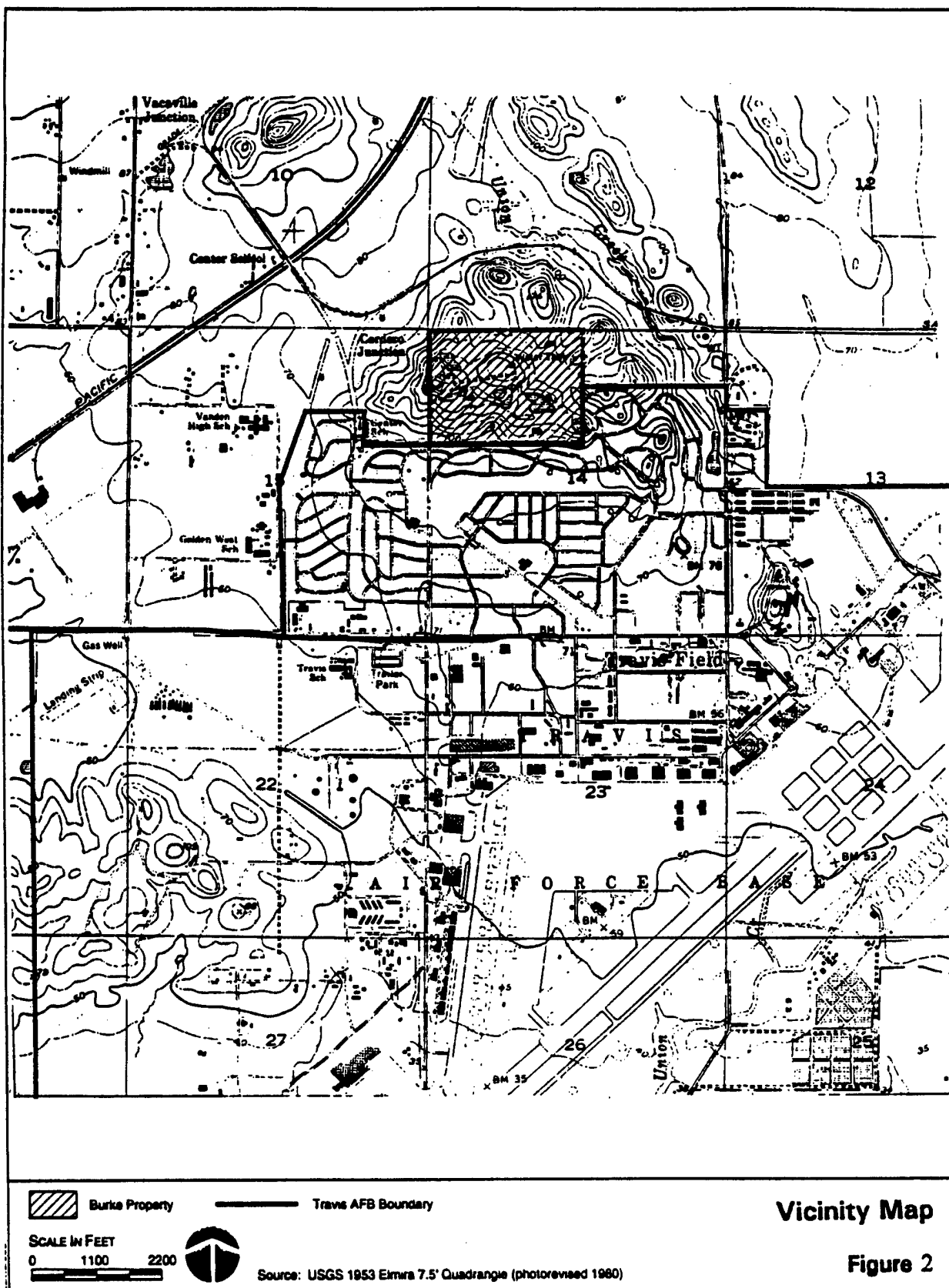
— County Boundary

Source: Earth Tech 1998

Regional Map



Figure 1



3.0 METHODS

Surveys for federally listed large branchiopods were conducted under Section 10 (a) (1) (A) permit number PRT-795930 of the of the federal Endangered Species Act. All areas that could potentially support large branchiopods were sampled using wet-season techniques. Sampling methods followed U.S. Fish and Wildlife Service (USFWS) guidelines (USFWS 1996) and are described briefly below. Numbering of sites followed Jones & Stokes and Earth Tech (1999). Multiple wet areas within a site were identified by site number followed by a letter.

Wet-season sampling was conducted on:

- December 8 and 23, 1998,
- January 5 and 19, 1999,
- February 3 and 16, 1999,
- March 2, 17, and 30, 1999, and
- April 19 and 28, 1999.

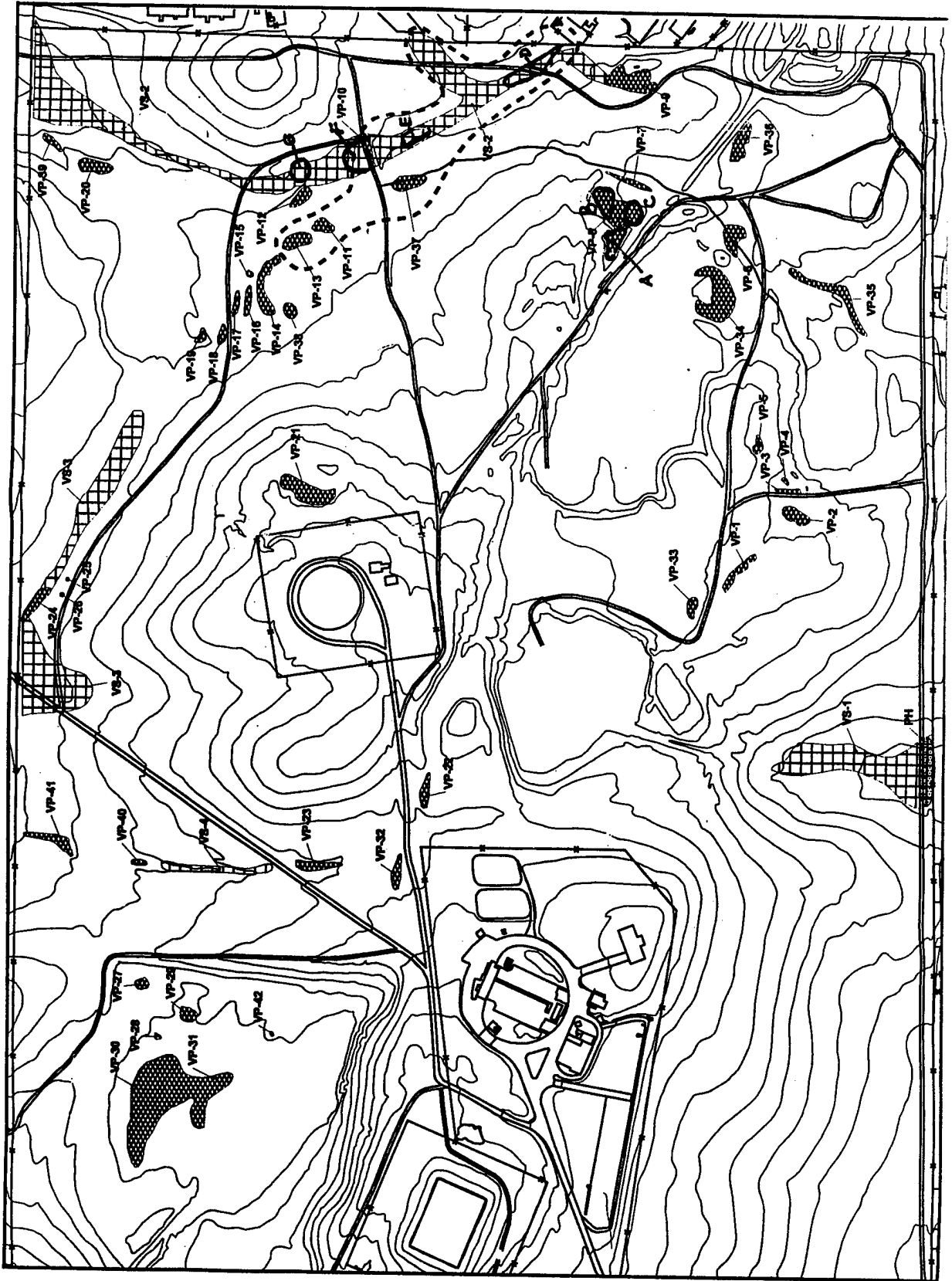
All areas ponding 1-inch or more water during each survey visit were dip-netted with a fine mesh (400- μ m aperture) aquarium net (0.048 m² mouth). The contents of the dipnet were examined for large branchiopods. During the first two field visits a small (10 cm diameter), fine mesh (80- μ m aperture) plankton net with a transparent plastic reservoir was used instead of the aquarium net to maximize opportunities to detect the early instar stages of large branchiopods. All macroscopic (> 2 mm in length) aquatic invertebrates were identify to the lowest justifiable taxon in the field and recorded on standardized data sheets.

In addition to aquatic invertebrates, all wildlife species, including amphibians observed during surveys, were recorded in field notes.

4.0 RESULTS

Two large branchiopod species were observed on site during wet-season surveys: vernal pool fairy shrimp (*Branchinecta lynchi*) and California clam shrimp (*Cyzicus californicus*). The vernal pool fairy shrimp, a federally listed threatened species, was observed in three wetlands onsite: VP-8B, VP-9, and VP-30 (Figure 3). The California clam shrimp, which has no federal or state protective status, was observed in VP-33.

A list of aquatic invertebrate species observed in each wetland during the field visits are included in Appendix A. Inundation depths and ponding durations of seasonal wetlands sampled at the Project Site are included in Appendix B. Appendix C lists the vertebrate species observed on site during field surveys. Representative photographs of the Project Site are included in Appendix D.



Legend

- Disturbed Vernal Pool and Swale
- VS - Vernal Swale
- VP - Vernal Pools
- PH - Other Potential Habitat



Seasonal Wetlands
Occurring at Burke
Property, Travis AFB,
California

Figure 3

5.0 CITATIONS

5.1 Printed References

Jones & Stokes and Earth Tech, 1999. Dry Season Surveys for Special-Status Shrimp Species at Travis Air Force Base, California.

U.S. Fish and Wildlife Service, 1996. Interim Survey Guidelines to Permittees for Recovery Permits under Section 10 (a) (1) (A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods. 11 pp.

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APPENDIX A.

**AQUATIC MACRO-INVERTEBRATE SPECIES OBSERVED IN EACH WETLAND AT
THE BURKE PROPERTY, TRAVIS AFB DURING 1998-99 WINTER FIELD SURVEYS.**

Weather Conditions: 550 deg F, partly cloudy, wind 10-15 mph from West

Date: 8-Dec-98
Investigators: M. Gause and B. Helm

New USA Polygon No.	Old USA Polygon No.	MCS Poly- gon No.	Habitat Type	Corps Status	Max. Depth (ft.)	Comments	Large Branchiopods				Ostracods		Copepods		Cladocera
							Lepidurus pachardi	Branchinecta lynchi	Lindberghia occidentalis	Cypris californicus			Calanoid	Cyclopoida	
VP-1	VP-1		VP (a)		4						x		x		x
VP-2	VP-2		VP (a)		4										
VP-3	VP-3		VP (a)		6										
VP-4	VP-4		VP (a)		0							x	x		x
VP-5	VP-5		VP (a)		0										
VP-6	VP-6		VP (a)	?	0										
VP-7	VP-7		VP (a,b)		0										
VP-8	VP-8	A	SW (a,e)		7										
VP-8	VP-8	B	SW (a,e)		0										
VP-8	VP-8	C	SW (a,e)		0										
VP-9	VP-9		SW (a,e)	?	0										
VP-10	VP-10		VP (a,m)		6						x				
VP-11	VP-11		VP (a)		0										
VP-12	VP-12		VP (a)		0										
VP-13	VP-13		VP (a)		0										
VP-14	VP-14		VP (a)		0										
VP-16	VP-16		VP (a)		0										
VP-17	VP-17		VP (a)		0										
VP-18	VP-18		VP (a)		0										
VP-19	VP-19		VP (a)		4							x			
VP-20	VP-20		VP (a)		0										
VP-21	VP-21		U (a,e)	?	1										
VP-22	not prev. mapped		VP (a)		0										
VP-23	VP-23		VS (a,b)	?	0										
VP-24	VP-24		VS (a)		0										
VP-27	VP-27		VP (a)		0										
VP-28	VP-28		VP (a)		0										
VP-29	VP-29		VP (a)		0										
VP-30	VP-30		VP (a)		6										
VP-31	VP-31		VP (a)		0							x	x		
VP-32	VP-32		VP (a)		5										
VP-33	VP-33		U (a,e)	?	0										
VP-34	VP-6A (west)		VP (a)		8										
VP-35	VP-6B		VS (a)	?	0										
VP-36	VP-6A (east)		VP (a,b)		0										
VP-38	VP-14A		VP (a)		0										
VP-39	VP-20A		VP (a)		0										
VP-40	VP-23A		VS (a)		0										
VP-41	VP-23B		SW (a)		0										
VP-42	VP-30A		VP (a)	?	0										
VS-1	VS-1		SW (a)		9										
VS-2	VS-2	F	VP (a)		12										
VS-2	VS-2	G	VP (a)		6							x	x		x
VS-2	VS-2	D	VP (a)		0								x	x	
VS-2	VS-2	E	VP (a)		6										
VS-2	VS-2		VS (a)		0										
VS-3	VS-3		SW (a)		0										
VS-4	VS-4		VS (a)		1										

New JSA Polygon No.	Old JSA Polygon No.	MCS Polygon No.	Habitat Type	Corps Status	Max. Depth (in.)	Comments	Large Branchiopoda				Copepoda		Cladocera
							Lepidurus packardii	Branchinecta lynchi	Lindberghia occidentalis	Cyzicus californicus	Ostracoda	Calanoid	
VP-1	VP-1		VP (a)		negligible								
VP-2	VP-2		VP (a)		0	Size over exaggerated							
VP-3	VP-3		VP (a)		0								
VP-4	VP-4		VP (a)		0								
VP-5	VP-5		VP (a)		0	Size over exaggerated							
VP-6	VP-6		VP (a)	?	0								
VP-7	VP-7		VP (a,d)		0	Further north than mapped							
VP-8	VP-8	A	SW (a,e)		4								
VP-8	VP-8	B	SW (a,e)		0								
VP-8	VP-8	C	SW (a,e)		0								
VP-9	VP-9		SW (a,e)	?	0	Size over exaggerated							
VP-10	VP-10		VP (e,m)		1								
VP-11	VP-11		VP (a)		0								
VP-12	VP-12		VP (a)		0	Longer than mapped							
VP-13	VP-13		VP (a)		0								
VP-14	VP-14		VP (a)		0								
VP-16	VP-16		VP (a)		0								
VP-17	VP-17		VP (a)		0								
VP-18	VP-18		VP (a)		0								
VP-19	VP-19		VP (a)		0								
VP-20	VP-20		VP (a)		0								
VP-21	VP-21		U (a,d)	?	0	Not a wetland (non jurisdictional)							
VP-22	VP-22	not prev. mapped	VP (a)		0	Size and shape questionable							
VP-23	VP-23		VS (a,b)	?	0								
VP-24	VP-24		VS (a)		0								
VP-27	VP-27		VP (a)		0								
VP-28	VP-28		VP (a)		0								
VP-29	VP-29		VP (a)		0								
VP-30	VP-30		VP (a)		0								
VP-31	VP-31		VP (a)		0	The majority is non jurisdictional							
VP-32	VP-32		VP (a)		0								
VP-33	VP-33		U (a,d)	?	0								
VP-34	VP-34	VP-6A (west)	VP (a)		2								
VP-35	VP-35	VP-6B	VS (a)	?	0	Portions may be non jurisdictional (size is exaggerated)							
VP-36	VP-36	VP-6A (east)	VP (a,b)		0								
VP-38	VP-38	VP-14A	VP (a)		0								
VP-39	VP-39	VP-20A	VP (a)		0								
VP-40	VP-40	VP-23A	VS (a)		0								
VP-41	VP-41	VP-23B	SW (a)		0								
VP-42	VP-42	VP-30A	VP (a)	?	0								
VS-1	VS-1	VS-1	SW (a)		9								
VS-2	VS-2	F	VP (a)		10	1/2 of pool dry					X		X
VS-2	VS-2	G	VP (a)		0								
VS-2	VS-2	D	VP (a)		0								
VS-2	VS-2	E	VP (a)		6	Only 2 small areas of pool ponded							X
VS-2	VS-2		VS (a)		0	Large portions are non jurisdictional							
VS-3	VS-3		SW (a)		0	The majority is non jurisdictional							
VS-4	VS-4		VS (a)		0								

Insecta										Hymenoptera				Diptera				Lepidoptera				Tribolium			
Coleoptera				Hemiptera		Ephemeroptera		Odonata		Culicidae		Chironomidae		Lymnaeidae		Physidae		Planorbidae		Micro-tubularian					
Dytiscidae	Hydrophilidae	Berosus sp.	Hydrophilidae	Notonectidae	Corixidae			Zygoptera	Anisoptera																
					X																				

New USA Polygon No.	Old USA Polygon No.	MCS Poly- gon No.	Habitat Type	Corps Status	Max. Depth (m.)	Comments	Large Branchiopods					Copepods		Cladocera
							Lepidurus pascuati	Branchinecta lynchi	Linderella occidentalis	Cyzicus californicus	Ostracods	Calanoid	Cyclopoda	
VP-1	VP-1		VP (e)		0									
VP-2	VP-2		VP (e)		0									
VP-3	VP-3		VP (e)		0									
VP-4	VP-4		VP (e)		0									
VP-5	VP-5		VP (e)		0									
VP-6	VP-6		VP (e)	?	0									
VP-7	VP-7		VP (e,d)		0									
VP-8	VP-8	A	SW (e,e)		0									
VP-8	VP-8	B	SW (e,e)		0									
VP-8	VP-8	C	SW (e,e)		0									
VP-9	VP-9		SW (e,e)	?	0									
VP-10	VP-10		VP (e,m)		0									
VP-11	VP-11		VP (e)		0									
VP-12	VP-12		VP (e)		0									
VP-13	VP-13		VP (e)		0									
VP-14	VP-14		VP (e)		0									
VP-16	VP-16		VP (e)		0									
VP-17	VP-17		VP (e)		0									
VP-18	VP-18		VP (e)		0									
VP-19	VP-19		VP (e)		0									
VP-20	VP-20		VP (e)		0									
VP-21	VP-21		U (e,e)	?	0									
VP-22	not prev. mapped		VP (e)		0									
VP-23	VP-23		VS (e,b)	?	0									
VP-24	VP-24		VS (e)		0									
VP-27	VP-27		VP (e)		0									
VP-28	VP-28		VP (e)		0									
VP-29	VP-29		VP (e)		0									
VP-30	VP-30		VP (e)		0									
VP-31	VP-31		VP (e)		0									
VP-32	VP-32		VP (e)		0									
VP-33	VP-33		U (e,e)	?	0									
VP-34	VP-34 (west)		VP (e)		0									
VP-35	VP-35		VS (e)	?	0									
VP-38	VP-38 (east)		VP (e,b)		0									
VP-38	VP-14A		VP (e)		0									
VP-39	VP-20A		VP (e)		0									
VP-40	VP-23A		VS (e)		0									
VP-41	VP-23B		SW (e)		0									
VP-42	VP-30A		VP (e)	?	0									
VS-1	VS-1		SW (e)		0						X			
VS-2	VS-2	F	VP (e)		0						X			X
VS-2	VS-2	G	VP (e)		0									
VS-2	VS-2	D	VP (e)		0									
VS-2	VS-2	E	VP (e)		0									
VS-2	VS-2		VS (e)		0									
VS-3	VS-3		SW (e)		0									
VS-4	VS-4		VS (e)		0									

Weather Conditions: s55 deg F. Cloudy, had rain in last 24 hours

Date: 19-Jan-99
Investigators: M. Gause and B. Helm

New JSA Polygon No.	Old JSA Polygon No.	MCS Poly- gon No.	Habitat Type	Corps Status	Max. Depth (ft.)	Comments	Large Branchiopods				Copepods		Chydora
							Lepidurus packardii	Branchinecta lynchi	Linderella occidentalis	Cyzicus californicus	Ostracoda	Calanoid	
VP-1	VP-1		VP (e)		4							x	
VP-2	VP-2		VP (e)		0								
VP-3	VP-3		VP (e)		2								
VP-4	VP-4		VP (e)		0								
VP-5	VP-5		VP (e)		0								
VP-6	VP-6		VP (e)	7	1								
VP-7	VP-7		VP (e,g)		0								
VP-8	VP-8	A	SW (e,g)		2								
VP-9	VP-9	B	SW (e,g)		0								
VP-10	VP-10	C	SW (e,g)		1								
VP-11	VP-11		SW (e,g)	7	0								
VP-12	VP-12		VP (e,r)		4	6.5 feet x 20 feet in size							
VP-13	VP-13		VP (e)		0								
VP-14	VP-14		VP (e)		0								
VP-15	VP-15		VP (e)		0								
VP-16	VP-16		VP (e)		0								
VP-17	VP-17		VP (e)		0								
VP-18	VP-18		VP (e)		0								
VP-19	VP-19		VP (e)		0								
VP-20	VP-20		VP (e)		0								
VP-21	VP-21		U (e,g)	7	0								
VP-22	VP-22	not prev. mapped	VP (e)		0								
VP-23	VP-23		VS (e,b)	7	0								
VP-24	VP-24		VS (e)		0								
VP-25	VP-25		VP (e)		0								
VP-26	VP-26		VP (e)		0								
VP-27	VP-27		VP (e)		0								
VP-28	VP-28		VP (e)		0								
VP-29	VP-29		VP (e)		0								
VP-30	VP-30		VP (e)		0								
VP-31	VP-31		VP (e)		0								
VP-32	VP-32		VP (e)		7								
VP-33	VP-33	VP-1A	U (e,g)	7	0								
VP-34	VP-34	VP-6A (west)	VP (e)		2								
VP-35	VP-35	VP-6B	VS (e)	7	0								
VP-36	VP-36	VP-6A (east)	VP (e,b)		0								
VP-37	VP-37	VP-14A	VP (e)		0								
VP-38	VP-38	VP-20A	VP (e)		0								
VP-39	VP-39	VP-23A	VS (e)		0								
VP-40	VP-40	VP-23B	SW (e)		0								
VP-41	VP-41	VP-30A	VP (e)	7	0								
VP-42	VP-42	VS-1	SW (e)		10						X		
VS-1	VS-1	VS-2	VP (e)		7						X		X
VS-2	VS-2	VS-2	VP (e)		3						X		
VS-3	VS-3	VS-2	VP (e)		5						X		
VS-4	VS-4	VS-2	VP (e)		1								
VS-5	VS-5	VS-2	VS (e)		0								
VS-6	VS-6	VS-3	SW (e)		1	75% is non-jurisdictional							
VS-7	VS-7	VS-4	VS (e)		0								

Investigator: M. Gause and B. Helm

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Investigator: M. Gause and B. Helm

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Investigator: M. Gause and B. Helm

Investigator: M. Gause and B. Helm

Investigator: M. Gause and B. Helm

Investigator: M

[illegible]

New USA Polygon No.	Old USA Polygon No.	MCS Poly- gon No.	Habitat Type	Corpe Status	Max. Depth (ft.)	Comments	Large Branchiopods					Cyclopoids	Cladocera
							Lepidurus packard	Unknown Anostraca	Branchinecta lynchi	Linderella occidentalis	Cyclops californicus	Ostracods	
VP-1	VP-1		VP (a)		6							X	X
VP-2	VP-2		VP (a)		9	Pseudocis egg masses							
VP-3	VP-3		VP (a)		6	Pseudocis egg masses							X
VP-4	VP-4		VP (a)		4								
VP-5	VP-5		VP (a)		7								
VP-6	VP-6		VP (a)	7	3	no inverts							
VP-7	VP-7		VP (a,b)		0								
VP-8	VP-8	A	SW (a,c)		12+	Pseudocis egg masses							
VP-8	VP-8	B	SW (a,c)		10	Pseudocis egg masses							
VP-8	VP-8	C	SW (a,c)		12+	Pseudocis egg masses							
VP-9	VP-9		SW (a,c)	7	5								
VP-10	VP-10		VP (a,r)		7	Pseudocis egg masses							
VP-11	VP-11		VP (a)		0								
VP-12	VP-12		VP (a)		4	Pseudocis egg masses							
VP-13	VP-13		VP (a)		0								
VP-14	VP-14		VP (a)		7								X
VP-15	VP-15		VP (a)		neg								
VP-16	VP-16		VP (a)		2	no inverts							
VP-17	VP-17		VP (a)		neg								
VP-18	VP-18		VP (a)		2								
VP-19	VP-19		VP (a)		6	Pseudocis egg masses							
VP-20	VP-20		VP (a)		7								
VP-21	VP-21		U (a,e)	7	12+								
VP-22	VP-22	not prev. mapped	VP (a)		6								
VP-23	VP-23		VS (a,b)	7	4	no inverts							
VP-24	VP-24		VS (a)	7	3								
VP-25	VP-25	not prev. mapped	VP (a,r)		4	springtails							
VP-26	VP-26	not prev. mapped	VP (a,r)		4								
VP-27	VP-27		VP (a)		2								
VP-28	VP-28		VP (a)		6	springtails							
VP-29	VP-29		VP (a)		0								
VP-30	VP-30		VP (a)		12	Pseudocis egg masses							
VP-31	VP-31		VP (a)		12	Pseudocis egg masses							
VP-32	VP-32		VP (a)		7	Pseudocis egg masses							
VP-33	VP-33		U (a,e)	7	12+								
VP-34	VP-34	VP-6A (west)	VP (a)		6								
VP-35	VP-35	VP-6B	VS (a)	7	0								
VP-36	VP-36	VP-6A (east)	VP (a,b)		0								
VP-37	VP-37	VP-10A	VP (a)		2	springtails and coleopterans present							
VP-38	VP-38	VP-14A	VP (a)		0								
VP-39	VP-39	VP-20A	VP (a)		6								
VP-40	VP-40	VP-29A	VS (a)		neg								
VP-41	VP-41	VP-23B	SW (a)		1	no inverts							
VP-42	VP-42	VP-30A	VP (a)	7	5	Pseudocis egg masses							
VS-1	VS-1	VS-1	SW (a)		12+	Pseudocis egg masses							
VS-2	VS-2	VS-2	VP (a)		12+	Pseudocis egg masses							X
VS-2	VS-2	VS-2	VP (a)		7	Pseudocis egg masses							
VS-2	VS-2	VS-2	VP (a)		6	Pseudocis egg masses and springtails							
VS-2	VS-2	VS-2	VP (a)		12	Pseudocis egg masses							
VS-2	VS-2	VS-2	VS (a)		2	no inverts							
VS-3	VS-3	VS-3	SW (a)		neg								
VS-4	VS-4	VS-4	VS (a)		2	no inverts							

New JSA Polygon No.	Old JSA Polygon No.	MCS Poly- gon No.	Habitat Type	Coirpe Status	Max Depth (ft.)	Comments	Large Branchiopoda				Ostracoda	Copepoda		Cladocera
							Lepidurus packard	Branchinecta lynchi	Underella occidentalis	Cyzicus californicus		Calanoid	Cyclopoida	
VP-1			VP (a)		4						X		X	X
VP-2			VP (a)		6								X	X
VP-3			VP (a)		5	treeing tadpoles					X			
VP-4			VP (a)		neg									
VP-5			VP (a)		4.5						X			
VP-6			VP (a)	7	0									
VP-7			VP (a,g)		0									
VP-8		A	SW (a,e)		12+						X	X	X	X
VP-9		B	SW (a,e)		9			X			X	X	X	X
VP-10		C	SW (a,e)		12+						X	X	X	X
VP-11			SW (a,e)		6	treeing tadpoles		X			X	X	X	
VP-12			VP (a,n)		5	treeing tadpoles					X			X
VP-13			VP (a)		0									
VP-14			VP (a)		4	treeing tadpoles					X			
VP-15			VP (a)		neg									
VP-16			VP (a)		0									
VP-17			VP (a)		neg									
VP-18			VP (a)		0									
VP-19			VP (a)		4						X			
VP-20			VP (a)		4						X			
VP-21			U (a,e)	7	12+						X	X	X	
VP-22	not prev. mapped		VP (a)		neg									
VP-23			VS (a,b)	7	neg									
VP-24			VS (a)		neg									
VP-25	not prev. mapped		VP (a,n)		neg									
VP-26	not prev. mapped		VP (a,n)		neg									
VP-27			VP (a)		0									
VP-28			VP (a)		3									
VP-29			VP (a)		0									
VP-30			VP (a)		12+	treeing tadpoles		X (few)			X	X	X	X
VP-31			VP (a)		6+	connected to pond								
VP-32			VP (a)		7	treeing tadpoles					X		X	X
VP-33			U (a,e)	7	12+	treeing tadpoles					X	X	X	X
VP-34			VP (a)		6	treeing tadpoles					X	X	X	X
VP-35			VS (a)	7	0	treeing tadpoles								
VP-36			VP (a,b)		0									
VP-37			VP (a)		1.5						X		X	
VP-38			VP (a)		neg									
VP-39			VP (a)		6						X	X	X	
VP-40			VS (a)		0									
VP-41			SW (a)		0									
VP-42			VP (a)	7	neg									
VS-1			SW (a)		6	treeing tadpoles								
VS-2		F	VP (a)		6	treeing tadpoles					X	X	X	X
VS-2		G	VP (a)		11	treeing tadpoles					X	X	X	X
VS-2		D	VP (a)		7	treeing tadpoles					X	X	X	X
VS-2		E	VP (a)		5	treeing tadpoles					X	X	X	X
VS-2			VS (a)		neg									
VS-3			SW (a)		2	none								
VS-4			VS (a)		neg									

Pests										Beneficials				Unrecorded
Coleoptera			Hemiptera		Ephemeroptera		Odonata		Diptera		Lymnaeidae	Physidae	Planorbidae	Macro- tubularian
Dytiscidae	Hydrophilidae	Berosus sp.	Hydrophilidae	Notonectidae	Corbidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae				
														X

New JSA Polygon No.	Old JSA Polygon No.	MOS Polygon No.	Habitat Type	Corpe Status	Max. Depth (m.)	Comments	Large Branchiopoda					Copepoda		Cladocera
							Lepidurus packard	Branchinecta lynchi	Limnadia occidentalis	Cyclops californicus	Ostracoda	Calanoid	Cyclopoda	
VP-1	VP-1		VP (a)		neg.									
VP-2	VP-2		VP (a)		6							X		
VP-3	VP-3		VP (a)		3	predaceous diving beetles					X			X
VP-4	VP-4		VP (a)		0									
VP-5	VP-5		VP (a)		0									
VP-6	VP-6		VP (a)	7	0									
VP-7	VP-7		VP (a)		0									
VP-8	VP-8	A	SW (a,e)		>12	Pseudocric tadpoles								X
VP-8	VP-8	B	SW (a,e)		10	Pseudocric tadpoles						X		X
VP-8	VP-8	C	SW (a,e)		>12	Pseudocric tadpoles								X
VP-9	VP-9		SW (a,e)	7	0									
VP-10	VP-10		SW (a,e)		2.5	Pseudocric tadpoles, beetle larvae					X			X
VP-11	VP-11		VP (a)		0									
VP-12	VP-12		VP (a)		0									
VP-13	VP-13		VP (a)		0									
VP-14	VP-14		VP (a)		3	Pseudocric tadpoles							X	X
VP-15	VP-15		VP (a)		0									
VP-16	VP-16		VP (a)		0									
VP-17	VP-17		VP (a)		0									
VP-18	VP-18		VP (a)		0									
VP-19	VP-19		VP (a)		2.5						X		X	
VP-20	VP-20		VP (a)		0									
VP-21	VP-21		U (a,e)		>12									
VP-22	not prev. mapped		VP (a)		8	pseudocric tadpoles					X		X	
VP-23	VP-23		VS (a,b)	7	0						X		X	
VP-24	VP-24		VS (a)		neg.									
VP-25	not prev. mapped		VP (a,r)		neg.									
VP-26	not prev. mapped		VP (a,r)		neg.									
VP-27	VP-27		VP (a)		0									
VP-28	VP-28		VP (a)		0									
VP-29	VP-29		VP (a)		0									
VP-30	VP-30		VP (a)		10	pseudocric scymnases and tadpoles connected to pond						X		X
VP-31	VP-31		VP (a)		5						X			
VP-32	VP-32		VP (a)		0									
VP-33	VP-33		U (a,e)	7	>12	predaceous diving beetles				X				X
VP-34	VP-34	VP-6A (was)	VP (a)		6	Pseudocric tadpoles and pred. Diving beetle larvae					X		X	X
VP-35	VP-35	VP-4B	VS (a)	7	0									
VP-36	VP-6A (was)		VP (a,b)		0									
VP-37	VP-10A		VP (a)		neg.									
VP-38	VP-14A		VP (a)		0									
VP-39	VP-20A		VP (a)		0									
VP-40	VP-23A		VS (a)		neg.									
VP-41	VP-23B		SW (a)		0									
VP-42	VP-30A		VP (a)	7	0									
VS-1	VS-1		SW (a)		8	Pseudocric tadpoles					X			X
VS-2	VS-2	F	VP (a)		10	Pseudocric tadpoles, beetle larvae					X		X	X
VS-2	VS-2	G	VP (a)		7	Pseudocric tadpoles					X		X	X
VS-2	VS-2	D	VP (a)		9	Pseudocric tadpoles					X			X
VS-2	VS-2	E	VP (a)		4.5						X			X
VS-2	VS-2		VS (a)		0									
VS-3	VS-3		SW (a)		neg.									
VS-4	VS-4		VS (a)		0									

[illegible]

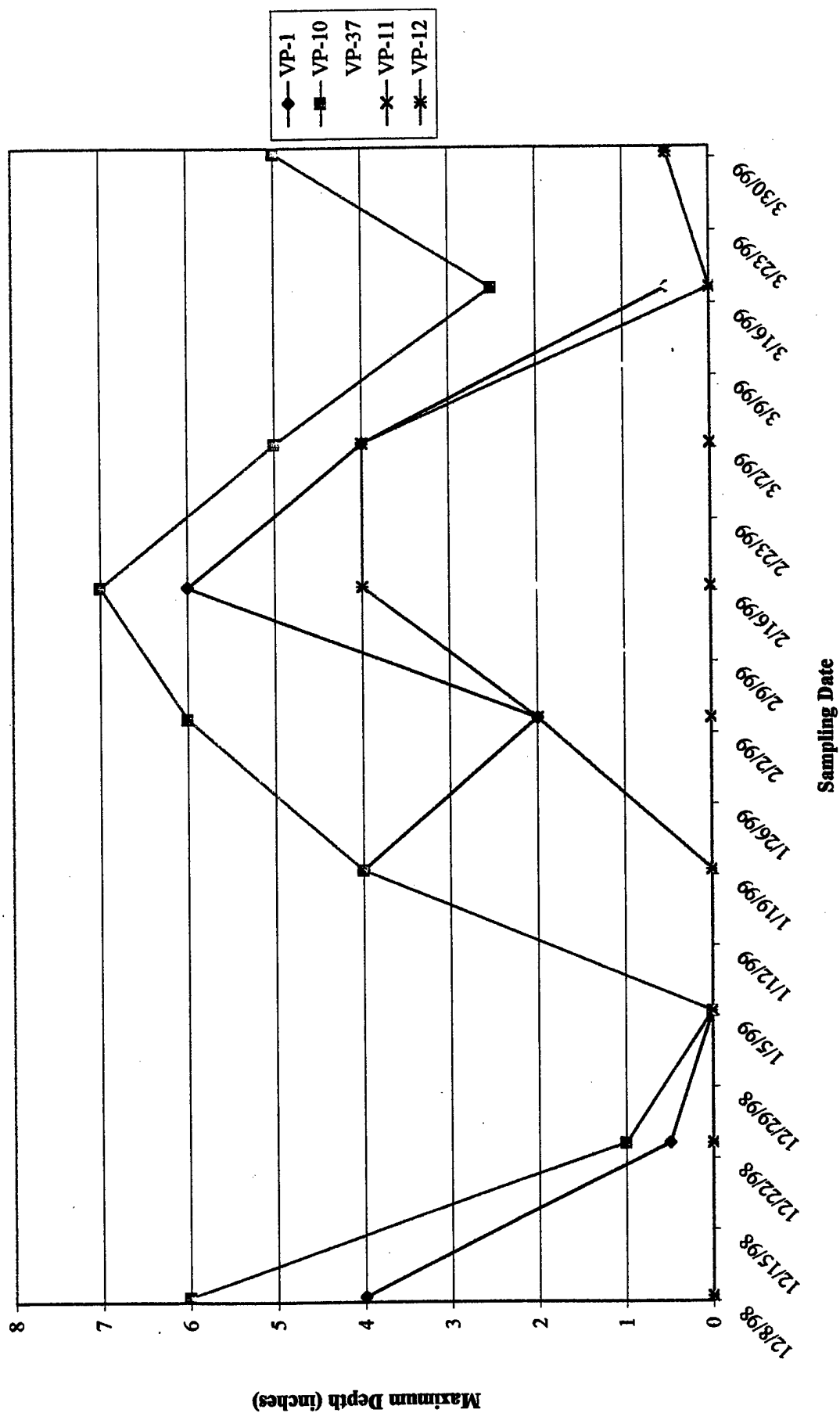
New JSA Polygon No.	Old JSA Polygon No.	MCS Poly- gon No.	Habitat Type	Corpe Status	Max. Depth (ft.)	Comments	Large Branchiopoda					Copepoda		Cladocera
							Lepidurus perford	Branchinecta lynchi	Lindaliella occidentalis	Cyrtus californicus	Ostracoda	Calanoid	Cyclopoid	
VP-1	VP-1		VP (a)		neg.									
VP-2	VP-2		VP (a)		6	predaceous diving beetles								x
VP-3	VP-3		VP (a)		8	predaceous diving beetles								x
VP-4	VP-4		VP (a)		4									x
VP-5	VP-5		VP (a)		6						x			x
VP-6	VP-6		VP (a)	?	0									
VP-7	VP-7		VP (a,b)		0									
VP-8	VP-8	A	SW (a,e)		>12	Pseudocoris tadpoles, beetle larvae								x
VP-8	VP-8	B	SW (a,e)		10	Pseudocoris tadpoles					x	x		x
VP-8	VP-8	C	SW (a,e)		>12	Pseudocoris tadpoles, Predaceous diving beetle larvae					x	x		x
VP-9	VP-9		SW (a,e)	?	6									
VP-10	VP-10		VP (a,n)		5	Pseudocoris tadpoles, beetle larvae								
VP-11	VP-11		VP (a)		neg.									
VP-12	VP-12		VP (a)		neg.									
VP-13	VP-13		VP (a)		0									
VP-14	VP-14		VP (a)		10	predaceous diving beetles								x
VP-15	VP-15		VP (a)		neg.									
VP-16	VP-16		VP (a)		neg.									
VP-17	VP-17		VP (a)		0									
VP-18	VP-18		VP (a)		0									
VP-19	VP-19		VP (a)		2						x			
VP-20	VP-20		VP (a)		4						x			
VP-21	VP-21		U (a,e)		>12	predaceous diving beetles					x	x		
VP-22	not prev. mapped		VP (a)		neg.									
VP-23	VP-23		VS (a,b)	?	0									
VP-24	VP-24		VS (a)		0									
VP-25	not prev. mapped		VP (a,n)		0									
VP-26	not prev. mapped		VP (a,n)		0									
VP-27	VP-27		VP (a)		0									
VP-28	VP-28		VP (a)		0									
VP-29	VP-29		VP (a)		0									
VP-30	VP-30		VP (a)		10	pseudocoris egg masses and tadpoles, pred. Div. Beetles						x		
VP-31	VP-31		VP (a)		6	connected to pond								
VP-32	VP-32		VP (a)		7						x	x		x
VP-33	VP-11A		U (a,e)	?	>12						x	x		
VP-34	VP-6A (west)		VS (a)		8	Pseudocoris tadpoles and pred. Diving beetle larvae					x			
VP-35	VP-8B		VS (a)	?	0									
VP-36	VP-6A (east)		VP (a,b)		0									
VP-37	VP-10A		VP (a)		neg.									
VP-38	VP-14A		VP (a)		0									
VP-39	VP-20A		VP (a)		0									
VP-40	VP-23A		VS (a)		0									
VP-41	VP-23B		SW (a)		0									
VP-42	VP-30A		VP (a)	?	0									
VS-1	VS-1		SW (a)		8	damaged flies					x			
VS-2	VS-2	F	VP (a)		10	Pseudocoris tadpoles					x			x
VS-2	VS-2	G	VP (a)		8	Pseudocoris tadpoles, Predaceous diving beetle larvae					x			x
VS-2	VS-2	D	VP (a)		8.5	Pseudocoris tadpoles, damaged fly					x			x
VS-2	VS-2	E	VP (a)		4	Pseudocoris tadpoles					x			x
VS-2	VS-2		VS (a)		0									
VS-3	VS-3		SW (a)		0									
VS-4	VS-4		VS (a)		0									

[illegible]

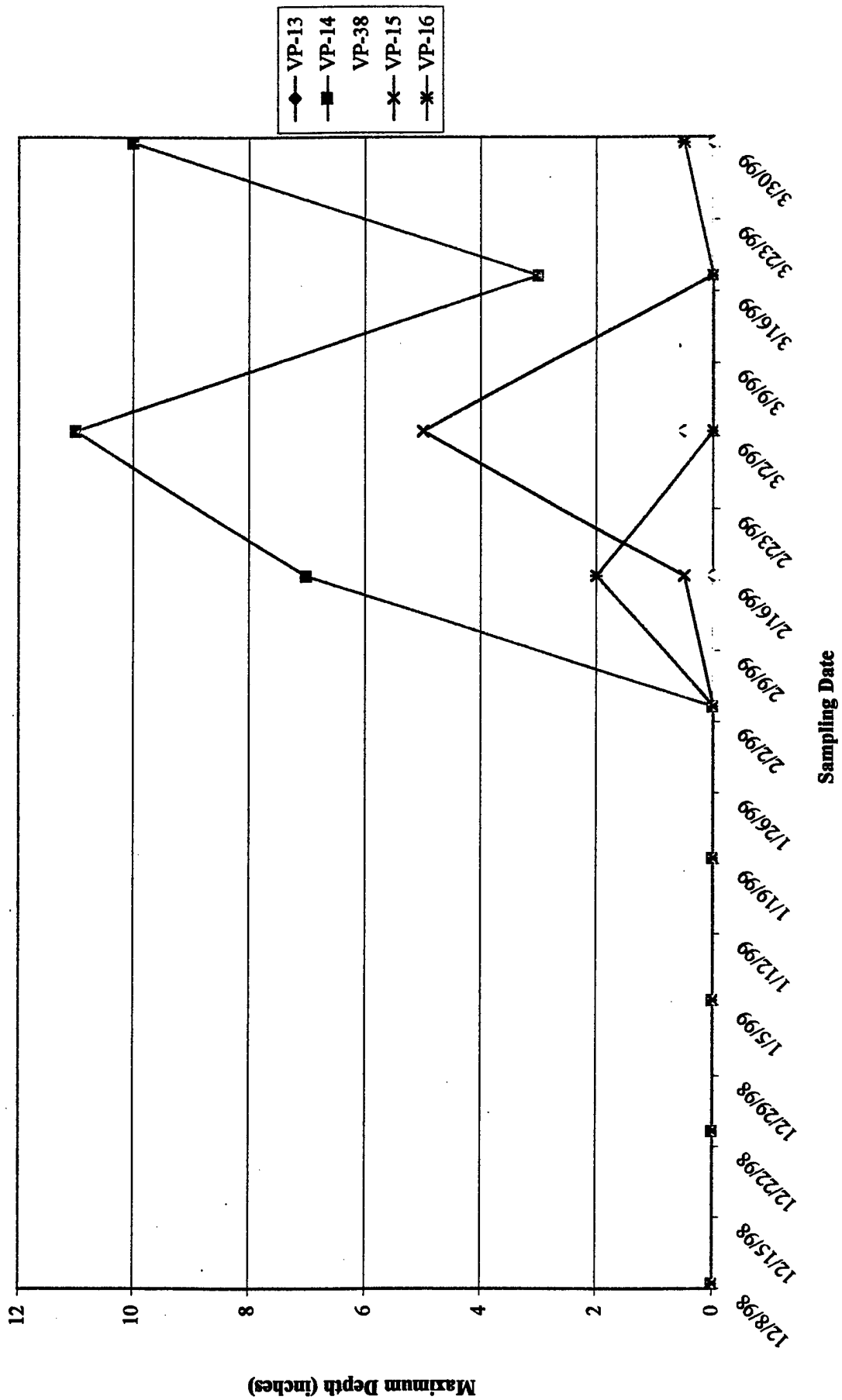
APPENDIX B.

**INUNDATION DEPTHS AND DURATIONS OF SEASONAL WETLANDS AT THE
BURKE PROPERTY, TRAVIS AFB DURING 1998-99 WINTER FIELD SURVEYS.**

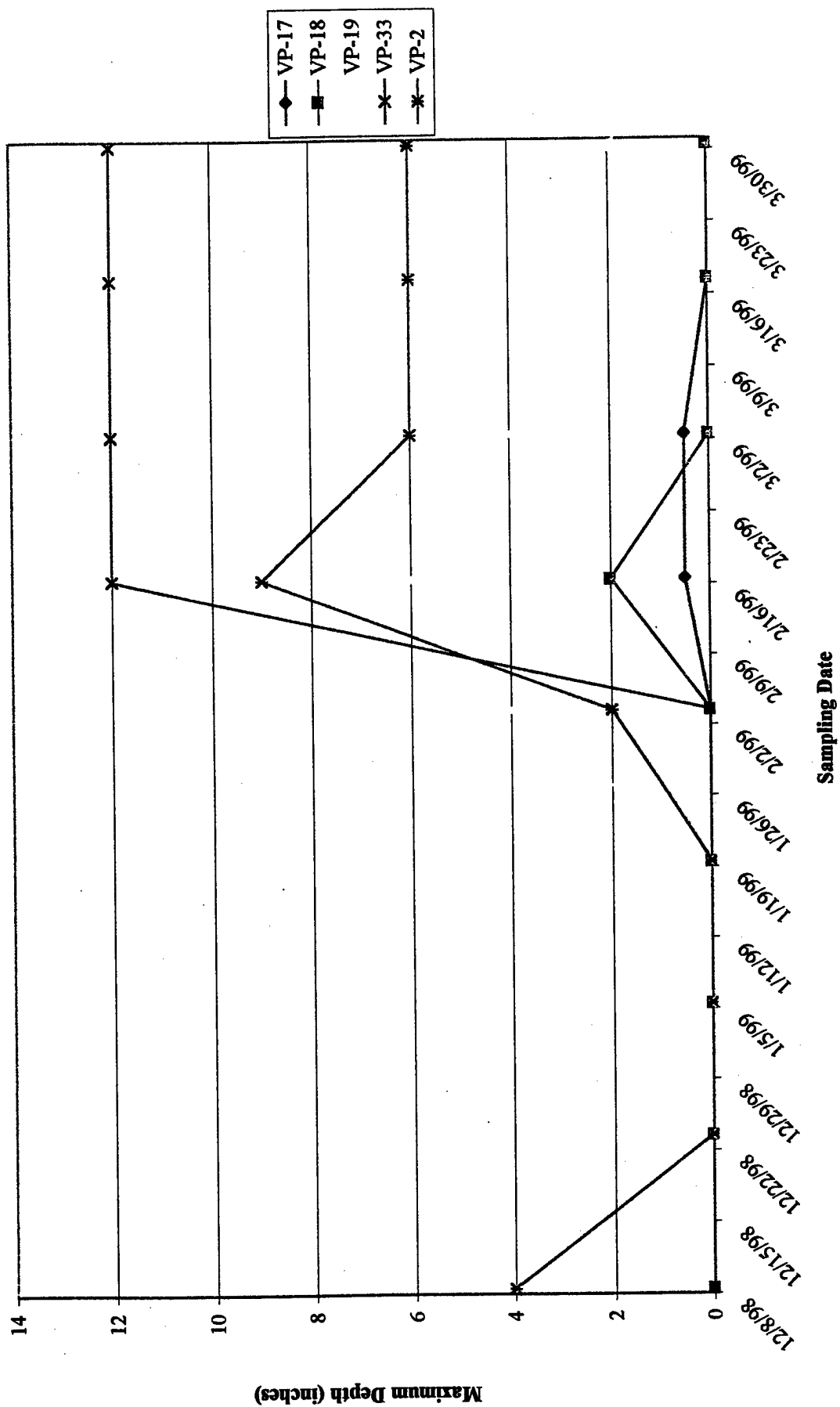
Inundation Depths and Ponding Durations of Seasonal Wetlands at the Burke Property, Travis Air Force Base



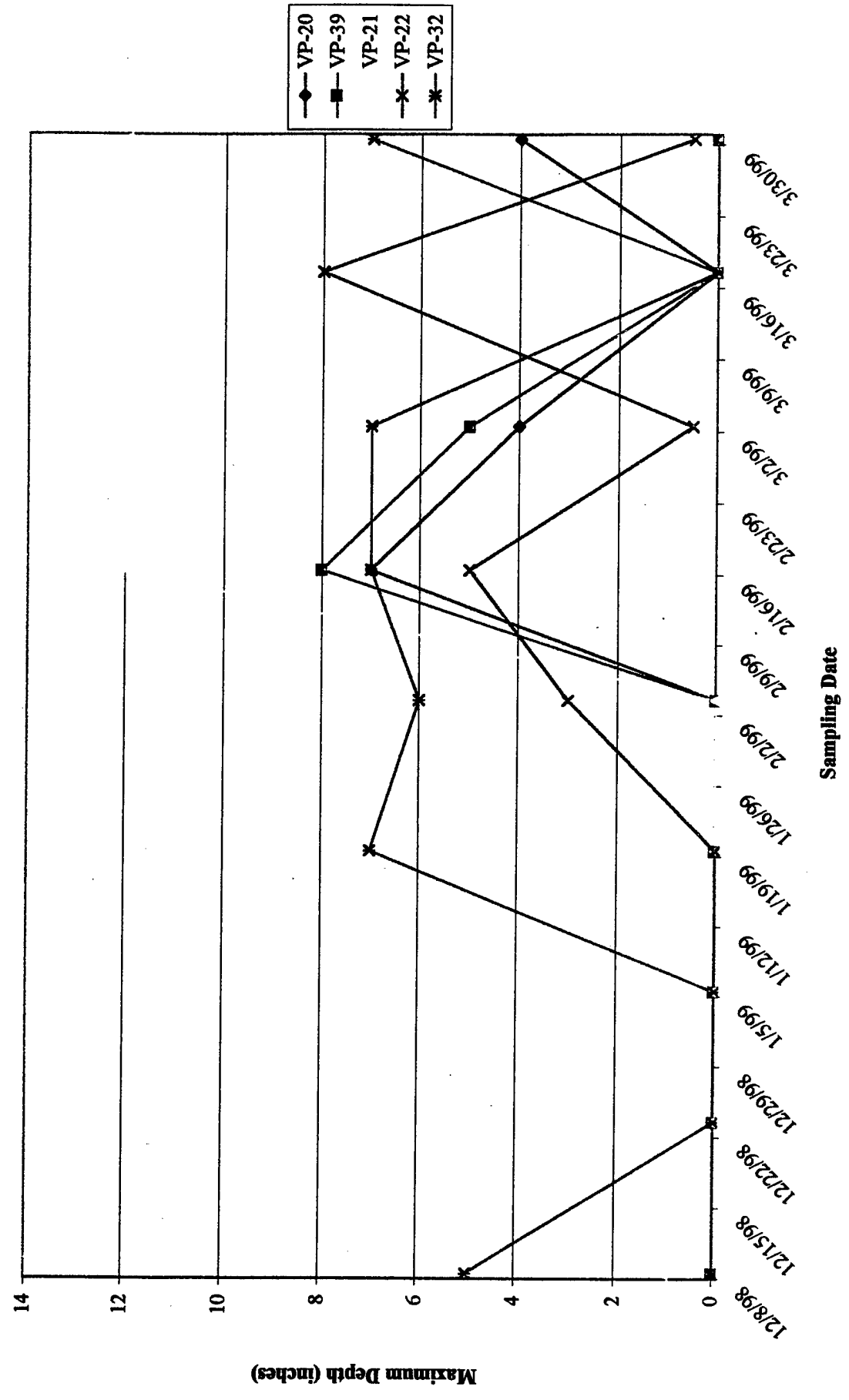
Inundation Depths and Ponding Durations of Seasonal Wetlands at the Burke Property, Travis Air Force Base



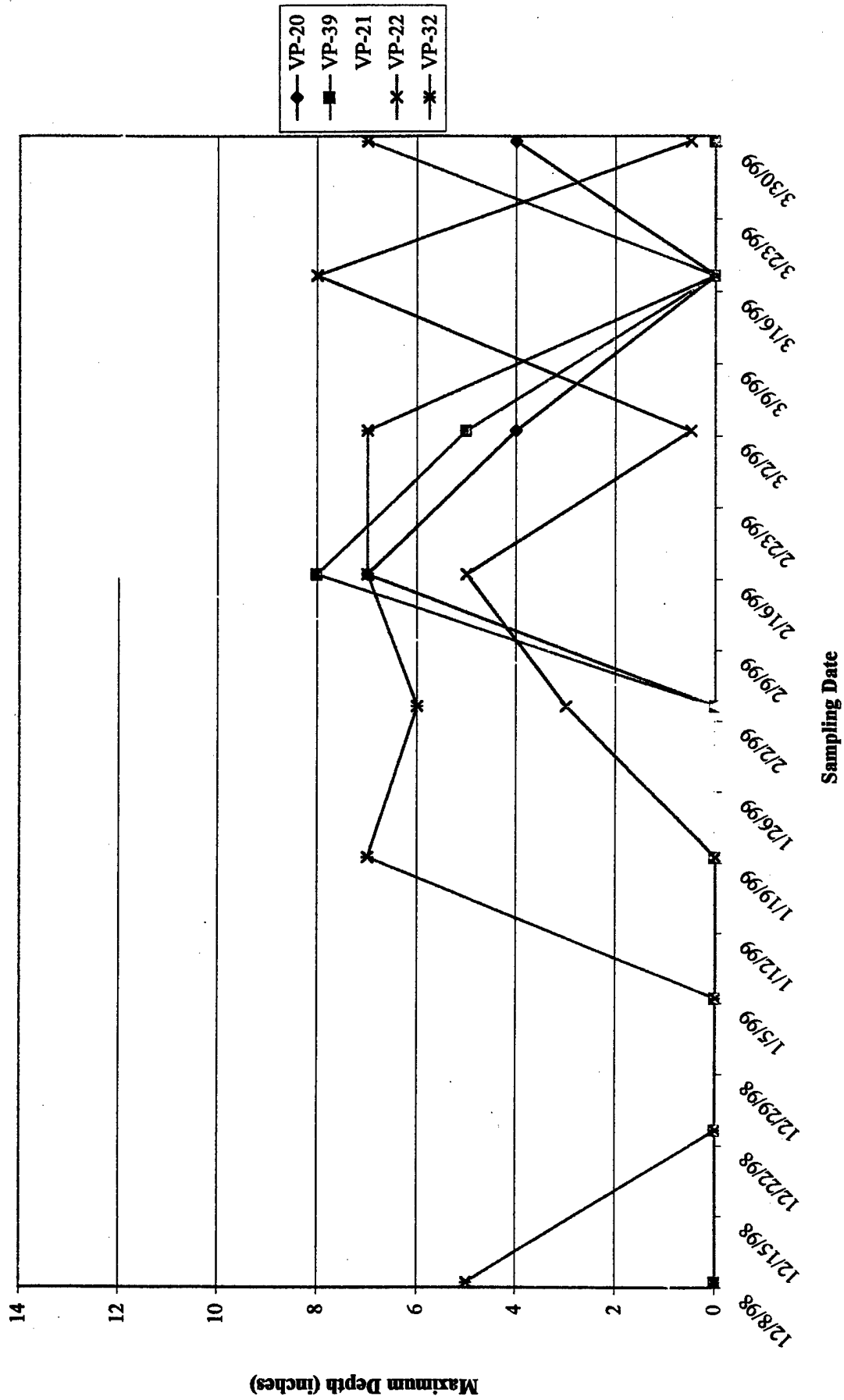
Inundations Depths and Ponding Durations of Seasonal Wetlands at the Burke Property, Travis Air Force Base



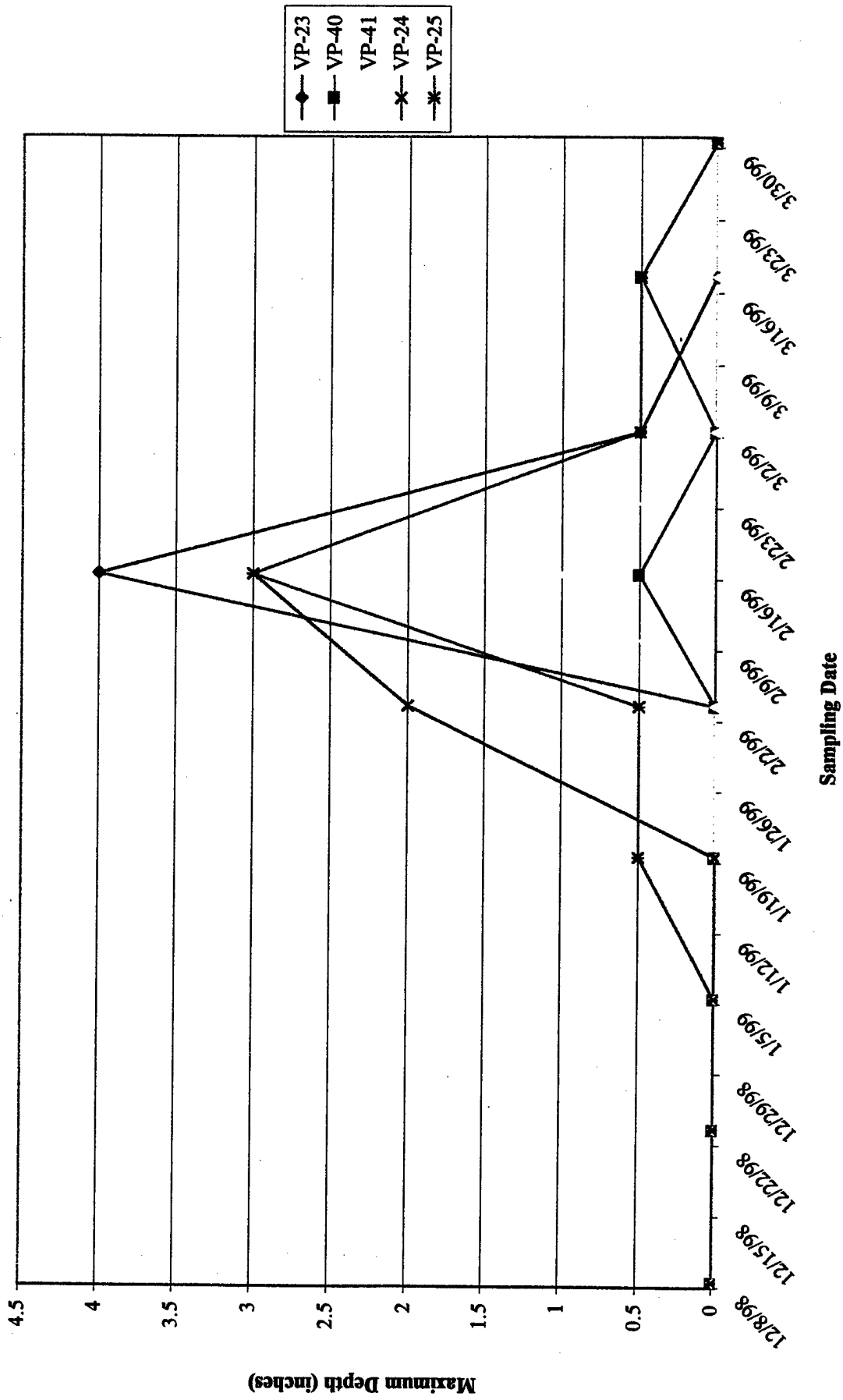
Inundation Depths and Ponding Durations of Seasonal Wetlands at the Burke Property, Travis Air Force Base



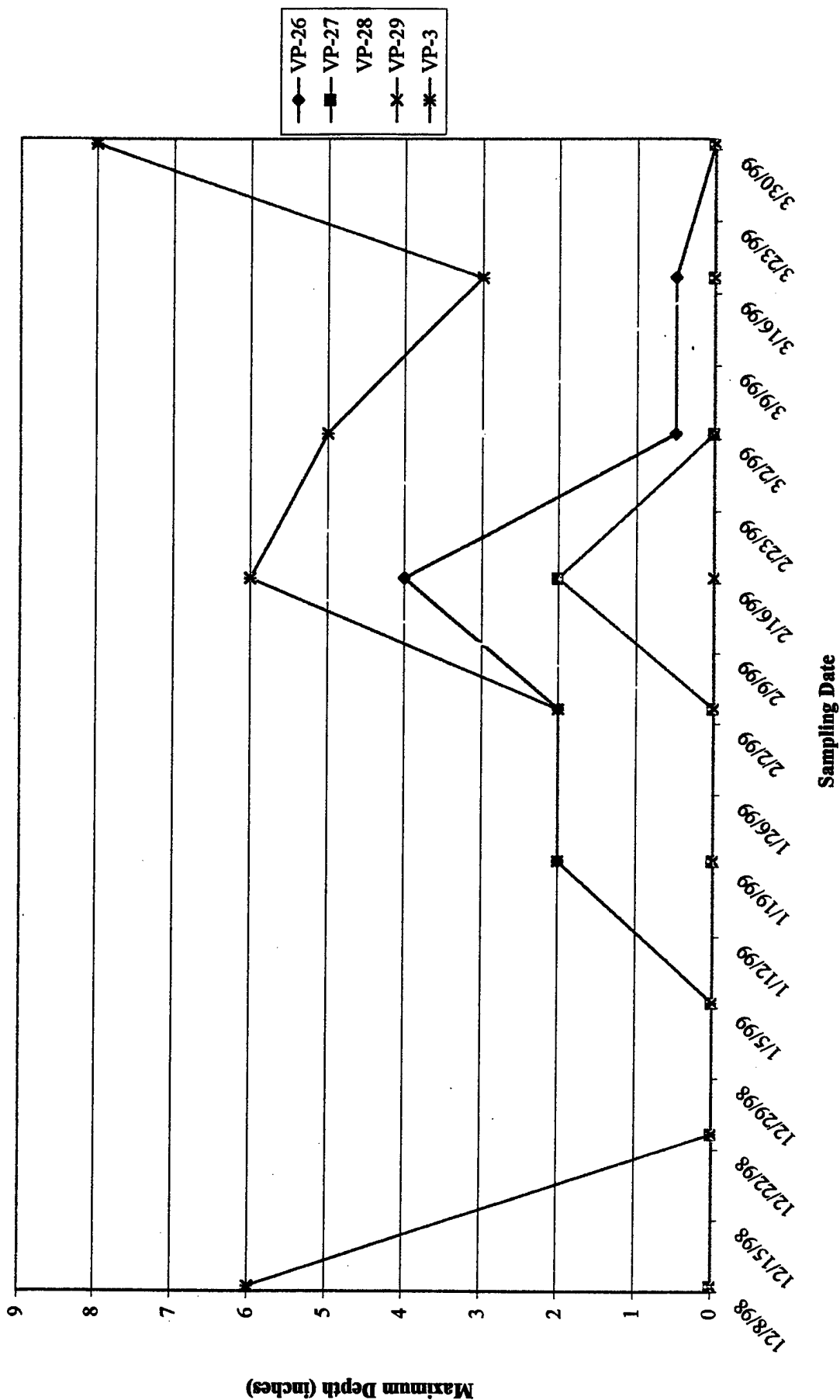
Inundation Depths and Ponding Durations of Seasonal Wetlands at the Burke Property, Travis Air Force Base



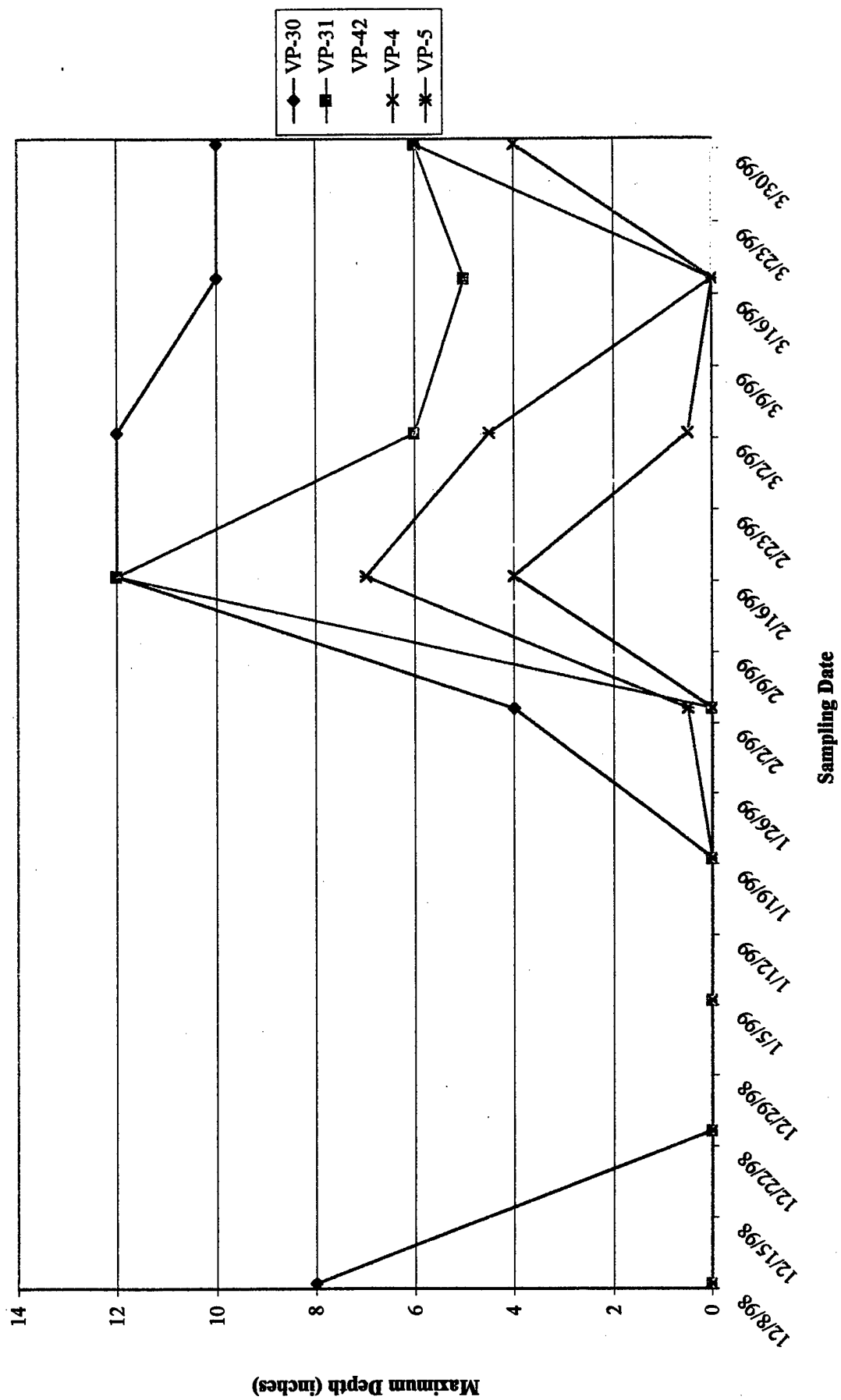
Inundation Depths and Ponding Durations of Seasonal Wetlands at the Burke Property, Travis Air Force Base



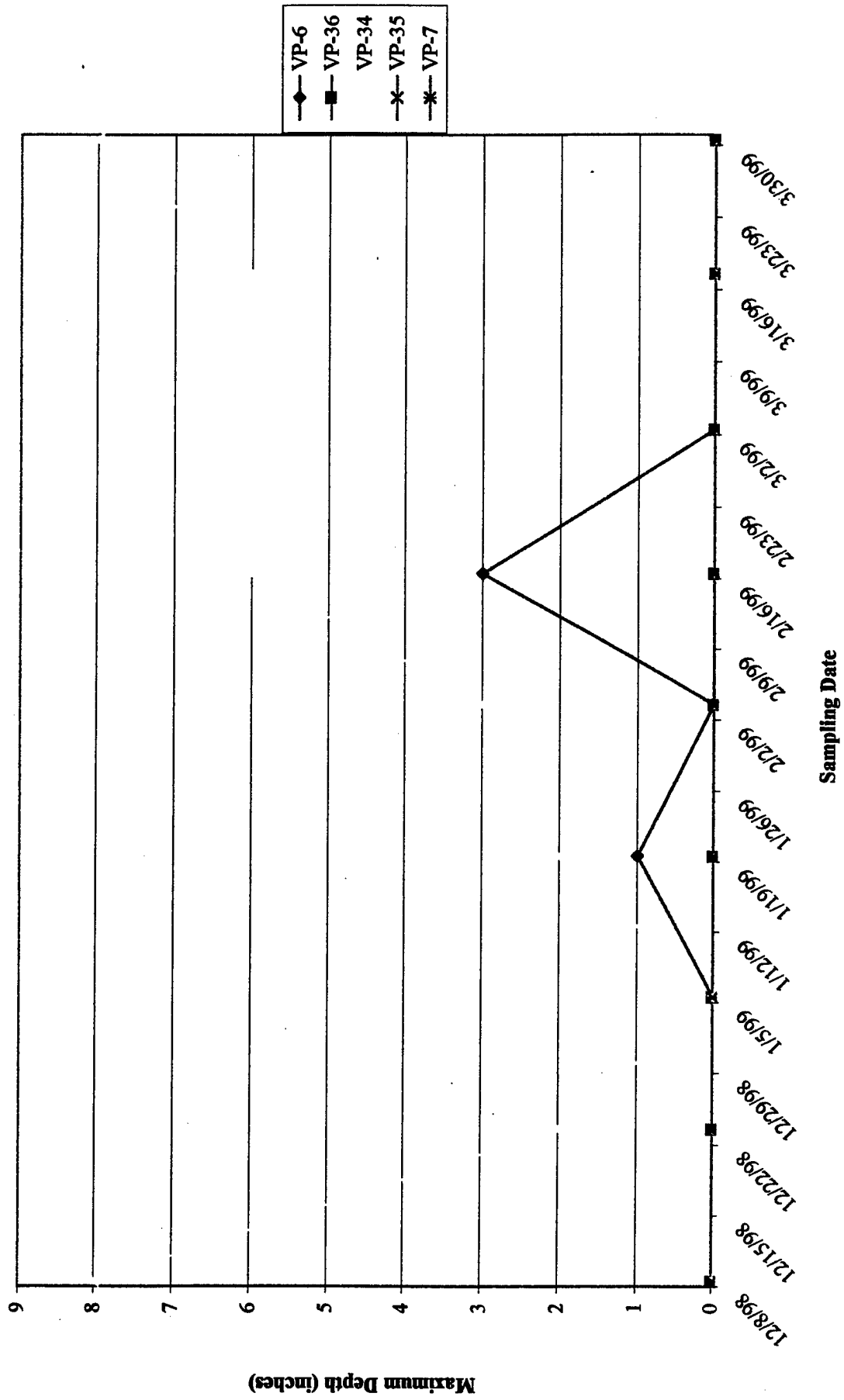
Inundation Depths and Ponding Durations of Seasonal Wetlands at the Burke Property, Travis Air Force Base



Inundation Depths and Ponding Durations of Seasonal Wetlands at the Burke Propoerty, Travis Air Force Base



Inundation Depths and Ponding Durations of Seasonal Wetlands at the Burke Property, Travis Air Force Base



APPENDIX C.

VERTEBRATE SPECIES OBSERVED AT THE BURKE PROPERTY, TRAVIS AFB DURING 1998-99 WINTER FIELD SURVEYS.

Common Name**Scientific Name****Mammals**

Blacktail hare
Botta's pocket gopher
California ground squirrel
Coyote
Deer mouse
Feral cat
Raccoon
Striped skunk

Lepus californicus
Thomomys bottae
Spermophilus beecheyi
Canis latrans
Peromyscus maniculatus
Felis catus
Procyon lotor
Mephitis mephitis

Birds

American kestrel
American robin
Barn swallow
Black phoebe
Brewer's blackbird
Bufflehead
Canada goose
Common snipe
European starling
Greater yellowlegs
Great blue heron
Great egret
Horned lark
House finch
Killdeer
Mallard
Mourning dove
Northern flicker
Northern mockingbird
Pied-billed grebe
Red-tailed hawk
Ring-necked duck
Savannah sparrow
Scrub jay
Song sparrow
Turkey vulture
Western kingbird
Western meadowlark
White crowned sparrow
Wood duck

Falco sparverius
Turdus migratorius
Hirundo rustica
Sayornis nigricans
Euphagus cyanocephalus
Bucephala albeola
Branta canadensis
Gallinago gallinago
Sturnus vulgaris
Tringa melanoleuca
Ardea herodias
Casmerodius albus
Eremophila alpestris
Carpodacus mexicanus
Charadrius vociferus
Anas platyrhynchos
Zenaida macroura
Colaptes auratus
Mimus polyglottos
Podilymbus podiceps
Buteo jamaicensis
Aythya collaris
Passerculus sandwichensis
Aphelocoma coerulescens
Melospiza melodia
Cathartes aura
Tyrannus verticalis
Sturnella neglecta
Zonotrichia leucophyllus
Aix sponsa

Common Name**Scientific Name****Reptiles**

Western fence lizard

*Sceloporus occidentalis***Amphibians**

Bullfrog

Rana catesbeiana

Pacific chorus frog

Pseudacris regilla

Western toad

Bufo boreas

APPENDIX D.

**REPRESENTATIVE PHOTOGRAPHS OF THE BURKE PROPERTY, TRAVIS AFB
DURING 1998-99 WINTER FIELD SURVEYS.**



Northwest view of northwest corner of project site containing pond 5.



Southeast view of vernal swale 2 and vernal pool 10



West view of vernal pool 8 (MCS VP-8A)



Southeast view of southeast corner of the project site



Northeast view of northeast corner of project site containing pond 4



Northern view of north central portion of project site from VP-21

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APPENDIX C
Archaeological Investigation for the Burke Property,
Travis AFB, California

**ARCHAEOLOGICAL INVESTIGATION
FOR THE BURKE PROPERTY**

NOVEMBER 1998

TRAVIS AIR FORCE BASE, CALIFORNIA

Prepared by:

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ABSTRACT

A reconnaissance was conducted on the 100-acre Burke Property at Travis Air Force Base on 22 September 1998 by Earth Tech personnel. One area was recommended for further investigation. Based on historic maps for the property, it was believed that a burned house site was situated on the southwestern portion of the property. This site was recorded by Earth Tech personnel on 5 October 1998. During the reconnaissance and site recordation, data was collected to support a recommendation of noneligibility for the site on the Burke Property. Black and white photographs were made of the site and associated disturbances. Much of the site's integrity has been destroyed due to extensive agricultural use, dumping, and quarrying activities. It is unlikely that any useful information regarding the site or the history of the property would result from further investigations. Therefore, given the extent of the disturbance on the Burke Property, no further archaeological work is recommended on the site or the Burke Property as a whole.

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LIST OF ACRONYMS

AAB	Army Air Base
AAF	Army Air Field
ADC	Air Defense Command
AFB	Air Force Base
AFI	Air Force Instruction
AFSWP	Armed Forces Special Weapons Project
Ag.	Agriculture
AIRFA	American Indian Religious Freedom Act
APE	Area of Potential Effect
ATC	Air Transport Command
AMW	Air Mobility Wing
B.C.	Before Christ
CA-CCO	California-Contra Costa County
CA-SOL	California-Solano County
CES	Civil Engineering Squadron
CFR	Code of Federal Regulations
Council	Advisory Council on Historic Preservation
DoD	Department of Defense
EM	Environmental Management
I-80	Interstate 80
Lt.	Lieutenant
MATS	Military Air Transport Service
NAGPRA	Native American Graves Protection and Repatriation Act
National Register	National Register of Historic Places
n.d.	no date
NHPA	National Historic Preservation Act
NPS	National Park Service
PVC	polyvinyl chloride
SAC	Strategic Air Command
SHPO	State Historic Preservation Office
60AW/EM	60th Air Mobility Wing, Environmental Management
UC	University of California
US	United States
USGS	United States Geological Survey

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1.0 INTRODUCTION

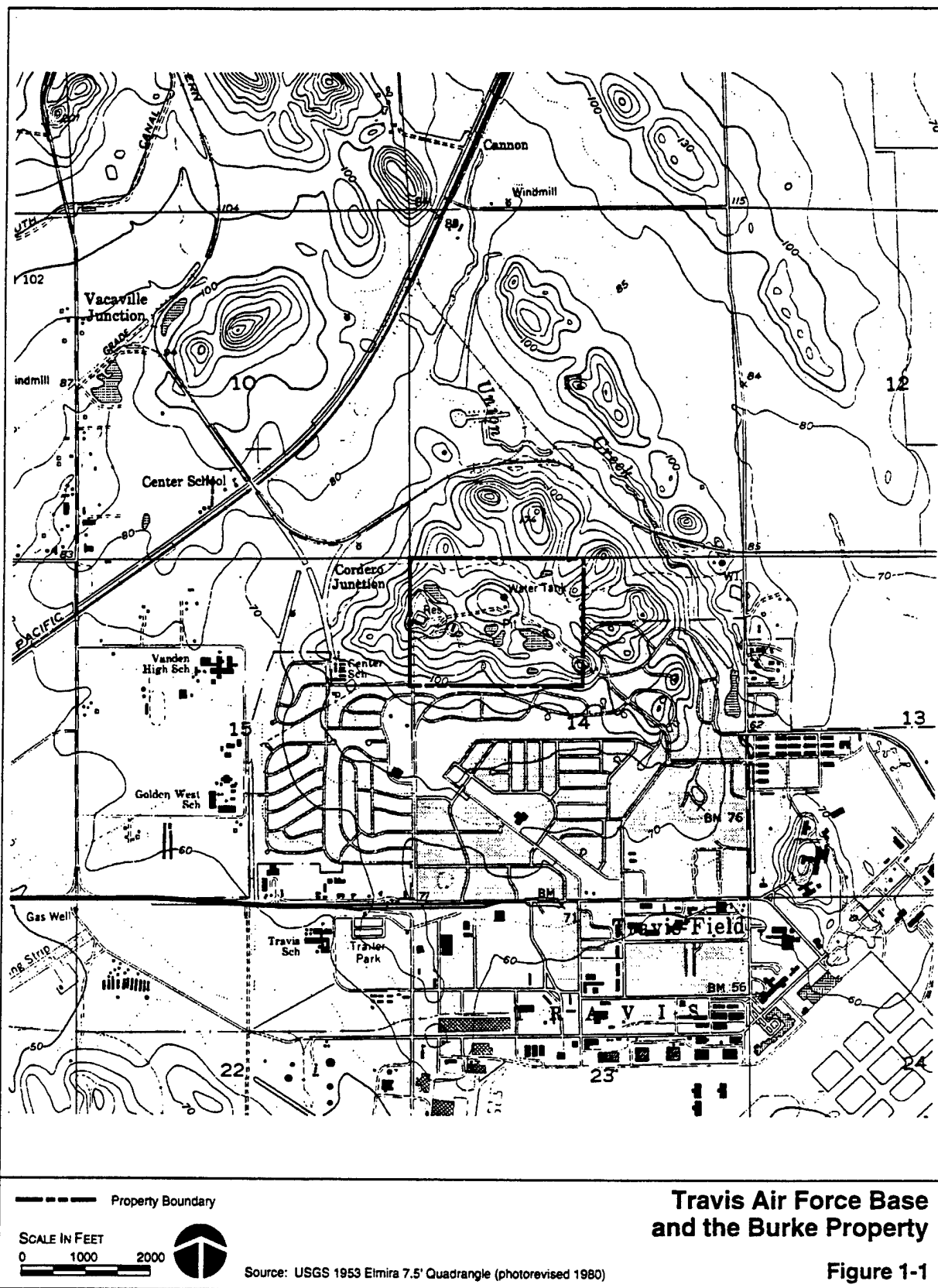
1.1 LOCATION/STUDY AREA

This technical report has been prepared to outline the theoretical and methodological approach for the archaeological reconnaissance investigation for the 100-acre Burke Property, which is situated on the northern base boundary of Travis Air Force Base (AFB), Solano, County, and to describe the results of the site recordation for a homestead situated on the southwest portion of the Burke Property.

Travis AFB is situated within the city limits of Fairfield, California. It is in Solano County, in the Sacramento Valley. The base is readily accessible via Interstate 80 (I-80), which connects the cities of Sacramento and San Francisco. Currently, Travis AFB is planning use alternatives for a recently acquired parcel of land adjacent to the northern base boundary, known as the Burke Property. One plan calls for the construction of 384 single-family residential units, which would support the transfer of up to 830 full-time military personnel to the installation.

The Burke Property is situated in Section 14, Township 5 North, Range 1 West, U.S. Geological Survey (USGS) Elmira, California, 7.5' Quadrangle (Photorevised 1980). It is recorded in the Solano County Assessor's office as Parcel Number 4, Book 174 (Figure 1-1). It contains approximately 101.06 acres and is bordered by military housing on both the south and east. The property may be accessed via a gated entrance to the northwest of the Travis AFB/City of Vallejo Water Treatment Plant property. In the center of the property are two large water holding tanks and a small building, all enclosed within a fence.

The Burke Property was previously used as a borrow site and sandstone quarry. It currently has depressions, reaching depths of 30 feet, that coincide with two borrow pit or mining locations, one in the southeastern portion and one in the northwestern portion. It is possible that four of the five ponds on the property were also the result of borrow pit or mining excavation. Several of these ponds are surrounded by large eucalyptus trees. Additionally, the site was utilized as a landfill by Kaweah Construction Company in 1993 (Air Mobility Command 1994a). A water main has also been constructed through the middle of the site; it is operated by the City of Vallejo and Travis AFB. According to historic documents provided by the 60th Air Mobility Wing, Environmental Management (60AW/EM), a homestead site is believed to have been situated in an area surrounded by eucalyptus trees. The property is currently being used for livestock grazing.



1.2 LEGISLATIVE REQUIREMENTS

Numerous laws and regulations require federal agencies to consider the effects of a proposed project on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationships among other involved agencies (e.g., State Historic Preservation Officer [SHPO], the Advisory Council on Historic Preservation [Council]).

Ideally, compliance with requirements of cultural resources laws and regulations consists of five steps: (1) identification of cultural resources that could be affected by the proposed action or its alternatives; (2) assessment of the impacts or effects of these actions; (3) determination of significance of potential historic properties within a region of influence, or Area of Potential Effect (APE); (4) Council comment; and (5) development and implementation of measures to eliminate or reduce adverse effects. The primary law governing cultural resources is the National Historic Preservation Act (NHPA), which addresses the protection of historic properties.

Significant cultural resources, either prehistoric or historic in age, are referred to as historic properties. Under 36 Code of Federal Regulations (CFR) Part 800, historic properties are defined as

...any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places. This term includes, for the purposes of these regulations, artifacts, records, and remains that are related to and located within such properties. The term 'eligible for inclusion in the National Register' includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria.

Only historic properties, as defined under cultural resources legislation, are subject to protection or consideration by a federal agency.

According to National Register of Historic Places (National Register) criteria (36 Code of Federal Regulations Part 60.4), the quality of significance is present in districts, sites, buildings, and objects:

- (a) that are associated with events that have made a significant contribution to the broad patterns of history; or
- (b) that are associated with the lives of persons significant in the past; or
- (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant

and distinguishable entity whose components may lack individual distinction; or

- (d) that have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in or considered eligible for listing in the National Register, a cultural resource must meet at least one of the above criteria, and must also possess integrity of location, design, setting, material, workmanship, feeling, and association. Integrity is defined as the authenticity of a property's historic identity, as evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric occupation or use. If a resource retains the physical characteristics it possessed in the past, it has the capacity to convey information about a culture or a people, historical patterns, or architectural or engineering design and technology.

Transfer or conveyance of federal lands that may contain historic properties is considered an undertaking under the NHPA. The Air Force must, therefore, comply with Section 106 of the NHPA and Council regulations implementing Section 106 (36 Code of Federal Regulations Part 800). As a federal agency, the Air Force must also comply with Sections 110 and 111 of the NHPA. Under these requirements, the Air Force:

- Assumes responsibilities for the preservation of historic properties under its control.
- Exercises caution to ensure that historic properties are not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly.
- Takes into account the effects of its undertakings on historic properties and affords the Council a reasonable opportunity to comment on such undertakings. In addition, the proposed action must comply with Air Force Instruction (AFI) 32-7065, which implements Air Force Policy Directive 32-70, Environmental Quality; and Department of Defense (DoD) Directive 4710.1, Archaeological and Historic Resources Management.

These efforts are aimed at protecting all sensitive cultural resources in the United States and its territories and possessions.

1.3 NATIVE AMERICAN CONCERNS

Legislation pertaining to Native American concerns on federal lands consists of the American Indian Religious Freedom Act (AIRFA) and the Native American Graves Protection and Repatriation Act (NAGPRA). The Air Force has developed specific guidelines and regulations to address Native American concerns and the management of Traditional Resources (refer to Air Force

Instruction 32-7065). Traditional and sacred sites may include, but are not necessarily limited to:

- Burial grounds and graves
- Traditional resources (e.g., floral, faunal) gathering sites
- Spiritual and legendary sites
- Astronomical observatories
- Access to traditional and sacred resource sites.

Air Force policy stipulates that attempts to identify sites and areas of concern to Native Americans should be accomplished during the earliest stages of project planning. These efforts serve to avoid unnecessary impacts to sensitive sites and associated traditional practices.

Examples of sites of religious or cultural importance to Native Americans include mountain peaks, springs, prehistoric archaeological sites and artifacts, native plant gathering areas, and sources for materials used in the sites that may have archaeological manifestations. There is, however, a possibility that a culturally important area will not contain any physical manifestations or archaeological features or artifacts. In these instances, it is important to distinguish cultural importance from archaeological significance. Archaeological sites lacking significance under federal law (36 Code of Federal Regulations Part 60.4) may nevertheless be culturally important; many sensitive Native American sites will lack archaeological materials altogether (Air Force Instruction 32-7065).

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2.0 ENVIRONMENTAL SETTING

2.1 TOPOGRAPHY

Travis AFB is situated within the Suisun Delta of the Sacramento Valley. The terrain of the Burke Property is characteristic of the Suisun Delta, which comprises rolling hills and swales with wetland areas. The Burke Property also contains severely eroded gravelly loam soils, with loam soils in the northeast and a clay loam soil in the southwest (Soil Foundation Systems, Inc. 1990; University of California Ag. Experiment Station n.d.).

Much of the northern base property also contains several wetlands areas known as vernal pools. Vernal pools are associated with drainages, or vernal swales, that allow water runoff to flow into the pool basins and collect on the relatively impermeable surfaces. Additionally, the property has been subjected to borrow activities, which may account for the creation of the ponds and associated wetlands (Earth Tech 1998).

2.2 SOILS AND GEOLOGY

Ancient alluvium dominates the geological setting of Travis AFB. To the northern part of the base, sedimentary rock is present, while outcrops of the Tehama Formation are present in the southwestern part. The Tehama Formation is composed of a conglomerate of sand, silt, gravels, and calcium carbonate, which assists in forming rolling hills in the region. The remainder of the terrain is relatively flat, ranging from 20 to 160 feet above mean sea level. The soils are predominantly of the Antioch and San Ysidro series; they possess a thick, claylike subsoil and are formed in alluvium derived from sedimentary sources. Soils of this type are typically utilized for dry-farming sugar beets, small grains, and irrigated pastures. Uncultivated areas are dominated by grasses and forbs (Soil Conservation Service 1977 in Argonne National Laboratory 1996). Claypan soils, such as Capay and Solano series, give way to vernal pools in the area.

2.3 BIOTIC RESOURCES

2.3.1 Vegetation

Over 200 plant species were identified on the Burke Property during a May 1998 survey by Earth Tech (Earth Tech 1998). At least seven vegetation types or habitats and two additional non-vegetated habitats are supported by the Burke Property. Vegetated habitats on the property are vernal pools and swales, freshwater marsh and pond areas, riparian areas (drainages and streams), non-native grasslands, and landscaped areas. Non-vegetated habitats comprise unvegetated pools which may support fairy shrimp, and disturbed/developed areas that were enclosed within fences.

Native vegetation in the area typically includes fescue, foxtail, and brome grass, while native trees include valley oaks, live oaks, willows, and some cottonwoods. Due to historic settlement of the area, windbreaks comprising Monterey Cypress, non-native eucalyptus, and other trees have been planted. The majority of the landscape, however, is dominated by grassland, especially introduced species that have resulted from past agricultural activities such as livestock grazing and discing; construction activities (e.g., bulldozing, mining, grading, and excavation); and landscaping. Species occurring within grasslands on the Burke Property include barleys, bromes, star thistle, butter and eggs, and blue-eyed grass. Other species, such as salt grass, Baltic rush, meadow fescue, and cattails may be found within wetland areas on the property.

2.3.2 Wetlands

Approximately 31 vernal pools exist in the 100-acre parcel. The pools comprise small, shallow ponds or depressions that are seasonally inundated with water. Vernal pools support habitat for unique species, including fairy shrimp. Most of the artificial vernal pools, swales, and depressions on the Burke Property have been created through construction, dumping, and mining activities. Freshwater marshes also occur on the Burke Property, primarily around the edges of ponds or within swales. These marshes are characterized by cattails.

2.3.3 Landscaped Areas

Historic human use of the site probably accounts for the presence and success of various cultivars localized around historic use sites. Landscape species in the project area include blue gum, plum, apricot, velvet ash, and narrow-leafed firethorn (Earth Tech 1998).

2.3.4 Wildlife

The Burke Property has been historically used for livestock grazing. Grasslands provide habitats for pheasants, doves, California quail, songbirds, cottontail rabbits, and the common garter snake (Earth Tech 1998). Canada geese also frequent the wetland areas on the property.

3.0 CULTURAL SETTING

3.1 PREHISTORIC OVERVIEW

Situated within the delta subregion of the Central Valley Archaeological Region, the area of Travis AFB and the Burke Property provided prehistoric inhabitants a wealth of resources. Most of these cultures lived on hunting, gathering, and fishing. By the arrival of the Spaniards, many of these cultures had established the foundations of the early agricultural practices for the southwest.

3.1.1 Late Pleistocene and Early Holocene (10,000-6,000 Before Christ [B.C.])

Sites dating to this period are often near the sea coast, or old stream channels near estuaries, or on the fossil shores of ancient lakes and marshes (Moratto 1984:76). These sites typically yield evidence of a sophisticated lithic technology; specialized tools and associated faunal remains indicate that the early inhabitants exploited a wide range of both animal and plant life.

It is possible that the early inhabitants exploited, or traveled through, the area now occupied by Travis AFB. During this period, sea levels would have been significantly lower, and the Sacramento River would have flowed through the Suisun Bay area of the valley (Argonne National Laboratory 1996). As a result, any sites along the banks of the river would be covered in sediment or under water. Traces of early occupation may, however, be identified along tributary valleys and ravines that provide access to the river.

3.1.2 Pre-Early Horizon (6000-2500 B.C.) and Early Horizon (2500-1500 B.C.)

Although earlier sites have been recorded in the San Francisco Bay Region, the prehistory of the Suisun Delta usually begins with the Windmill Phase of the Central California Early Horizon (2500-1500 B.C.) (Argonne National Laboratory 1996). This period is characterized by an increasingly intense hunting and gathering culture. Also during this period, the population increased in size and tended to be less nomadic, relying more on plant resources. Populations to the west of the Sierra Nevada, possibly including those in the Travis AFB area, are believed to be Hokan speakers (Moratto 1984:546).

Typical artifacts associated with Early Horizon Sites include obsidian and chert projectile points, bone awls and needles, mortar fragments, and baked-clay balls, which are believed to be "cooking stones." Fishing spears, hooks, and possible net weights have also been identified, indicating a reliance on fishing in the area.

Faunal remains include salmon, sturgeon, smaller fishes, deer, elk, pronghorn, rabbits, and waterfowl. Decorative and ritual artifacts include polished stones of

marble, alabaster, and diorite. The Windmill tradition is representative of the arrival of the Utian language group from outside of California spreading into the Delta and East Bay Area to the south of Carquinez Strait (Moratto 1984:207, 550-553; Argonne National Laboratory 1996).

3.1.3 Middle Horizon (1500 B.C.-Anno Domini [A.D.] 500)

During the Middle Horizon Period, inhabitants of the Suisun Delta area and the San Francisco Bay Region shared cultural traits, indicating that both regions were inhabited by Western Miwok-speaking groups (Argonne National Laboratory 1996; Moratto 1984:279). Further, based on linguistic evidence, this culture reflected earlier Hokan and Utian cultures.

Also during this period, there was an increase in the population, and villages were established near freshwater streams rather than marshlands. Artifacts of this period include cobble mortars and pestles, and atlatl and darts that feature distinctive diagonal flaking of large concave base points (Argonne National Laboratory 1996; Moratto 1984:210). Although there is little evidence of a trade network for raw materials, there appears to have been trading of finished products. The polished stone industry becomes less important, but a bone industry emerges that includes decorative shell appliqué (Frederickson in Moratto 1984:278).

3.1.4 Late Horizon (A.D. 500-1900)

During this period, there was an increase of population density and social complexity, resulting from the village pattern established during the Middle Horizon period. By A.D. 700, at the time of the arrival of the ancestral Patwin into the Solano area, there is a distinctive set of cultural traits emerging among the cultures. The period also reflects intensive hunting, fishing, and gathering. Artifacts include the bow and arrow, the harpoon, Gunther barbed points, bone awls for basketry, shaped mortars and pestles, and pottery in the Central Valley.

By A.D. 1400, evidence of increased populations and social complexity is observed through a proliferation of settlements, elaborate ceremonialism, and an intensification of trade through the use of shell disk moneys. By the time of Spanish contact, the cultures had developed a proto-agricultural environment, focusing on techniques to manage both animal and plant resources.

3.2 HISTORIC OVERVIEW

The area that is now California drastically changed with the arrival of the Spaniards. Using the foundations for agriculture developed by the cultural groups, the Spaniards began establishing a system of missions. The Spaniards also transmitted deadly diseases that decimated the native populations.

3.2.1 Contact Period

About A.D. 1750, Spaniards arrived in Alta California. At this time, Penutian-speaking groups inhabited Travis AFB's current location; the Suisun and Talenas tribelets of the Southern Patwin (or Wintuan) also occupied this region.

In 1833 and 1837, malaria and smallpox epidemics nearly decimated the indigenous Central Valley population. By the 1850s, little was left of the Southern Patwin due to the effects of the Gold Rush. In 1923-1924, A.L. Kroeber conducted ethnographic investigations of the area, which revealed that those who had survived had already abandoned the area. What has been determined about the Southern Patwin is based on ethnographic information provided by the Northern Patwin (e.g., Kroeber 1925) and the Plains Miwok (Bennyhoff 1977).

Southern Patwin lived in large villages along water courses above levels of seasonal flooding (Powers 1877:219). Grassy plains served as temporary hunting grounds for both large and small game in the winter, including deer, elk, pronghorn, and rabbits; the plains also provided seeds, acorns, and blackberries (Flynn and Roop 1984:26). A variety of resources were exploited, including salmon and steelhead trout on the Sacramento River, and waterfowl (Johnson 1978:355). Historically known Patwin Village locations in the Travis AFB area have been recorded in Vacaville, Napa, and near Suisun City (Argonne National Laboratory 1996; Kroeber 1925: plate 34; Powers 1877:218).

3.2.2 Settlement of the Travis Air Force Base Area

Agriculture. During the Spanish Mission Period (A.D. 1750-1830), the foundation was laid for the foundations of agricultural development and land tenure. Missionaries, who controlled much of coastal California, built missions on land that could be cultivated and irrigated and would be well suited for raising cattle (Argonne National Laboratory 1996; Gates 1967:75-76; Liebman 1983:7).

The 1830s marked the end of Spanish rule and the beginning of Mexican control. This period also marked an end to the missionary monopoly of lands throughout California, and the beginning of the "rancho." Mission lands were secularized, creating an era of private ownership, and spawning ranchos, or large agricultural holdings. Rancheros, or ranchers, continued the missions' agricultural practices, but focused more readily upon cattle ranching, as well as hide and tallow trade (Argonne National Laboratory 1996; Liebman 1983:7).

Settlements were made by the Mexican government, primarily for Mexican citizens, and extended away from the former mission lands and coastal regions. Outlying grants in the Central Valley included areas along the Sacramento and San Joaquin river valleys (Jelinek 1979:18-19; Liebman 1983:7). Several grants were made to rancheros in Solano County; however, they did not include the land Travis AFB now occupies (Argonne National Laboratory 1996).

In the 1840s, Mexican rule came to an end and California was granted U.S. statehood. A flood of immigrants entered the state in 1949 with the gold rush, spurring on a growth of cities as well as providing a market for beef and steady profits for the rancheros (Argonne National Laboratory 1996; Paul 1973:18; Jelinek 1979:24; Liebman 1983:8). By the 1850s, however, the rancheros faced competition from cattle ranching from the Midwest and Texas; additionally, the state introduced a property tax, causing many rancheros to fall into debt, forcing the sale of both land holdings and herds (Jelinek 1979:23-24). Although cattle ranching continued to be an agricultural economic focus, the cultivation of cereal grains gained prominence, especially in the Central Valley (Argonne National Laboratory 1996).

Many of the miners who came to California during the gold rush gave up mining and began to turn to agriculture. Dry farming of barley and wheat was centered in the Sacramento and northern San Joaquin river valleys, which were well suited for grain agriculture production. Barley provided a food supply for pack animals in the mining regions and was used in the production of beer, while wheat provided flour for the baking of breads. By the 1850s, California had begun exporting surplus grains to Australia and Great Britain (Jelinek 1979:34, 40; Liebman 1983:16). During the 1860s, orchard crop production, including apples, plums, peaches, pears, and apricots, expanded throughout the state.

River routes provided the earliest means for transporting harvested grains and fruits for export. The construction of railroads led to increased cultivation of land for wheat farming. In 1869, the transcontinental railroad was completed, providing a significant link to the domestic market. Between 1874 and 1902, California saw a peak in the production of wheat (Jelinek 1979:34, 40-41; Paul 1873:22). The production of wheat soon exhausted the soil, however, leading to smaller yields, and by 1903, the consumption of wheat exceeded exports; by 1904, wheat had to be imported into the state (Argonne National Laboratory 1996; Jelinek 1979:43).

After the collapse of the wheat market, some landowners made a transition to fruit and specialty crops, while others began irrigating their crops and harvested other grains and alfalfa. Orchards were expensive, and some landowners sold subdivisions of their large land holdings (Argonne National Laboratory 1996; Liebman 1983:55).

In the Sacramento Valley, the trend towards subdivision came in the early 20th century, somewhat later than in other parts of the state. Prior to the 1900s, large landowners in the valley blocked the establishment of irrigation, as dry farming of grains could still bring a profit (Liebman 1983:54). Large landowners in this area rented land to tenant farmers in order to keep their holdings intact (Liebman 1983:79).

Land surrounding the Travis AFB area was referred to as "poor man's acres" (Central Solano County Cultural Heritage Commission 1975:41). This land,

unlike that of the Maine Prairie township or the Vacaville fruit district, was not regarded as prime farmland. As a result, much of the land was utilized for sheep and cattle ranching, with irrigation for crops such as sorghum, corn, alfalfa, tomatoes, sugar beets, and some fruit trees (Argonne National Laboratory 1996; Loving 1986:3; Soil Conservation Service 1977).

Industry. Between 1875 and the early 1900s, the local economy was based on agriculture and local extractive industries, primarily tufa and basalt quarries. To the east of Travis AFB, at Cement Hill, the Pacific Portland Cement Company employed between 500 and 1,000 individuals at its tufa and limestone quarry (Central Solano County Cultural Heritage Commission 1975:33-34; Gregory 1912:74). A town was erected at the quarry, catering to the needs of its employees, and included housing and dormitories, a hotel, store, hospital, and a school (Central Solano County Cultural Heritage Commission 1975:34). By the 1920s, the tufa deposit had been depleted, however, and the plant and employment suffered a decline.

At Thomasson's Hill, near present-day Cordelia, a basalt/andesite quarry was established in 1875. The dark-gray to black andesite was crushed and used for concrete and macadam (Central Solano County Cultural Heritage Commission 1975:33; Weaver 1949:173). Quarries in the area also produced basaltic paving stones, street pavers, and building stone (Thompson and West 1878:9; Weaver 1949:173; Higgins 1983:238-239; Argonne National Laboratory 1996).

In the early 1900s, when the demand for street pavers declined, the industry began to wane. A few quarries remained open, like the E.B. and A.L. Stone Company, which operated near Cordelia in 1912; these companies produced crushed and building stone for the Southern Pacific Railroad and similar companies. Local stone was used for the construction of bridges, retaining walls, culverts, and farm outbuildings (Central Solano County Cultural Heritage Commission 1975:34; Gregory 1912:74; Weaver 1949:173-174).

Settlement. Jose Franciso Armijo established the first Hispanic settlement in the area now known as Solano County. In 1839, Armijo applied for a land grant in Suisun and Tolenas valleys. In 1840, he received the grant and was followed by his son, Antonio, who established a rancho on his father's land grant. In 1842, the Vaca and Pena families applied for and received a land grant; this land centered on the Lagoon and Vaca valleys and extended into the northern part of present-day Solano County (Argonne National Laboratory 1996; Central Solano County Cultural Heritage Commission 1975:20-21).

John Wolfskill was the first recorded Anglo-American settler of Solano County. In 1842, he settled on the Putah Creek land grant, which had been obtained by his brother, a naturalized Mexican citizen. Unlike the Mexican cattle ranchers in the area, Wolfskill cultivated grains, row crops, vegetables, a vineyard, and an orchard (Argonne National Laboratory 1996; Central Solano County Cultural Heritage Commission 1975:21; Gregory 1912:57).

In 1847 or 1848, Daniel Barry and his family became the first recorded Anglo-Americans to settle in the Travis AFB area, along Cache Creek. They later established a permanent residence two miles north of Rockville (Argonne National Laboratory 1996; Central Solano County Cultural Heritage Commission 1975:21).

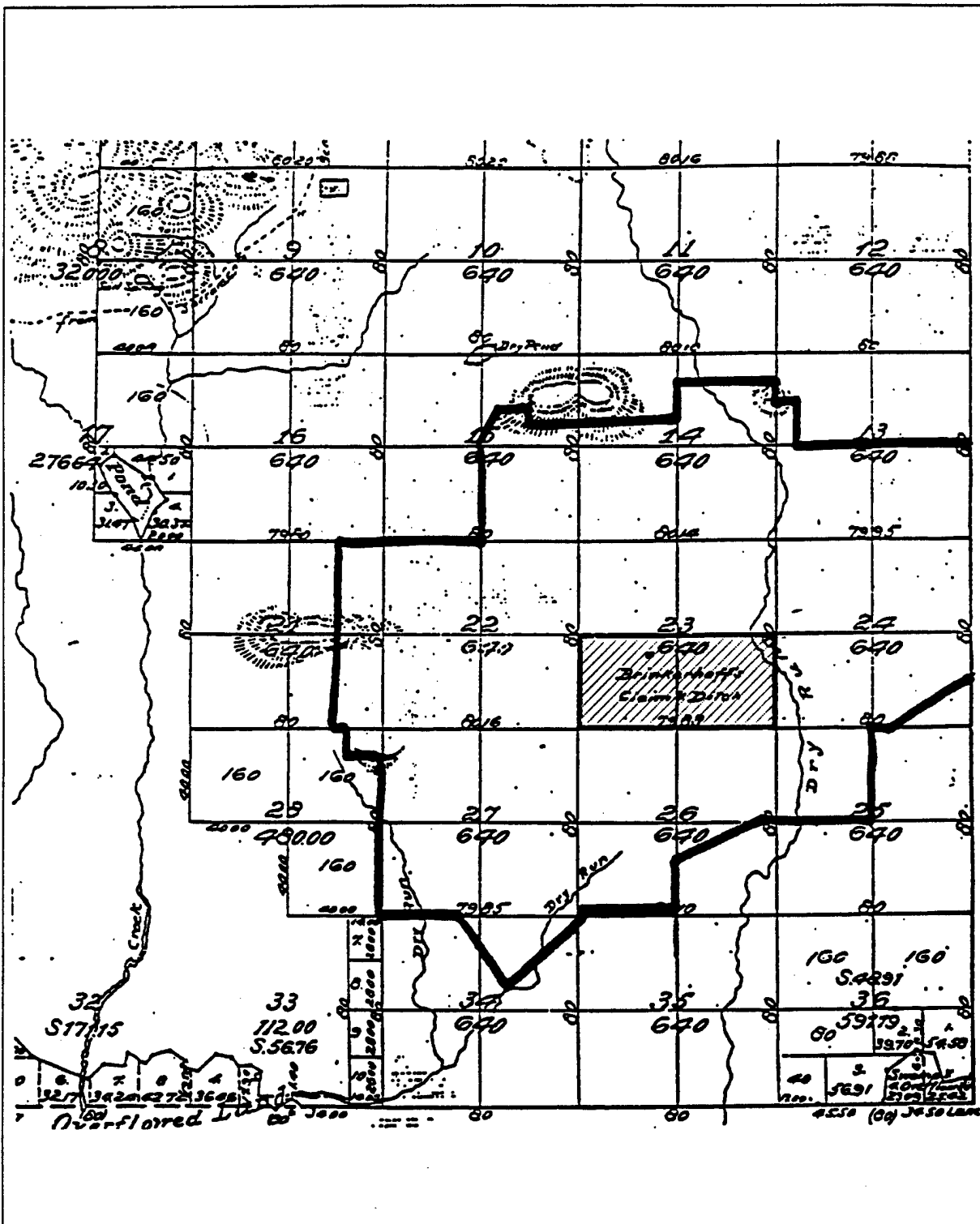
In 1848, with the discovery of gold, Solano County ranchers used the Benicia to Sacramento Road to drive cattle and transport food supplies to Sacramento to feed miners. This road ran approximately 2 miles west of Travis AFB (Argonne National Laboratory 1996; Central Solano County Cultural Heritage Commission 1975:21; Gregory 1912:58; U.S. Government Land Office 1861).

The 1851 U.S. Government Land Office map (revised 1861) of the Travis AFB area depicts the Benicia to Sacramento Road, as well as several houses along its route. This map also depicts Brinkerhoff's Claim and Ditch, the first settlement on the present-day Travis AFB property (Figure 3-1). It is believed that the ditch referenced on the map is actually a type of mound constructed by the early settlers to enclose their property, rather than an irrigation channel. Such an enclosure may indicate that Brinkerhoff was an agriculturist and needed the ditch to protect his crops from cattle grazing in the area; additionally, early accounts of Solano County refer to "wild oxen" and "wild cattle," which roamed the surrounding landscape (Argonne National Laboratory 1996; Munro-Fraser 1879:71). By 1878, both the Brinkerhoff name and the structure associated with the property are absent from Solano County map sources.

The Henning map of Solano County (1872) indicates relatively few landowners in the area of present-day Travis AFB. One of these is S. [Stephen] Burke (Figure 3-2). One structure depicted on the map has been identified as the Union or Scandia School.

The Thompson and West map of Solano County, dated 1878, indicates the landowners of the area now known as Travis AFB (Figure 3-3). The majority of these properties served as farmsteads, operating as part of the wheat farming bonanza of the Sacramento Valley. Union, or Scandia, School is also represented on this map.

Between 1878 and 1908, Solano Irrigated Farms, Inc., is reported to have owned an increasing number of discontinuous land tracts in the Travis AFB area (Solano County n.d.) (Figure 3-4). This land holding pattern probably reflects a trend toward consolidation of specialty crop agriculture, where large land holdings were created through the purchasing of small, unsuccessful orchards and vineyards (Argonne National Laboratory 1996). By 1908, several homestead locations are depicted in the Travis AFB area (U.S. Geological Survey 1908), indicating that previously large land holdings had been subdivided, including that of the Burke Property (Figure 3-5).



Brinkerhoff's Claim
and Ditch



Travis AFB Boundary

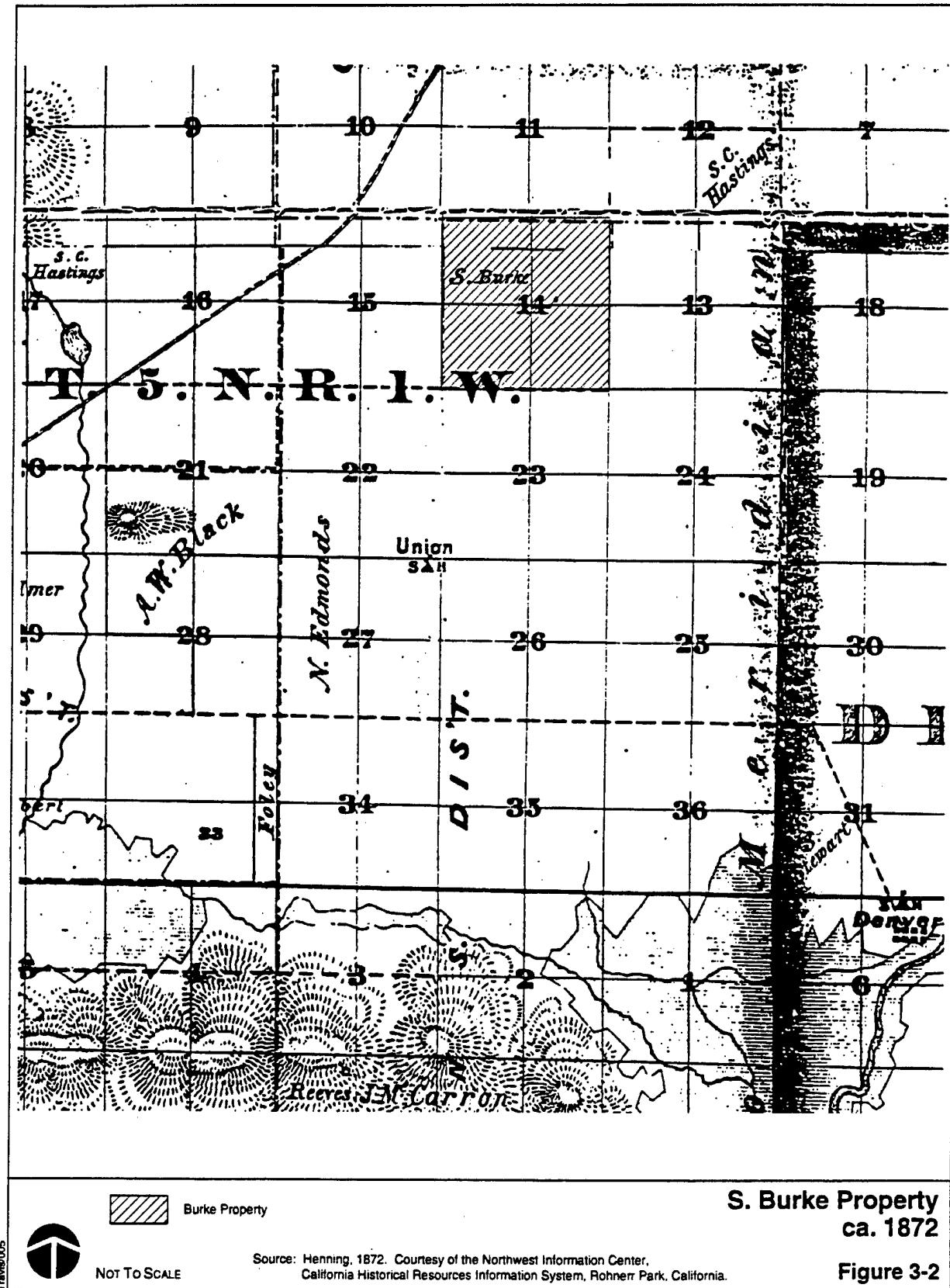


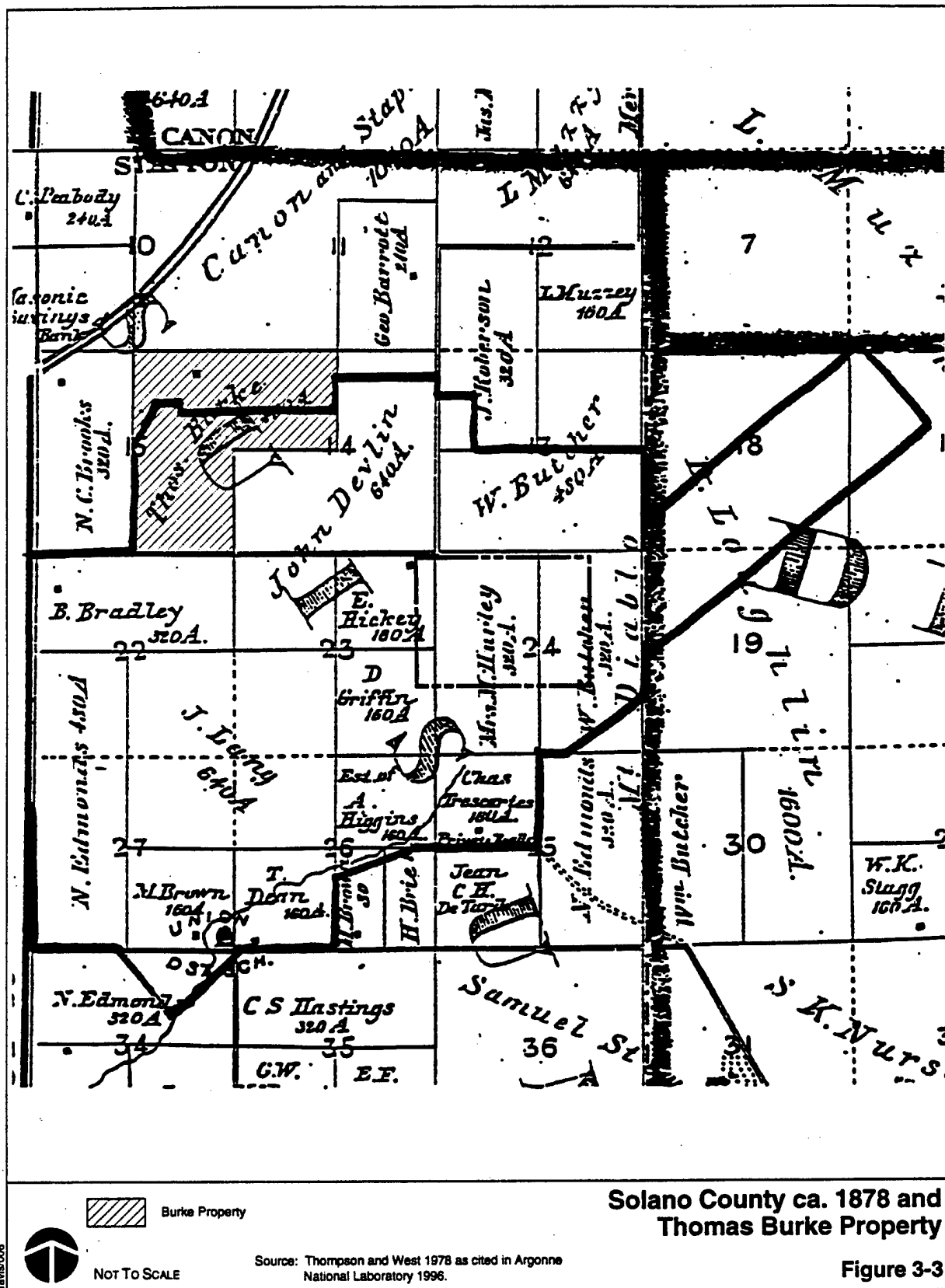
NOT TO SCALE

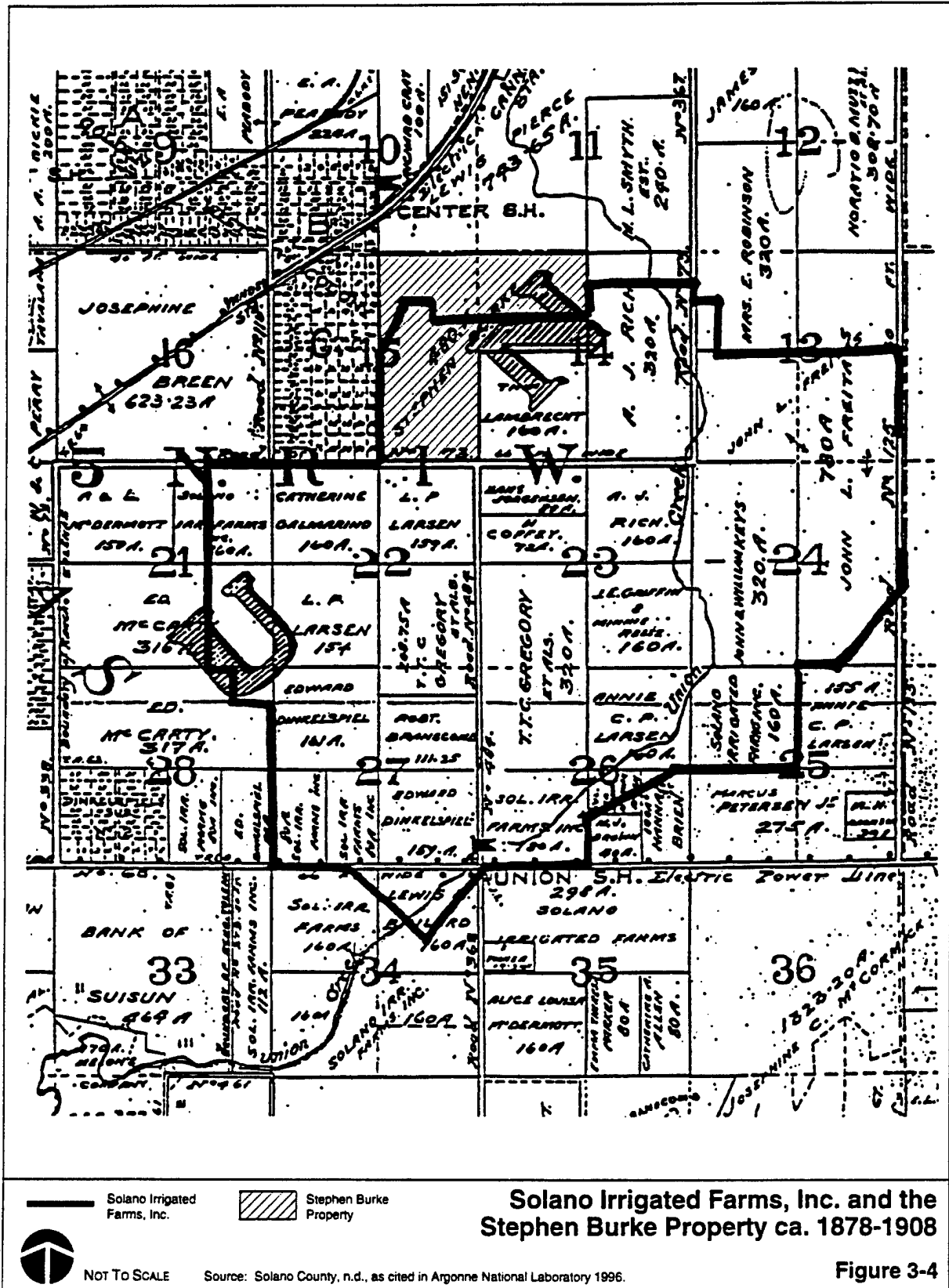
Source: U.S. Government Land Office 1881, cited in Argonne
National Laboratory 1996.

Brinkerhoff's Claim and Ditch Travis Air Force Base Property

Figure 3-1







The 1941 USGS Vacaville Quadrangle depicts the Sacramento Northern Railroad running northwest to southeast through the present-day location of Travis AFB, just south of the Burke Property (Figure 3-6). This map depicts several structures (at least three on the Burke Property) in Travis AFB at this time.

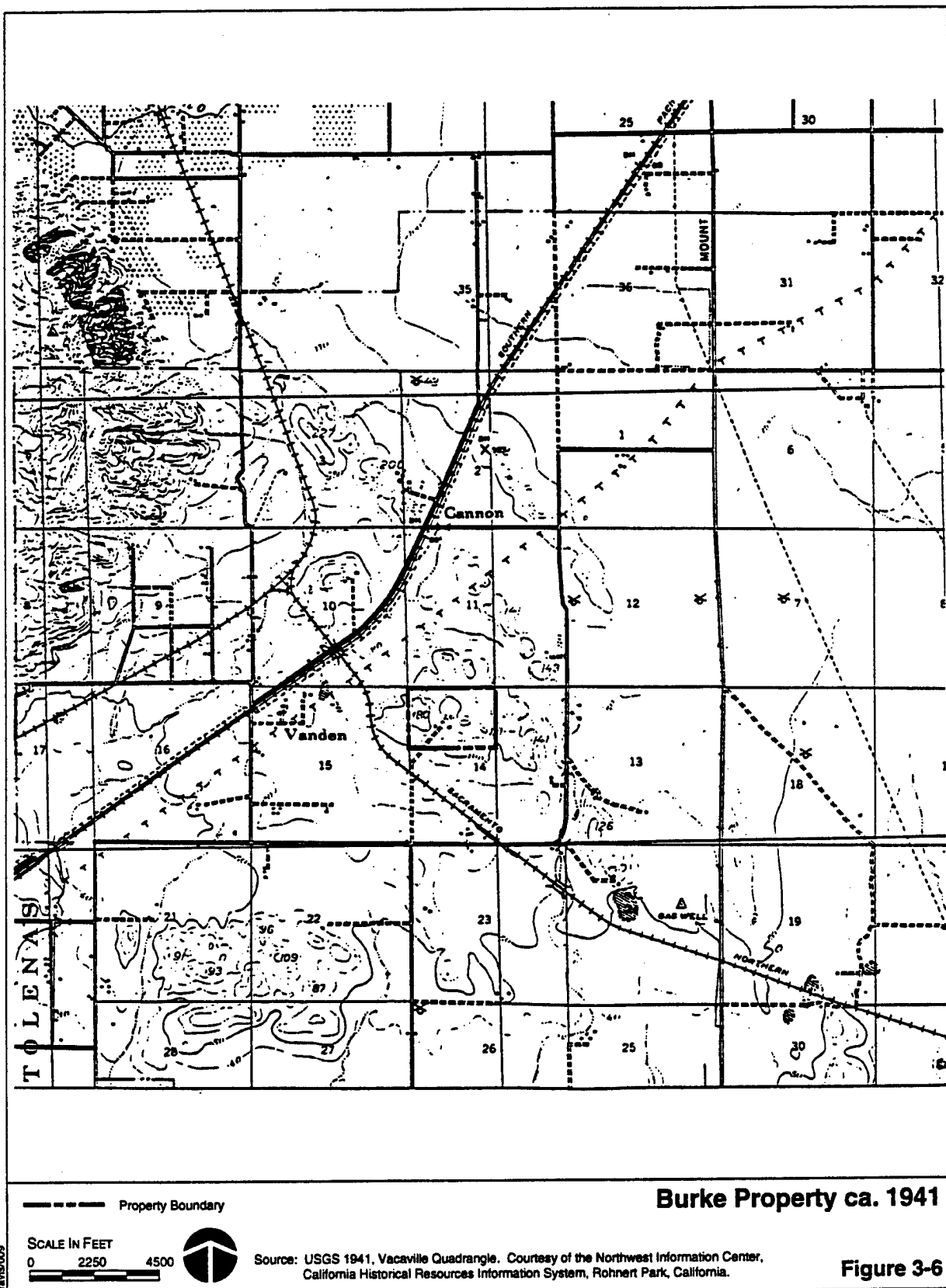
In 1942, the army established an airfield in the area. By 1953, most of these structures had been razed, dismantled, or had been used on a temporary basis by the army personnel; the Sacramento Northern line was abandoned and relocated just north of the present-day base property (Argonne National Laboratory 1996; Travis Air Force Base 1953). Also by 1953, a water tank had been constructed on the Burke Property (Travis Air Force Base 1953) (Figure 3-7). The remnants of these homesteads on Travis AFB consist of imported Australian eucalyptus trees, planted as windbreaks, as a self-regenerating wood source, and for protection from malaria and miasma (Argonne National Laboratory 1996; Pisani 1984:68-69).

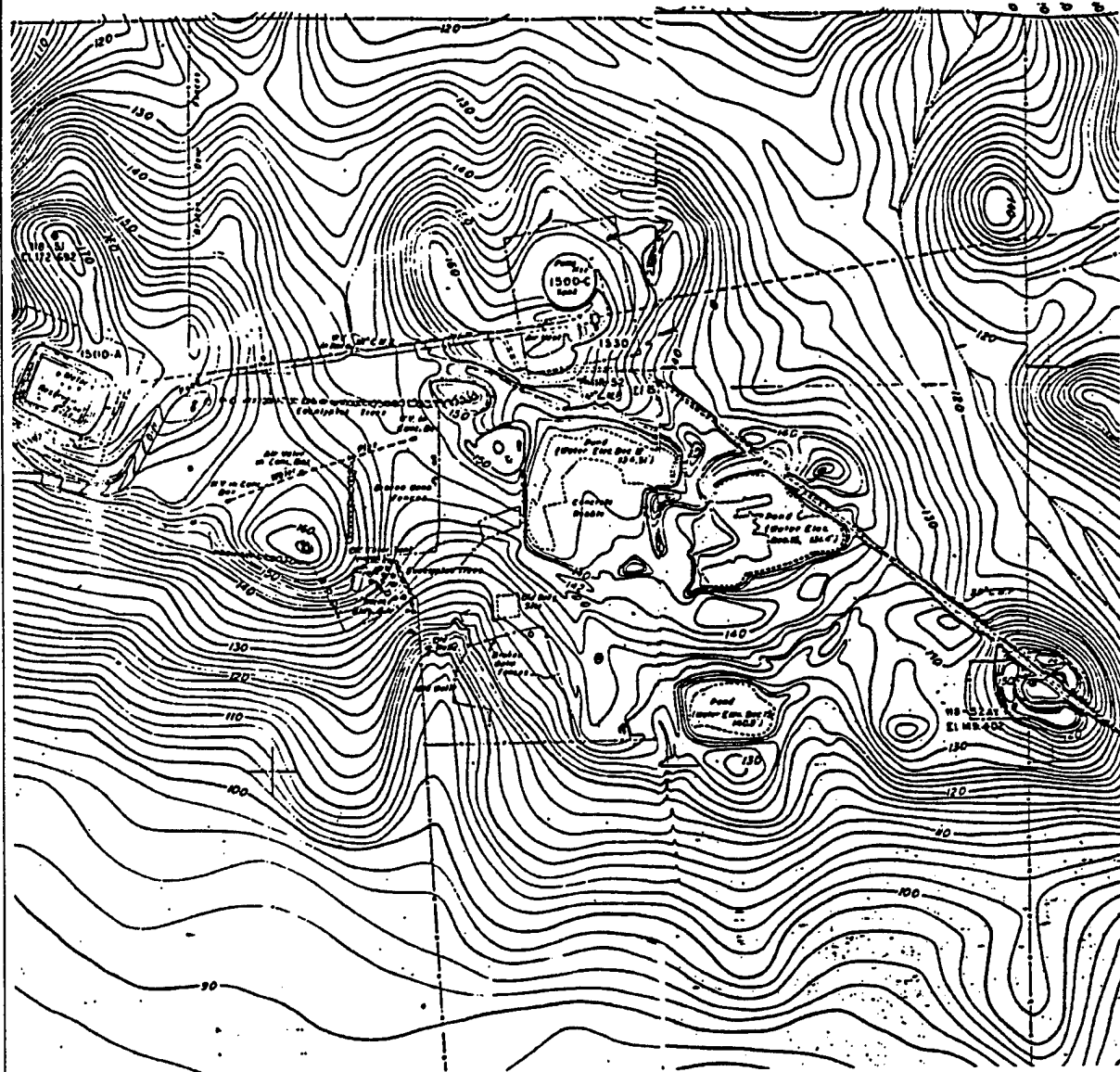
3.2.3 History of Travis Air Force Base

In 1942, the U.S. Government selected property in the area of present-day Travis AFB as the site of an air transportation location, primarily due to its prevailing winds. After being assigned to the Air Transport Command (ATC), however, plans for the bomber base were canceled. In 1943, the facility was activated as the Fairfield-Suisun Army Air Base (AAB). Originally occupying 945 acres, the base expanded to 2,257 acres as its role in World War II operations increased. As a major aerial port and supply transfer point for both replacement troops and cargo for the Pacific Theater, the base also prepared aircrews and newly constructed bombers for deployment. By 1945, Fairfield-Suisun AAB had become the largest air freight terminal for ATC on the West Coast.

The War Department declared the base a permanent installation in May 1945. As a result, an additional \$19.6 million was allocated for construction and expansion programs, expanding the base by an additional 1,145 acres (Argonne National Laboratory 1996; Snow 1983:5; NPS 1989:12). In 1946, Fairfield-Suisun AAB became the headquarters for the ATC, which had moved to the base from nearby Hamilton Army Air Field (AAF) in Marin County, California. Also in 1946, Fairfield-Suisun AAB became the western hub for all of ATC's domestic aeromedical evacuation flight network, reflecting the importance not only of the base, but also of its hospital (Argonne National Laboratory 1996; Snow 1983:8).

During the Berlin Airlift in 1948, ATC transport units conducted operations in Germany. At this time, the Strategic Air Command (SAC) used the base for bomber operations. In 1949, SAC became a host unit of the base. In 1950, Fairfield-Suisun AAB was renamed Travis Air Force Base in honor of Brigadier General Robert Falligant Travis, an SAC commander.





----- Property Boundary

Burke Property, ca. 1953



NOT TO SCALE

Source: Travis AFB, 1953. Courtesy of Sanford Bennett,
60AW/CES, Travis AFB, California

Figure 3-7

During the Korean War, and throughout the 1950s, Travis AFB participated in Military Air Transport Service (MATS) activities and operated as a center of air logistics support in Southeast Asia. MATS regained host responsibilities in 1958.

3.2.4 History of the Burke Property

Based on historic maps of the area, the property has been owned by the Burke family since 1872 (Henning 1872). The earliest known owner of the property is S[tephen] Burke. By 1878, approximately 400 acres of the property in Sections 14 and 15 was owned by Thos. [Thomas] Burke (Thompson and West 1878). Between 1878 and 1908, the surrounding area increased in population. Many of the large land holdings in Solano County were subdivided and sold to Solano Irrigated Farms, Inc. At this time, 480 acres in Sections 14 and 15 were owned by Stephen Burke (Solano County n.d.). By 1908, one structure had been erected on the Burke Property; it is unknown who constructed this structure (U.S. Geological Survey 1908). At least three structures had been erected on the property by 1941 (U.S. Geological Survey 1941). Between 1941 and 1953, the Burke Property was mined for sandstone. In some areas, sandstone was quarried to a depth of 30 feet.

In February 1943, Stephen Burke granted a 1.4-acre easement to the government to construct a water pipeline through the middle of the property. The pipeline, which runs through the southwest portion of the property, is currently maintained and operated by the City of Vallejo and Travis AFB. On 24 May 1943, the Air Force purchased Tract 15, comprising 2.5 acres, from Katherine Burke, who is possibly Stephen Burke's wife or daughter. In March 1952, Katherine Burke granted an easement for the construction of a second pipeline on the southwest portion of the property. Tract 96, comprising 2.41 acres, was acquired from Ms. Burke under a Declaration of Taking on 21 May 1952 (Air Mobility Command 1994a).

Based on maps of the property dating to 1953, at least two structures, several wells, and broken fence lines had been constructed on the southern half of the Burke Property (Travis Air Force Base 1953). A reservoir on the westernmost edge of the property and a water tank in the center of the property had been constructed. A dirt road leads from the reservoir to the tank, and a pipeline extends from the tank to the southeast corner of the property. Also, three ponds had been dug on the southern half of the property. It is believed that one of these ponds was created through sandstone quarrying just south of the water tank.

In February 1957, the government acquired 66.4 acres of land from Katherine Burke through a Declaration of Taking. Military family housing was constructed on this portion of the property, which lies to the south of the current property. In December 1960, Katherine Burke granted a 2-year easement to the government on 4.3 acres to construct a temporary road on the north section of the property. This road was used to access housing being constructed to the east of the current property (Air Mobility Command 1994a).

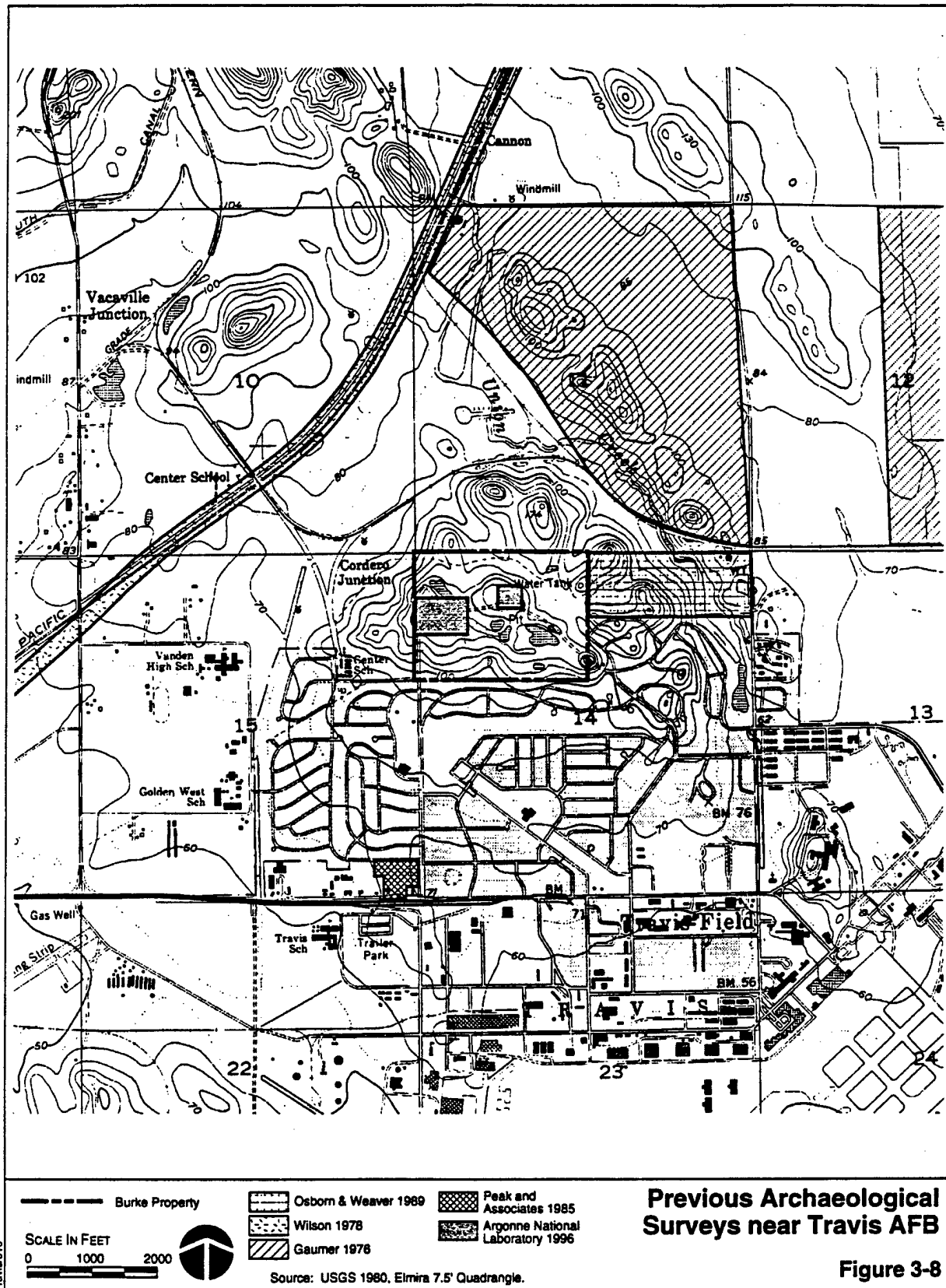
After the 1960s, Katherine Burke deeded the remainder of the property to her children, Patrick Burke, Mary Wunderlich, and Kathleen Powell. The present Burke Property surrounds 8.35 acres (Parcel Number 2) owned by the City of Vallejo and used as the site of a water treatment plant. The Air Force also owns water tanks enclosed within a fence in the center of the property. In September 1992 and March 1993, the Burke family gave the Kaweah Construction Company permission to dump 1,120 cubic yards of earth material and 23 loads of concrete and construction debris on the property (Air Mobility Command 1994 a, b). Much of this material derived from the upgrade of the Travis AFB/City of Vallejo Water Treatment Plant. Other waste deposited on the property includes fragments of steel and metal, terra cotta piping, and tires. Most of the debris and rubble were covered with soil up to 20 feet thick (Air Mobility Command 1994a). Currently, the property is part of a 10-year contract under an agricultural preserve program known as the Williamson Act.

3.3 CULTURAL RESOURCES IN THE VICINITY OF THE PROJECT AREA

In order to identify previously recorded archaeological sites in the Travis AFB area, a record search was conducted through the California Historical Resources Information System, Northwest Information Center, at Sonoma State University, California (Figure 3-8). Additionally, existing archaeological reports and files, historic maps and records, and other sources for the area were consulted for background information regarding the Burke Property.

Several archaeological surveys have been conducted in the Travis AFB (Solano County) area since the 1960s. Each of these surveys is summarized below:

- One survey was conducted in the 1960s for the construction of the Tehama-Colusa Canal. The study, which covered several counties, identified 19 sites, none within Solano County (Treganza et al. 1965).
- In 1975, a survey was conducted to the west of the base for the proposed widening of Walters Road (Greenway 1975). No archaeological sites were identified during this survey.
- Two surveys were conducted in 1976 by Peak and Associates; a third survey was conducted by this firm in 1985. All three surveys focused on a road expansion project including portions of a 4.64-acre parcel outside the main gate at Travis AFB for the California National Guard Fairfield Armory, portions of a drainage ditch, and Air Base Parkway to the north of the new medical facility. No archaeological sites were identified during these surveys (Peak and Associates 1976 a, b, 1985).
- In 1978, a survey was conducted for a transmission line along the Southern Pacific Railroad to the north boundary of Travis AFB. This survey also included an area outside the southern boundary of Water Well II (a discontinuous property belonging to the base). No archaeological sites were identified during this survey (Wilson 1978).



- A survey of 430 acres to the south of Travis AFB and near the Potrero Hills Storage Annex along a canal/drainage route for the Solano County Water Project Feasibility Study was conducted in 1979 (True 1979). No archaeological sites were identified during this survey.
- In 1984, Flynn and Roop conducted the largest archaeological survey of Travis AFB. The survey, consisting of a 100 percent intensive pedestrian survey, was conducted on the 100-acre parcel where the new David Granr Medical Center is situated. This survey identified two sites near vernal pools. No further work was recommended for one site that had been severely disturbed. The other site was tested and fully recorded prior to the construction of the hospital.
- In April 1987 the Interagency Archaeological Services Branch, Division of National Register Programs, Western Region, of the National Park Service (NPS) prepared cultural resource management recommendations for Travis AFB. This report, which was revised in February 1989, noted that no historic archaeological sites had been recorded or excavated within Travis AFB's present boundaries. No surveys had been conducted to identify potentially significant historic archaeological sites on the discontinuous land parcels (i.e., Burke Property). The NPS noted that maps and aerial photographs of the base depicted the possible locations of structures on the Burke Property. Furthermore, the NPS report stated that:

"While all pre-World War II structures were razed in the several phases of military development at Travis, several stands of eucalyptus trees associated with earlier settlements were incorporated into Base landscaping and still remain. It is possible that partially intact historic archaeological remains in the form of privies, wells, root cellars, or dumps, with stratified cultural deposits may also still exist. With the degree of subsurface land disturbance on Travis AFB, however, the potential for these subsurface site remains is low (NPS 1989)."

- In 1989, Osborn and Weaver conducted a 50-acre survey of land adjacent to the base and discontinuous property (Water Well I; Burke Property) for the construction of family housing. This 50-acre parcel is adjacent to the eastern boundary of the Burke Property. No archaeological sites were identified during this survey (Osborn et al. 1989).
- In March 1996, Argonne National Laboratory conducted an archaeological and historic resources survey and inventory for Travis AFB. The project area was the entire 5,020-acre base and 300 acres in four off-base facilities. After eliminating areas too disturbed to contain archaeological sites, the remaining 657 acres of grazing land and 19 potential historic sites were surveyed by Argonne National

Laboratory. The 300 discontinuous acres included the Water Well I site. The three fenced areas within this seven-acre site were each investigated by walking one transect along the inside of the perimeter fence. Water Well I is described as 100 percent disturbed. No cultural material was encountered on the surface, and no further testing was warranted. No prehistoric remains were identified on Travis AFB or its discontinuous properties. Six locations were identified to contain some physical remains and merited subsurface testing; none of these were recommended for inclusion in the National Register. Additionally, none of the pre-1947 military structures was determined eligible for inclusion in the National Register.

3.3.1 Prehistoric Sites

Although no exact location was given, Gaumer (1976) identified a prehistoric site to the north of Travis AFB in the hills along Union Creek. This site consisted of a bedrock mortar and small midden with several basalt flakes. Gaumer (1976) also recorded a historic hunting blind and water well, along with a historic trash scatter of bottles and shotgun shells.

Two prehistoric lithic scatters (CA-SOL-313 and CA-SOL-314) were recorded in 1984 (Flynn and Roop 1984). Both sites were on Travis AFB, in the area now occupied by the new medical building. One of the sites, CA-SOL-314, had been severely disturbed, and no further testing was recommended; the other site, CA-SOL-313, underwent testing and was fully recorded prior to the construction of the hospital (Flynn and Roop 1984).

No prehistoric sites have been identified for the discontinuous properties in Solano County. One prehistoric site (CA-CCO-252) was recorded in Contra Costa County on Travis AFB's OZOL property. Consisting of a shell midden 30 feet in diameter and less than 3 feet deep, the site was recorded in 1907 by N.C. Nelson.

Argonne National Laboratory (1996) determined that, based on surface reconnaissance, subsurface testing, and the observed level of disturbance, it is unlikely that any prehistoric materials would be encountered on Travis AFB. Additionally, no prehistoric sites are likely at Water Well I (on the Burke Property) or at Water Well II (golf course), due to heavy disturbance at both locations. Additional prehistoric sites are unlikely on the steep slopes or the disturbed areas of the OZOL location. It is, however, possible that subsurface material may be present at Potrero Hills and the location of the storage annex (Argonne National Laboratory 1996).

3.3.2 Historic Sites

As of 1992, at least 12 historic properties have been listed in the National Register, including areas in Benicia, Fairfield, Vacaville, Vallejo, and Suisun City. Two of these properties are the Pena Adobe in Vacaville and the Hastings Adobe

in Collinsville. Fifteen of 23 properties listed in the Historic Properties Index at Sonoma State University have been determined eligible for inclusion in the National Register; only two of those have been listed. None of these properties is on Travis AFB or its discontiguous properties.

Argonne National Laboratory (1996) identified several locations as possibly containing historic sites. At least five of these locations contained artifactual materials; however, due to extreme disturbance, none were recommended as eligible for inclusion in the National Register. Furthermore, no pre-1947 (World War II) properties at Travis AFB were determined eligible for inclusion in the National Register (Argonne National Laboratory 1996).

In August 1996, the Air Mobility Command conducted an inventory of the Cold War-era buildings and structures situated on Travis AFB. Thirty-two buildings were determined potentially eligible for the National Register as two historic districts and one individually eligible building (Air Mobility Command 1996).

4.0 METHODS

4.1 RECONNAISSANCE INVESTIGATION

Earth Tech personnel visited Travis AFB, California, on 22 September 1998, to gather historical land use information regarding the newest northern land parcel (Burke Property) and to conduct a reconnaissance for cultural resources on that 100-acre parcel. A reconnaissance was conducted by Earth Tech Senior Staff Cultural Resources Specialist, Heather Puckett, and Lt. David Gwisdalla (60 AMW/EM) (for Robert Holmes [60 AMW/EM]). Lt. Gwisdalla and Mr. Holmes provided copies of documents pertaining to the historic land use of the Burke Property. Earth Tech also met with Sanford Bennett, Architect (60 AMW/CES), who provided copies of historic maps of the property that dated to 1953. These maps indicated the location of a burned feature and additional structures that had been situated on the property prior to acquisition by the Air Force.

Earth Tech walked over the entire 100-acre parcel in order to identify disturbances or areas with the potential to contain cultural deposits. Exposed ground surfaces, including the steep slopes of the vernal swales and pools, were visually observed for artifacts. Ground terrain was also examined for any aboveground features, such as berms or depressions, that may be evidence of a prehistoric or historic site. Black and white photographs were taken of the reconnaissance area, while topography and areas displaying disturbance were indicated on the project area map (Figure 4-1). The field investigation also included the survey of areas known to have contained structures prior to the construction of Travis AFB. Structures known to have been located on the Burke Property included a burned house location and an old building location. Upon observation of the property, a possible burned structure (bricks and two wooden structural beams), as well as tools, a windmill or possible water wheel, and ceramics were identified at the southeastern corner of the fence enclosing the City of Vallejo/Travis AFB Water Treatment Plant property. It was determined that this site warranted further investigation and a more detailed recordation.

4.2 SITE RECORDATION

On 5 October, Earth Tech personnel Heather Puckett and Randy Cooper returned to the Burke Property to record the possible burned homestead location (Figure 4-2). The recordation involved the relocation of artifacts and features noted during the earlier reconnaissance, and careful examination of exposed areas (especially the plowed area) and "hot spots" (areas near features) to identify other remains. An effort was also made to determine the areal extent of associated remains in order to establish site boundaries. Remains included not only artifacts and features, but introduced trees. In the northern part of the site, determining the extent of remains was not possible because of the fence and property line of the City of Vallejo/Travis AFB Water Treatment Plant. The fence was therefore considered the northern site boundary, despite the presence of

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**Burke Property
Cultural Resource
Investigation
22 September 1998**

EXPLANATION	
Point	●
Cultural Island	□
Not surveyed	▨
Potential Early Shrimp habitat in a wetland	▨
Wetland pool wetland and Number	□ P11
Water	▨
Wetland and other than marshy areas	□
Endangered sp of <i>Salmonella</i> spp.	*
State-Sensitive sp of <i>Salmonella</i> spp. in <i>Salmonella</i>	*
Potential Areas	▨
Threatened Areas	▨
See Boundary	—

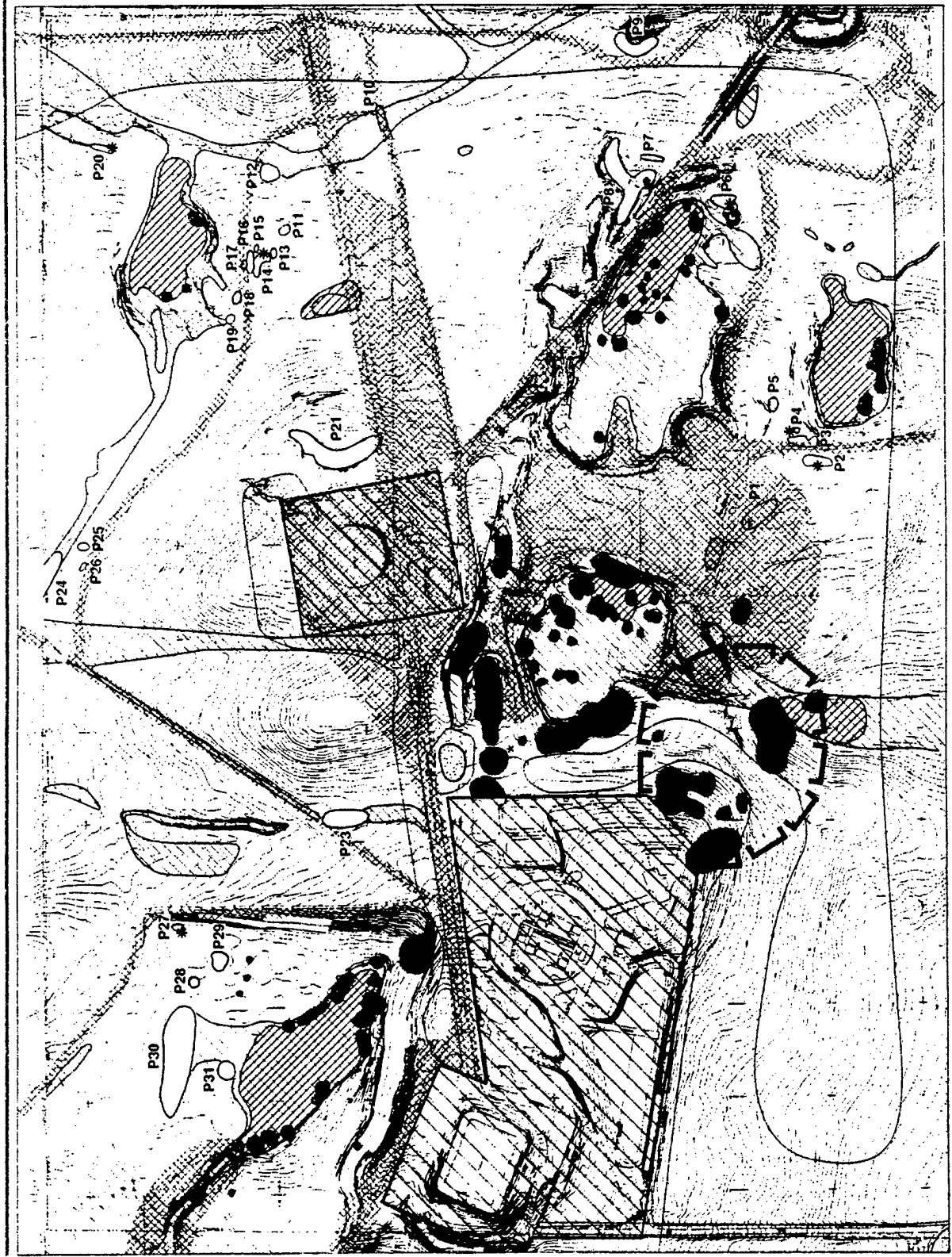
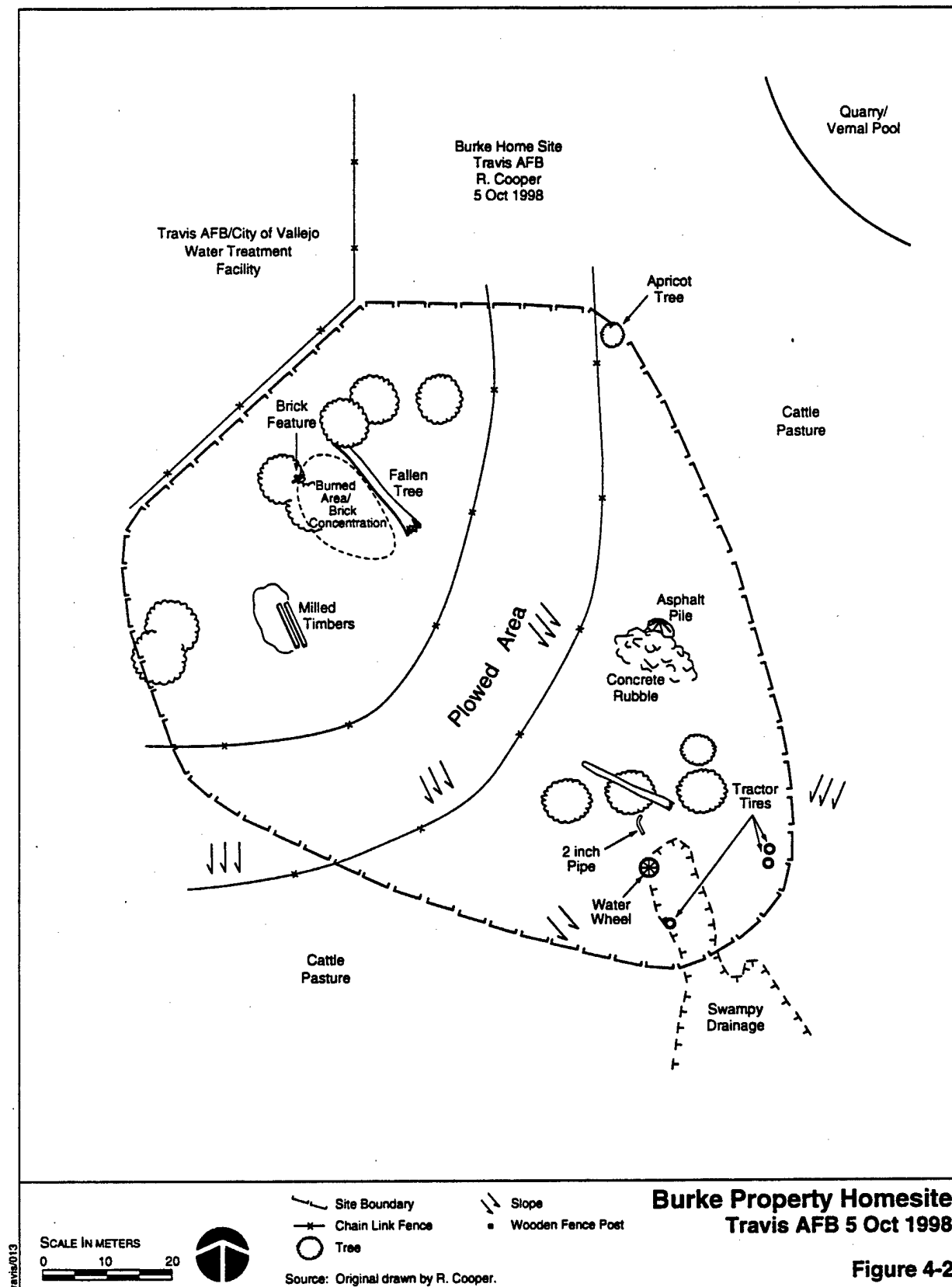


Figure 4-1

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eucalyptus trees on the other side. An occupied residence with an irrigated lawn is situated to the north of the site and also contains many eucalyptus trees. A map of the site was made using a compass and survey tape. Features and important artifacts were described, measured, and in some cases, photographed with black and white film. Site overview photographs were also taken. All necessary information, including environmental and locational information, was gathered to complete site recordation on the State of California -The Resources Agency Department of Parks and Recreation Archaeological Primary Record DPR523A (see Appendix A). No artifacts were collected.

5.0 RESULTS

5.1 RECONNAISSANCE INVESTIGATION RESULTS

During Earth Tech's reconnaissance of the Burke Property on 22 September, the following observations were recorded (see Figure 4-1):

Surveying along the east fence of the Travis AFB/City of Vallejo Water Treatment Plant, Earth Tech observed what appeared to be a manhole or cistern marked by a concrete monument inscribed with "MH"/"40"; this marker is most likely directly over and part of the water supply line to the treatment plant." Walking southward, Earth Tech personnel observed concrete debris, metal pieces, a tin can, and golf balls. The concrete debris and metal pieces appear to have been dumped, probably by the Kaweah Construction Company, which is known to have dumped construction debris at the site in the early 1990s.

At the center of the project area, on the southwestern corner of the fence enclosing the large water tanks, is a sandstone outcrop, indicating a possible location of the quarry pit. To the east of this sandstone area, approximately 5 meters south of the Water Well I fence line, is a well, also indicated by a concrete monument (not inscribed). There is no indication of the age of this well, but it may be associated with the tank facility. The well comprises a metal casing that has been capped. A white polyvinyl chloride (PVC) pipe protrudes from the ground approximately 1 foot to the north, between the well casing and the monument.

Approximately 10 meters from the center of the southern edge of the fence surrounding the tanks is a water valve. It has a large, round metal cover and is marked by a blue sign that has apparently fallen. The area between the valve and the fence line has also been plowed. Except for a few (>5) chunks of concrete mixed with the dirt, no cultural material was visible. At the southeastern corner of the fence surrounding the tanks is a large growth of what appear to be bamboo stalks. The earth outside the fence is heavily eroded due to water flow (possibly run-off from the tank) in the area.

Walking south between two large ponds (Ponds #2, 3), Earth Tech personnel observed concrete, wood, and metal debris scattered throughout the terrain. At the westernmost edge of Pond 3, Earth Tech observed a scatter of wooden fence posts, a black plastic pail, a brick, a flattened and rusted metal pail, a large square concrete box or vault, and a cylindrical concrete object. The concrete box appears to have a PVC pipe and a small metal pipe emerging from the top. Both have been broken away. The concrete has been chipped on both the north and south sides. A metal pipe sticks out from the side and bends slightly to the rear. A hole is situated approximately 5 inches above this pipe. Inside the box are two pipes, copper tubing, and what looks like a coupling for a pipe. It is probably a

housing for a small pump. The cylindrical concrete object is approximately 12 feet to the south; it has no distinguishing characteristics.

At what would be the center of the pond (#3) (when filled completely with water) is a wood panel piece comprising veneer nailed to a wood timber. This is situated approximately 3 feet east of a large rock/boulder. Near the edge of the current water level sits a small green boat. A child's helmet (upside down in a fallen tree trunk/log) and two water bottles (recently deposited) are scattered to the east and west of the boat. The debris extends past the western edge of Pond 4, and to the southern edge of the property. Pond #4 also contains tires.

Walking back to the top of the ridge above pond #3, Earth Tech observed several small hills and a holding vault containing a faucet/pipe that appears to drain into the pond (#3) below. The top of the ridge is relatively flat and appears to be the water main constructed in the 1940s. At the base of this ridge, to the southeast of the property, is a large depression, possibly from mining or use as a borrow pit. A culvert emerges from the center of the ridge. The area surrounding the fence line, and much of the area to the southeast of the property, has been plowed. The only cultural material observed in the southeastern portion of the property was a piece of wire cable that had been plowed up, and recently deposited trash (i.e., gum wrappers and a small piece of chain-link fence).

Walking north, Earth Tech personnel observed a rusty piece of unidentified metal, a recently deposited white cigarette lighter, an orange traffic cone (which had been tossed over the fence), and pieces of white styrofoam. Midway between the water holding tanks and the fence line is a wetlands area containing water. To the east of this wetlands area, along the ridge near the fence line, are three water valves. Two water valves are set in large concrete vaults, each with a metal cover. The northernmost valve is uncovered and consists of a concrete vault with a pipe and pump emerging from the interior of the vault.

To the east of the valves, the earth has been plowed. Situated in this plowed area is a piece of metal sheeting and a piece of bent window screen, both of which appear to have been tossed over the adjacent fence line. No other cultural material was observed in the northeast corner of the property. The area to the north is bordered by a partially fallen wooden fence line. The property to the north of the fence line is not part of the Burke Property and was not walked over. In the distance are several rolling hills, another partial wooden fence, and a road. Cattle graze in the pastures nearest to the road.

The north portion of the Burke Property is hilly and covered primarily by grassland and other vegetation. A small pond (#5) is situated in the northeast portion of the property. Pond 5 is, like the others, surrounded by eucalyptus trees and other vegetation. A tire, a small depression, and a metal pipe were observed on the surface to the northwest of the pond. This debris appears to have been recently deposited. Continuing to the center of the north portion of the property, Earth Tech personnel observed a two-track dirt road leading from the southwest

(between the Travis AFB/City of Vallejo Water Treatment Plant and the water holding tanks) and extending through the fallen wooden fence and off the Burke Property to the north. The 2-track road was not depicted on historic maps of the property and was not considered significant. Situated to the west of the two-track road is a ravine/depression previously identified by Earth Tech biologists as a wetlands area (Earth Tech 1998).

To the west of the two-track road and ravine, just north of the road accessing the property, is another large pond (#1) surrounded by eucalyptus trees. It is believed that pond #1 was created through quarrying or borrowing activities. On the northern edge of pond #1 are shrubs and small rodent burrows. Earth Tech observed a small gray box (in an area marked for biological concerns). The box had a white label inscribed "[HO]LD BEACON/SO THAT/[AN]TENNA/POINTS/STRAIGHT UP." Also along this edge of pond #1 were an old shoe sole and a small, plastic, blue ball. A trench on the western edge of pond #1 leads away into the open pasture; the ground is heavily eroded in this area. Off the Burke Property, in an adjacent pasture, is a large windmill and tank, as well as several old wooden fence posts.

At the southeast corner of the Travis AFB/City of Vallejo Water Treatment Plant, Earth Tech personnel noted several burned bricks and fragments, structural beams, a glass bottle, and several eucalyptus trees. The area to the south and southeast of this site (down slope) has been plowed, revealing several white-ware ceramic sherds, broken glass, metal, brick fragments, and an old plowshare. Approximately 40 meters down the hill from the house site is a wetlands area. In and around this area are eucalyptus trees (standing and fallen), a couple of old rusted tools (pliers and a pipe wrench), more ceramic sherds, old tractor tires, a section of fence, and a metal object that resembles an old windmill or waterwheel.

No test pits were dug during the reconnaissance investigation of the Burke Property. Much of the property has been disturbed by dumping, construction, and mining activities. Scattered debris throughout the property lack any potential data value and were not recorded as sites. As a result, it was presumed that there was no potential for subsurface remains of any value.

5.2 RESULTS OF THE SITE RECORDATION

The concentration of historic debris at the southeast corner of the water treatment plant, and the cultural remains near the wetlands area just to the southeast, were recorded in more detail on 5 October. In the northern (upper) part of the site, Earth Tech personnel recorded a tight cluster of at least six bricks and fragments. The bricks lie flat and are aligned as if they were part of a wall, floor, or perhaps a hearth. Some are red and some are orange, and their sizes vary. They are mostly buried in the ground. The surface they form is somewhat uneven, and there is no visible mortar between them. This feature is at the edge of a larger concentration of bricks, charcoal, wood fragments, and burned or melted glass.

These are apparently the remains of a structure that burned in this location. Several large eucalyptus trees stand over this area, and one has fallen across the edge of the brick concentration. A few meters to the southwest, two long, wooden beams lie side by side under a small willow tree. These are approximately 16 ½' and 19 ½' long. A small (4" long) extract or medicine bottle near the tree is the only complete bottle observed on the site. This bottle has an Owens-Illinois maker's mark on the base, but the numbers are unreadable due to weathering.

A wide swath has been plowed across the slope between the upper and lower areas, revealing hundreds of pieces of scattered debris. The scatter is made up mostly of small sherds of ceramics or bottle glass. The ceramics are almost all plain white-ware, but one piece has a bird painted on it. Several heavier white sherds, also plain, might be porcelain. The glass sherds are clear, white (milk), green, brown, and amethyst. One green bottle base bears the letters "...ERD..." Red and orange bricks and fragments are strewn down slope from the concentration into the plowed area and below. An old plowshare turned up by the more recent plowing marks the western edge of the site. Other iron objects and fragments (unidentified) are scattered sparsely throughout the plowed area and down the slope towards the drainage.

At the head of the swampy drainage in the southeastern corner of the site, a section of fence remains partially standing. It consists of a 13'-long section of "pig wire" attached to square wooden posts at each end. It marks the upper edge of the drainage. A few meters north, a 2" pipe sticks out of the ground toward the drainage. The exposed part of it is approximately 9½' long. It is part of some kind of water conveyance system, perhaps connected to a well that is no longer visible on the surface. Some kind of bladed wheel is buried in the muck of the drainage and is believed to be a remnant of either a water wheel or a windmill. Also partially buried in the drainage is a weathered tractor tire with "54" embossed in a box on the side wall. This may represent a date (the tire's diameter is approximately 44"). Two other tractor tires rest at the base of the slope just to the northeast. Several large eucalyptus trees stand over the head of the drainage, and another has recently fallen. Rusty pliers and a pipe wrench were noted near the base of this tree during the initial reconnaissance of the property in September but disappeared in the two weeks before the site was mapped. Fragments of bottle glass and white-ware ceramics are scattered around the upper end of the drainage.

Up the slope to the northeast of the drainage is an elongated pile of rubble (mostly concrete chunks) and a pile of asphalt that are apparently the result of recent dumping. North of this rubble, a lone apricot tree marks the northeastern boundary of the site. It may have been planted when the site was occupied.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

The property examined in this investigation was owned by the Burke family as early as 1872. Records suggest that it was mainly used for livestock grazing. Presumably, at some point, some members of the Burke family occupied and/or farmed it. Maps dating from 1908 to 1941 depict at least three structures on the property during the first half of the twentieth century. A 1953 map, however, shows only a single, burned house (Travis Air Force Base 1953). Massive pits were excavated in the 1950s as sandstone was quarried on the property. In the early 1990s, approximately 1,143 cubic yards of construction debris, including concrete, asphalt, and metal, was dumped in several (over 40 percent) locations on the property, which was still owned by the Burke family at that time (Air Mobility Command 1994a; Anderson 1995).

The entire property was walked, and cultural remains (some quite recent) were observed. One area contained the remains of an older historic period occupation and warranted recordation as an archaeological site. The resource of greatest concern on the property is the apparent burned house site and its associated remains. A concentration of bricks, charcoal, and burned or melted glass at the edge of a eucalyptus grove seems to correspond to the location of the "burned house" shown on the 1953 map (Travis AFB 1953). There is no information available regarding the occupants of this structure nor is it known when it was actually occupied or burned. No visible trace remains of the other two structures depicted on maps from 1908 and 1941.

Much of the interpretive value of the site has been lost and/or corrupted over the years. Despite the presence of hundreds of glass fragments, only a single intact bottle was found. An even greater number of ceramics were present, but there was not even a half-complete vessel among them. Melted glass observed during the site recordation suggests that the fire was intense and probably very destructive. There is little chance of finding any items in this rubble that can increase our understanding of the occupants. Eucalyptus trees suggest that a substantial portion of the site lies across a fenced property boundary (inside the water treatment plant enclosure) and may be mostly destroyed. Construction, plowing, grazing, quarrying, dumping, fire, and, possibly, looting have further compromised the integrity of the site.

Most of the information about this site may be found on historical maps and in historical documents. These sources probably cannot be expanded, elucidated, or supplemented through further archaeological investigation of the site.

This site does not meet any of the criteria for inclusion in the National Register. It does not have a direct association with any significant persons or important events in local, state, or national history. It does not represent the work of a

master, nor does it possess any high artistic value. Activities such as quarrying, dumping, and extensive agricultural use over the past several years have destroyed the site's integrity. Prior to this loss in integrity, the site may have had the potential to yield information important to our understanding of the history of the region. Chances of recovering any useful information regarding the history of the region are slight. As a result, this site is not recommended for inclusion in the National Register.

6.2 RECOMMENDATIONS

During the investigation and site recordation, data was collected to support a recommendation of noneligibility for the site on the Burke Property. Much of the site's integrity has been destroyed due to extensive agricultural use, dumping and quarrying activities. It is unlikely that any useful information regarding the site or the history of the property would result from further investigations. Therefore, given the extent of the disturbance on the Burke Property, no further archaeological work is recommended on the site or the Burke Property as a whole.

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8.0 LIST OF PREPARERS

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APPENDIX A

**STATE OF CALIFORNIA - THE RESOURCES AGENCY
DEPARTMENT OF PARKS AND RECREATION
ARCHAEOLOGICAL PRIMARY RECORD, DPR523A
BURKE PROPERTY, TRAVIS AIR FORCE BASE**

**PREPARED BY
EARTH TECH
OCTOBER 1998**

PRIMARY RECORD

NRHP Status Code: 7
Other Listings: None
Date:

Review Code:

Reviewer:

- P1. Other Identifier: Burke Home Site; Solano County Parcel 4 (Book 174)
- P2. Location: Not for publication
- a. County: Solano
- b. USGS Quadrangle: Elmira, California 7.5' Date: Photorevised 1980
T 5 N; R 1 W; N ½ of the NE ¼ of the SW ¼ of the NW ¼ of Sec 14;
MDM
- d. UTM: Zone 10, 592140 mE/ 4237500 mN
- e. Other Locational Data: The site is located on the northern part of Travis Air Force Base, on the south side of the City of Vallejo/Travis AFB Water Treatment plant.
- P3a. Description: The site consists of a scatter of ceramic sherds, bottle glass sherds, metal fragments, tractor tires, collapsed fencing, a possible well, a wind mill or water wheel, and a concentration of bricks in a burned area which might be the remains of a burned house. A grove of Eucalyptus trees and a single apricot tree are probably the legacy of the home site occupation also.
- P3b. Resource Attributes: HP2, HP30, HP33, HP34, AH4, AH5, AH6
- P4. Resources Present:
- | | | | |
|-----------------------------------|------------------------------------|---------------------------------|--------------------------------|
| ☐ Building | ☐ Structure | ☐ Object | ☐ Other |
|-----------------------------------|------------------------------------|---------------------------------|--------------------------------|
- (Isolates, etc.):
- | | | |
|--|-----------------------------------|--|
| ☒ Site | ☐ District | ☐ Element of District |
|--|-----------------------------------|--|
- P6. Date Constructed/Age and Sources:
- | | | |
|--------------------------------------|--|-------------------------------|
| ☐ Prehistoric | ☒ Historic | ☐ Both |
|--------------------------------------|--|-------------------------------|
- The age determination was based on the nature of the artifacts.
- References:
- P7. Owner and Address: U.S. Air Force - 60 AMW, Travis AFB, CA 94535
- P8. Recorded by: H. Puckett and R. Cooper, Earth Tech
- P9. Date Recorded: 5 October 1998
- P10. Survey Type: ☐ Intensive ☐ Reconnaissance ☒ Other
- Describe: Site recordation
- Purpose:
- P11. Report Citation:
- Attachments:
- | | |
|---|---|
| ☐ None | ☒ Location Map |
| ☒ Sketch Map | ☐ Continuation Sheet |
| ☐ Building, Structure, and Object Record | ☒ Archaeological Record |
| ☐ District Record | ☐ Linear Feature Record |
| ☐ Milling Station Record | ☐ Rock Art Record |
| ☐ Artifact Record | ☐ Photograph Record |
| ☐ Other (List): | |

ARCHAEOLOGICAL SITE RECORD

- A1. Dimensions: a. Length 114 meters (NW/SE) × b. Width 96 meters (NE/SW)
Method of Measurement: ☐ Paced ☒ Taped ☐ Visual estimate
☐ Other:

Method of Determination: ☒ Artifacts ☒ Features
☐ Soil ☒ Vegetation ☐ Topography ☐ Cut bank
☐ Animal burrow ☐ Excavation ☒ Property boundary
☐ Other (Explain):

Reliability of Determination: ☐ High ☒ Low

Explain: The boundary was delineated based on the distribution of occupation debris, features, and introduced trees. Other cultural remains might be obscured by vegetation, and some areas that might otherwise have been included were not accessible at the time of the survey -- i.e. they belonged to a different property owner and were fenced off. Also, the general area has been disturbed by construction, quarrying, and farming which almost certainly destroyed or obscured other remains.

Limitations: ☒ Restricted access ☒ Paved/built over
☐ Site limits incompletely defined ☒ Disturbances ☒ Vegetation
☐ Other (Explain):

- A2. Depth: ☐ None ☒ Unknown _____ Method of Determination:
A3. Human Remains: ☐ Present ☐ Absent ☐ Possible
☒ Unknown (Explain): Not tested

- A4. Features: A cluster of bricks at the north end of the site measures 18" by 9.5". The six bricks lie flat and are aligned with each other as if they were part of a wall, floor, or perhaps a hearth. Their sizes vary. Some are red and some are orange. The surface they form is somewhat uneven however, and there is no visible mortar between the bricks. This feature lies at the edge of a larger concentration of bricks, charcoal, and burned or melted glass fragments. These are apparently the remains of structure that burned in this location. The remains of other features can be found at the head of the drainage at the southeast edge of the site. A 2" pipe protruding from the ground in this area is part of a water conveyance system, possibly connected to a well. Just below the pipe is a 13' long section of a collapsed fence which marks the north edge of the swampy drainage. The fence consists of "pig wire" attached to a wooden post at each end. Some kind of bladed wheel is buried in the muck of the drainage and is a remnant of either a water wheel or windmill.

- A5. Cultural Constituents: Hundreds of pieces of historic period debris are scattered over the site. It is especially obvious in the plowed area just below the brick concentration. The scatter is made up mostly of small sherds of ceramics or bottle glass. The ceramics are almost all plain whiteware, but one piece had a bird painted onto it. A couple of heavier white sherds (also plain) might be porcelain. The glass sherds are clear, white (milk), green, brown, and amethyst. A single complete bottle was found. It is made of clear glass, measures approximately 4", and is probably an extract or medicine bottle. It has an Owens-Illinois maker's mark on the base, but it is

weathered and the numbers are unreadable. Part of a green glass bottle base bears the letters "...ERD.." Two 4" x 6" timbers lie side by side under a willow tree to the southwest of the brick concentration. One is approximately 16 1/2' long and the other is approximately 19 1/2'. A little further to the west an old plow share has been turned up by recent plowing. A few other iron objects and fragments (unidentified) are strewn down the slope to the south. Bricks and fragments (both red and orange) are scattered downslope from the concentration also. In the southeast portion of the site, three weathered tractor tires lie in or near the drainage. One has "54" embossed inside a box on the side wall. This might represent the year of manufacture (its diameter is approximately 44"). A rusted set of pliers and a rusted pipe wrench were noted during a visit to the site in September of 1998 near the drainage, but disappeared in the two week period before the site was mapped. Eucalyptus trees are concentrated around the brick concentration to the north and the drainage to the southeast. They are also abundant inside the water treatment plant enclosure, suggesting the site originally extended much further north. A lone apricot tree marks the eastern boundary of the site. A pile of asphalt, concrete chunks, and construction rubble south of the apricot tree is apparently from recent dumping.

A6. Were Specimens Collected? ☒ No ☐ Yes

A7. Site Condition: ☐ Good ☐ Fair ☒ Poor

Describe disturbances: Construction, plowing, quarrying, fire, bioturbation (especially from large trees and cattle grazing), and looting

A8. Nearest Water: There is a drainage at the southeast edge of the site, and a nearby water pipe protruding from the ground suggesting there might have been a well.

A9. Elevation: Approximately 130 to 150 feet

A10. Environmental Setting: The site sits on a hill slope overlooking a small drainage. The vegetation cover is predominantly grasses and thistle, but much of the site is shaded by large Eucalyptus trees. The plowed area across the middle of the site reveals a reddish brown sandy loam. Sandstone bedrock is revealed in large quarry pits to the east of the site. Several vernal pools now exist in and around these quarry pits.

A11. Historical Information: This parcel was owned by the Burke family from at least as early as 1872. At least three structures were present on the property between 1908 and 1941, but whether these were actually built by the Burke family has not been confirmed. A burned structure appears on a 1953 map (Earth Tech 1998).

A12. Age: ☐ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848
☐ 1848-1880 ☒ 1880-1914 ☒ 1914-1945 ☐ Post 1945
☐ Undetermined

Describe position in regional prehistoric chronology or factual historic dates if known:

A13. Interpretations: This site is a remnant of a home site/farm that was owned by the Burke family from the late 19th century to the 1990s. At least three structures stood on the property from 1908 to 1941, but it is not clear who built and/or occupied these. The site described in this record constitutes a small portion of the original site. Parts of the property were sold over the years, and much of the original site is fenced off or built over. Most of the site seems to have been destroyed by construction, quarrying, farming and perhaps looting. Despite the presence of hundreds of sherds of ceramics and bottle glass, a single complete bottle and no complete vessels were

observed. The concentration of bricks noted during this survey is believed to be a remnant of a burned house that appears on a 1953 map.

A14. Remarks:

A15. References:

Earth Tech

1998 *Archaeological Investigation for the Burke Property.* Travis Air Force Base, California, October.

A16. Photographs:

Original Media/Negatives kept at:

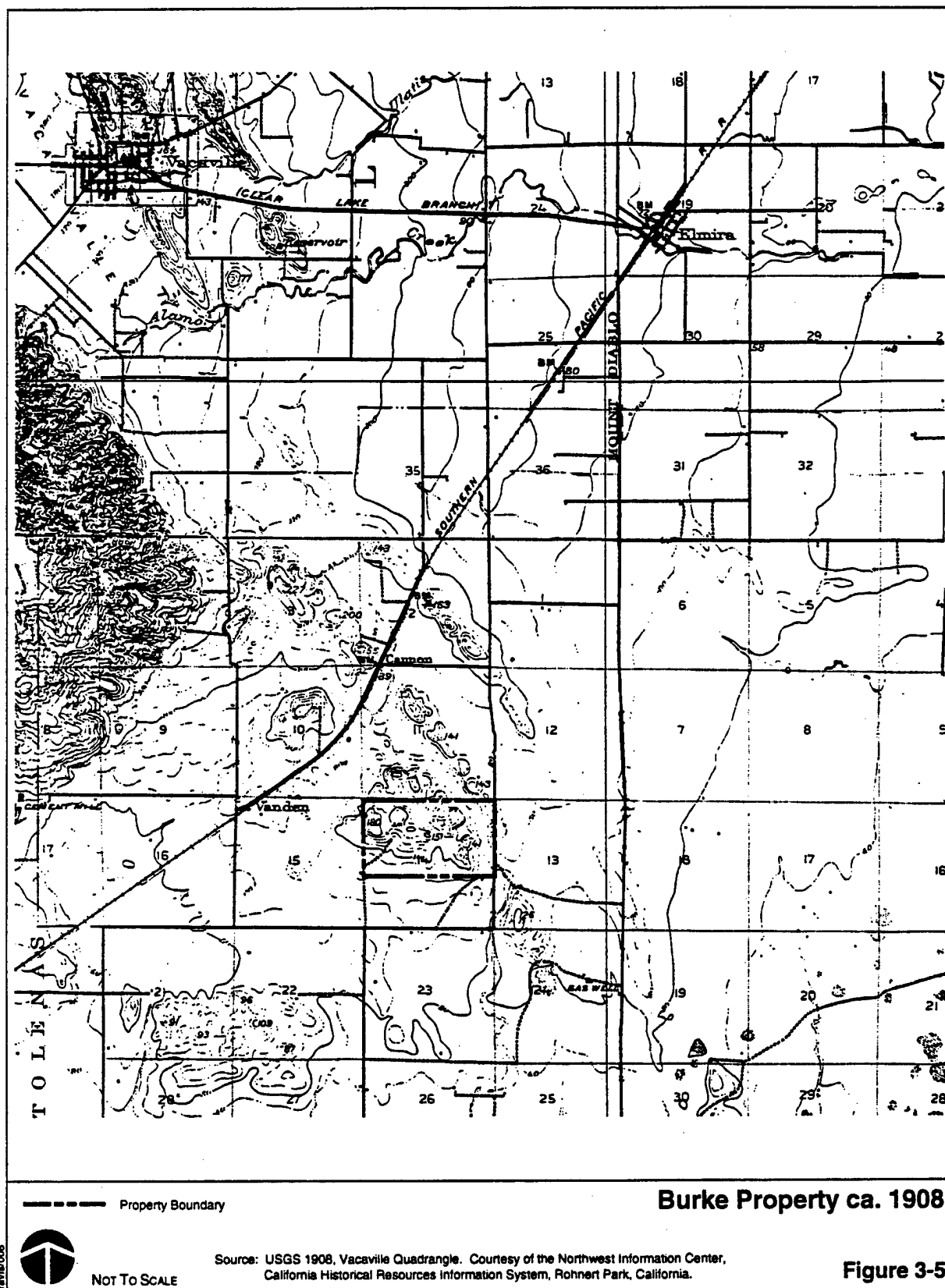
A17. Form Prepared by: R. Cooper

Date: 12 October 1998

Affiliation and Address: Earth Tech, 1461 East Cooley Drive, Suite 100, Colton, California 92324.

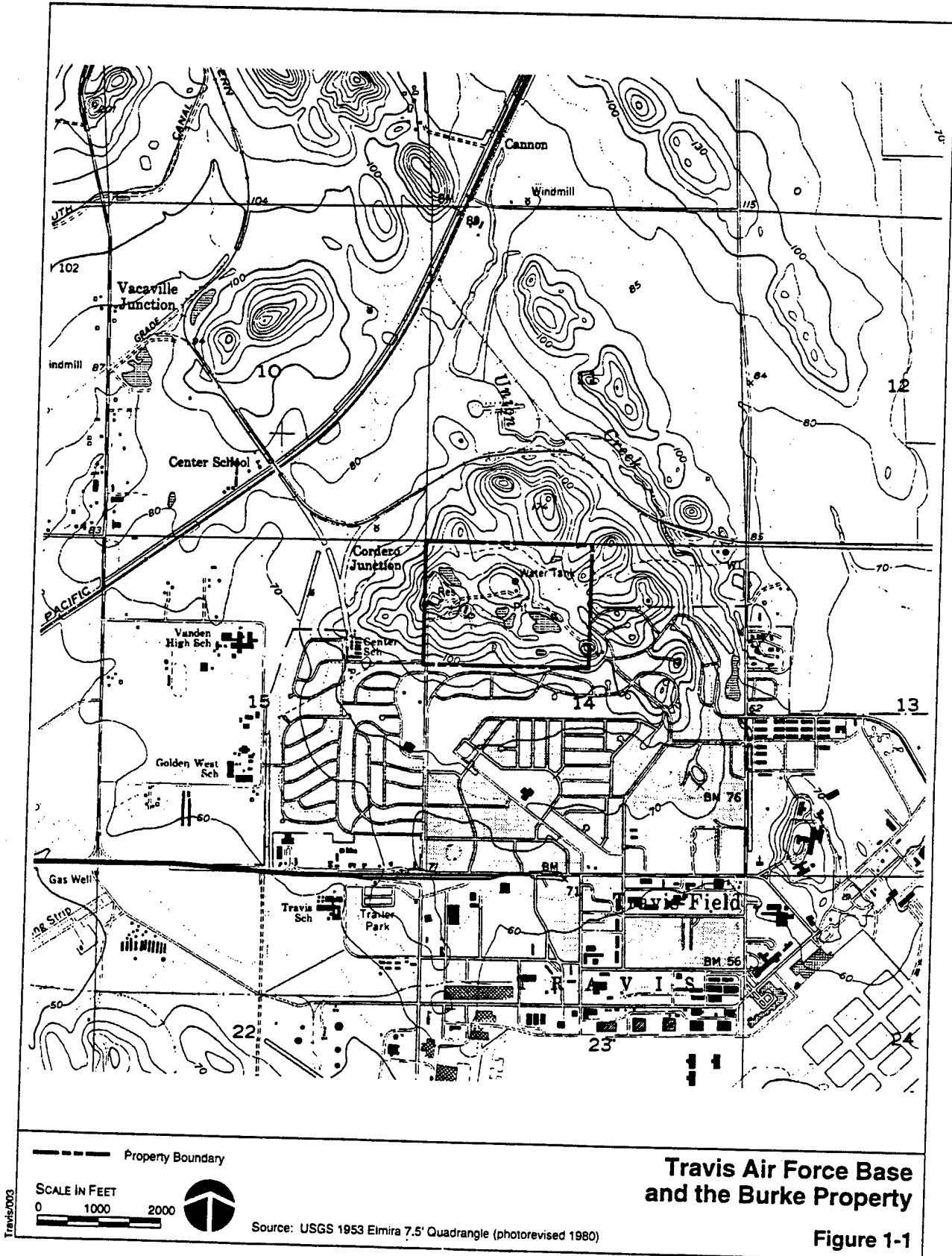
SKETCH MAP

Drawn by: Date:



LOCATION MAP

Map Name: Elmira, California 7.5' Date: 1980



APPENDIX B

**BLACK AND WHITE PHOTOGRAPHS
BURKE PROPERTY, TRAVIS AIR FORCE BASE**

**PREPARED BY
EARTH TECH
SEPTEMBER-OCTOBER 1998**



Photograph 1. Site overview,
view looking northwest



Photograph 2. Close-up of burned site location,
view looking west to northwest



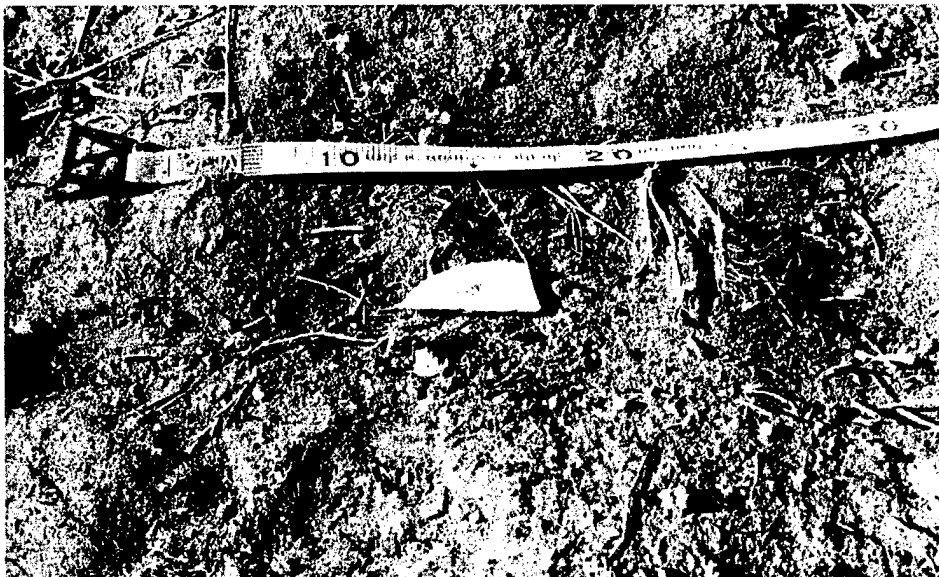
Photograph 3. Structural beams near burned site location,
view looking south to southeast



Photograph 4. Close-up of brick feature at burned site location



Photograph 5. Complete bottle found near structural beams
at burned site location



Photograph 6. Ceramic sherd bearing bird imprint
near burned site location



Photograph 7. Possible windmill or water wheel
southeast of the burned site location



Photograph 8. Site disturbed by asphalt pile and other debris,
view looking south to southeast

Correspondence



DEPARTMENT OF THE AIR FORCE
60TH AIR MOBILITY WING (AMC)

20 NOV 1998

Mr. Daniel Abeyta
Acting State Historic Preservation Officer
Department of Parks and Recreation
Post Office Box 942896
Sacramento, CA 94296

Dear Mr. Abeyta:

The Department of the Air Force recently purchased 101 acres of vacant land in Solano County, California known as the Burke property. The Air Force is proposing to build military family housing and supporting facilities on the property to serve Travis Air Force Base. In accordance with the regulations for the "Protection of Historic Properties" (36 CFR Part 800) which implement Section 106 of the National Historic Preservation Act (NHPA), we have had the property surveyed to identify any archeological properties that might qualify for inclusion in the National Register of Historic Places. No archeological properties that would qualify for inclusion in the National Register were found. A copy of the report, "Archaeological Investigation for the Burke Property," is attached.

In accordance with NHPA Sections 800.4(d), this is to notify you that we have determined that there are no historic properties that may be affected by the proposed military family housing project. While not required by this regulation, we would greatly appreciate your concurrence below on our determination and our report findings for our files.

If you have any questions about the enclosed survey or our determination, please contact Mr. Robert Holmes at (707) 424-3897.

Sincerely,

ROBERT E. NICHOLS II, Lt. Col, USAF
Director, Environmental Management

Concur

Mr. Daniel Abeyta
Acting State Historic Preservation Officer

Enclosure:
Archeological Investigation for the Burke Property

**OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION**

P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624
FAX (916) 653-9824



December 22, 1998

REPLY TO: USAF981123A

Lt. Col. Robert E. Nichols II
Director of Environmental Management
Department of the Air Force
60th Air Mobility Wing (AMW)
TRAVIS AIR FORCE BASE CA 94535-2176

Project: Burke Property/101 Acres, Build Military Housing for Travis Air Force Base

Dear Lt. Col. Nichols:

The State Historic Preservation Officer (SHPO) has reviewed and provides the following comments on the documentation you submitted on the matter cited above.

A reasonable argument could be made that the Air Force undertaking actually consists of the purchase and development of the Burke property for the purpose of building military housing. However, the Air Force appears to have defined its undertaking as consisting only of property development. It appears further that the Air Force has already purchased the property. I have no evidence indicating that the Air Force consulted with me under Section 106 of the NHPA prior to purchasing the property. Please review your records on this matter and advise me if the Air Force in fact did consult me about the purchase.

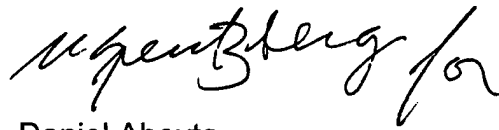
If no such consultation occurred, it is my opinion that the Air Force may have defined its undertaking in a manner inconsistent with Section 301(7) of the National Historic Preservation Act and applicable regulation, and that both my reasonable opportunity and that of the Advisory Council to comment on the undertaking may have been foreclosed.

I hope that we will have a timely opportunity to discuss the foregoing comment and to seek an appropriate resolution to the issue I have raised. If you have any questions in the meantime, please call Gary Reinoehl of our staff at

Lt. Col. Nichols
December 22, 1998
Page Two

(916) 653-5099.

Sincerely,

A handwritten signature in cursive script, appearing to read "Abeyta for".

Daniel Abeyta
Acting State Historic Preservation Officer



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND

Mr. Daniel Abeyta
Acting State Historic Preservation Officer
Department of Parks and Recreation
Post Office Box 942896
Sacramento, CA 94296

17 FEB 1999

Dear Mr. Abeyta:

This letter is in response to the question in your letter of December 22, 1998 (USAF981123A). Specifically, your letter questioned whether the Air Force had consulted the SHPO prior to the acquisition of the 101-acre parcel of property that is now planned for military family housing development.

The acquisition of the property in question was the result of Base Realignment and Closure Act (BRAC) actions. Those actions realigned 19 KC-10 aircraft and related personnel from March AFB, California to Travis AFB. In 1994, in response to BRAC Commission recommendations and as a prerequisite to implementation of the realignment action, a comprehensive Environmental Impact Statement (EIS) was prepared by Headquarters Air Mobility Command, Scott AFB, Illinois, in accordance with requirements of the National Environmental Policy Act (NEPA). The EIS included an analysis of, and identification of potential impacts to, cultural resources that might result from acquisition of and development upon the 101-acre parcel of property now at issue.

In 1994, as part of the EIS process, numerous State and Federal agencies, including your office were sent copies of the EIS. At that time we pointed out that there was a potential for the remains of a historic homestead to be found on this property and advised you that we were aware of our responsibilities to comply with the Advisory Council on Historic Preservation's regulations.

Since that time we have contracted for a professional archeological survey of the 101 acre parcel. No evidence was found that any archeological material exists on this property that would qualify for listing on the National Register. Our previous letter transmitted a copy of that evaluation with our finding that no National Register or eligible properties exist on the 101 acres.

Thank you for your assistance in this matter. If you have any further questions, please contact Mr. Robert Holmes at (707) 424-3897.

ROBERT E. NICHOLS, III, Lt Colonel, USAF
Director of Environmental Management

APPENDIX D
Comments & Responses to Comments

APPENDIX D

Comment Letters Received on the Environmental Assessment

Letter Reference	Commentor
1.	East Ranch Company
2.	John H. Anthony
3.	California Department of Transportation
4.	City of Vacaville
5.	City of Fairfield

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EAST RANCH COMPANY
1107 KENTUCKY STREET
FAIRFIELD CA 94533
(707) 426 0100

Letter 1

March 3, 1999

Mr. Surinder Sikand,
Environmental Planning Branch, Code 7311
Office of the Commanding Officer
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, CA 94066-50006

RE: Comments on Draft Environmental Assessment for Travis Air Force Base Burke
Property Housing.

Dear Mr. Sikand:

This concerns the Draft Environmental Assessment for Travis Air Force Base
Burke Property Housing, dated February 4, 1999.

Although we are supportive of any effort to improve the quality of housing for the
military personnel at Travis Air Force Base, we are concerned that the Environmental
Assessment completely overlooks the impact of the proposed housing development on
the school facilities of the Travis Unified School District (TUSD), which will serve the
school-age children living at the development.

On February 10, 1998, TUSD approved a Master Facilities Plan, identifying the
facilities required to serve new residential growth in the District over the next ten years.
On March 10, 1998, the District also approved a Facilities Financing Plan, which
identifies the means by which the District must raise the funds to pay for the needed new
facilities. The Financing Plan makes it clear that the District must collect an impact fee
equal to \$12,136 per single family residence, or require the participation of new
residential development in the District in a Community Facilities (Special Taxing)
District yielding a Special Taxes with the net present value equal to that amount, in order
to finance the construction of new school facilities required to serve new residential units
in the District.

A

The Financing Plan indicates that even with the collection of this amount for each
new residential unit in the District, ultimately a District-wide general obligation bond
would be required to fully fund the improvements required to serve new dwellings in the
District.

East Ranch Company is the Developer of a portion of the Gold Ridge Project,
which was recently annexed to the City of Fairfield. As a condition of the approval of
our project, we entered into a Mitigation Agreement with TUSD on October 31, 1998.

Mr. Surinder Sikand
March 3, 1999
Page 2

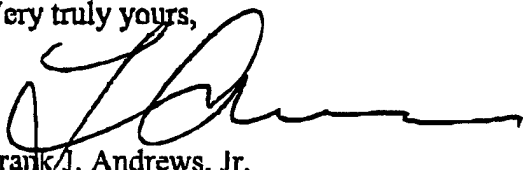
That Agreement, executed by all of the Gold Ridge landowners, requires that all of the housing units in the Gold Ridge Project participate in a Communities Facility District and be assessed special taxes with a present value equal to the \$12,134 figure identified by the District Financing Plan. B

Since the housing project proposed for the Burke Property will add students to the Travis Unified School District, and since the impact resulting from the addition of new students to the District has been so clearly identified by TUSD's Financing and Facilities Plans, if the impact on District facilities created by these new students is not mitigated by payment to the District of an amount equal to that identified by the Financing Plan, there can be no question that the existing students in the District, including Travis Air Force Base military dependents already attending TUSD schools, as well as the new students generated by the project, will be harmed.

Although it has been argued that the impact aid paid the District by the Federal Government covers impacts of new military housing on school facilities, this is clearly not the case. Impact aid only compensates for the fact that government owned facilities pay no property taxes. The need for the impact fees identified by the District's Studies is in addition to the property taxes generated by the units which must pay the impact fees. C

We urge that the environmental documentation for the Burke Property Housing Project fully account for the Project's impact on Travis Unified School District Facilities, and urge that the United States Government provide for the full mitigation of that impact as identified by the District's Financing Plan.

Very truly yours,



Frank J. Andrews, Jr.

Cc: Superintendent, Travis Unified School District

JOHN H. ANTHONY
2815 Shasta Drive
Fairfield, CA 94533
(707) 437-2674

Letter 2

March 4, 1999

Commanding Officer,
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, CA 94066-50006
ATTN: Mr. Surinder Sikand, Environmental Planning Branch

RE: Draft Environmental Assessment – Travis Air Force Base Burke Property
Housing

Dear Sirs:

The following are comments to the draft Environmental Assessment of the proposed Travis Air Force Base Burke Property Housing Project, which is to consist of either 226 or 281 housing units.

Introduction.

Ordinarily, one would expect that an assessment of the impacts of a proposed federal project would pay close attention to the project's consistency with local zoning and land use policies, and with its impact on the services and facilities of affected local governments. This Environmental Assessment ignores both of these issues, and as a result, vastly understates the negative impacts of the proposed project.

A

Schools.

Travis Air Force Base is located within the boundaries of the Travis Unified School District, which encompasses portions of the Cities of Vacaville and Fairfield and a portion of the unincorporated area of Solano County.

The School District recently completed a Facilities Study for the purpose of determining the impact of residential growth on the District's ability to provide necessary school facilities to its students.

The District determined that even taking into account the possibility of passing district-wide general obligation bonds and other potential funding sources, impact fees (or the equivalent), equal to over \$12000 per new dwelling unit would be necessary to provide adequate school facilities for new students in the District. The District used the study as the basis for requiring a new housing project in the District to join a special taxing district which levies special taxes with a present value equal to over \$12,000 per single family unit. Notwithstanding the willingness of the proponents of another proposed residential project (the Grill/McBail property) to agree to the same level of mitigation, the District refused to issue that project a "will serve letter," the lack which was one of the reasons given by the Solano County Local Agency Formation Commission ("LAFCO") for its decision to deny the annexation of the Grill/McBail project to the City of Fairfield.

B

Based on the School District's analysis, the proposed Burke Property Development would create an unmitigated impact of well over \$2,700,000 on Travis Unified School District facilities, and this impact does not take into account the factors leading to the District's decision to decline services to the Grill/McBail project.

C

Consistency with local land use plans.

The Burke property is located in the unincorporated area of Solano County, and the County's General Plan and zoning classifications for the property are for agricultural uses. The property is located within "Phasing Area D" as defined by the City of Fairfield's General Plan, as amended by the enactment of the "Travis Protection Element" of the General Plan. It is assumed that the Burke property, like the rest of the Base, will be annexed to the City of Fairfield.

At least half of the Burke property is located on land designated for open space uses by Fairfield's General Plan. Moreover, a large portion of the project site is located above the 100-foot contour, and Fairfield's General Plan prohibits development above the 100-foot elevation in this area.

D

Urban Services.

Sewage from Travis Air Force Base is treated at facilities belonging to the Fairfield-Suisun Sewer District. The Sewer District requires that new housing within its boundaries pay an impact (connection) fee of over \$6,000 per single family unit. Based on this impact fee, there would be an unmitigated impact of over \$1,350,000 on the Sewer District's facilities resulting from the project.

E

Likewise, the Base buys its water from the City of Vallejo and the addition of these units will create an impact on Vallejo's water supply.

Mr. Surinder Sikand
March 4, 1999
Page 3

Whether or not the addition of these housing units will impact still other facilities and services of nearby local governments should at least be discussed in the environmental documentation for the project.

F

Wetlands and Endangered Species Issues.

Fairfield's General Plan anticipates that wetlands lost to development will be mitigated at a ratio of between 2 and 3 to one. This is also a position of the Corp of Engineers in its administration of the Clean Water Act.

Either of the two development plans for the project would significantly impact wetlands and potential sensitive species habitat located on the site. A mitigation plan should, therefore, be required. Because species which are protected under the endangered species act are located in the vicinity of the project, either rigorous surveys to determine their presence should be conducted in the wetlands areas, or pursuant to applicable Fish and Wildlife Service regulations and policies, the assumption should be made that endangered species will be impacted

G

Summary

The Environmental Assessment ignores the project's potentially very large impacts on local government infrastructure, especially relating to schools and sewer treatment, and ignores its serious conflicts with the General Plans of both the County of Solano and the City of Fairfield. The proposed project would impacts wetlands and may well impact sensitive plant and wildlife species listed by the both the State and Federal governments.

The Federal Government should take a leadership role in adequately assessing the environmental and other impacts of its development projects. This study, however, would be deemed utterly inadequate for a private project creating impacts of a small fraction of those resulting from this large housing project.

Sincerely,


John H. Anthony

Cc: Army Corps of Engineers
Travis Unified School District
Fairfield-Suisun Sewer District
California Department of Fish and Game
City of Fairfield

DEPARTMENT OF TRANSPORTATION

BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454



February 23, 1999

SOL-80-19.176
SOL80246

Mr. Sam Dennis, Code 7031
Commanding Officer
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, CA 94066-5006

Dear Mr. Dennis:

Travis Air force Base Burke Property Housing

Thank you for including the California Department of Transportation (Caltrans) in the early stages of the environmental review process. We have reviewed the draft environmental assessment and concur with your assessment that the number of trips to Travis Air Force Base will be reduced upon project completion. We have noted and welcome responses to the following comments:

1. Appendix A, page A3 of the draft Environmental Assessment states that during construction, workers travelling to and from the work site might impact state facilities; and therefore, in an attempt to mitigate this, your agency will purpose ride share programs, etc. Should your proposals be unsuccessful, are there other alternatives that can be implemented?
2. Will any heavy construction equipment need to be transported via the State Highways to the work site? If so, what mitigation is proposed for any damage to the state facility (e. g. pavement damage) if it were to occur?

We appreciate the opportunity to work with you on this project. Should you require additional information or have any questions regarding this letter, please call Bonnit Braxton of my staff at (510) 622-1645.

Sincerely,

HARRY Y. YAHATA
District Director

By:

JEAN C. R. FINNEY
District Branch Chief
IGR/CEQA

COUNCIL MEMBERS
DAVID A. FLEMING, Mayor
ROB WOOD, Vice Mayor
LEN AUGUSTINE
PAULINE CLANCY
RISCHA SLADE



CITY OF VACAVILLE

650 MERCHANT STREET, VACAVILLE, CALIFORNIA 95688-6908

ESTABLISHED 1840

Community Development Department
Advanced Planning Section
(707) 449-5140

SENT VIA FAX TO (650) 244-3206
HARD COPY TO FOLLOW

March 4, 1999

Commanding Officer, Engineering Field Activity West
Naval Facilities Engineering Command
Attn: Mr. Surinder Sikand
Environmental Planning Branch, Code 70311
900 Commodore Drive
San Bruno, CA 94066-5006

**SUBJECT: Draft Environmental Assessment for Travis Air Force Base Burke
Property Housing**

Dear Mr. Sikand:

The City of Vacaville has received the Draft Environmental Assessment for the proposed Travis Air Force Base Burke Property Housing. The document was reviewed with respect to issues and potential impacts that the project might have related to the City of Vacaville. We have no comments regarding the document.

Please forward a copy of the Final Environmental Assessment to my attention. Thank you for the opportunity to review the Draft Environmental Assessment.

Sincerely,

Maureen Traut
Senior Planner

cc: Ron Rowland, Director of Community Development

D-9

DEPARTMENTS: Area Code (707)

Administrative Services 449-5101	City Attorney 449-5105	City Manager 449-5100	Community Development 449-5140	Community Services 449-5654	Fire 449-5452	Housing & Redevelopment 449-5660	Police 449-5200	Public Works 449-5170





DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-5006

FEB 05 1999
IN REPLY REFER TO:

Dear Interested Party,

The Air Force proposes to provide military family housing (MFH) on the 101-acre (41-hectare) Burke Property, which was acquired by the Air Force for that purpose in March 1998. The project would help meet the need for additional military family housing, especially for junior enlisted personnel, that was created by the relocation of personnel to Travis AFB from March AFB, an action approved by the Base Closure and Realignment Commission and evaluated in the Air Force's EIS and Record of Decision (USAF 1994a,b). Currently, personnel that have relocated to Travis AFB reside off-base in surrounding communities, where housing is in short supply and the cost of rent typically exceeds the housing allowances of junior enlisted personnel. Construction of MFH on the Burke Property would enable Air Force personnel and their families to live in closer proximity to their jobs and the schools their children attend, while avoiding the high costs, commuting, and uncertain availability and suitability of off-base housing. On-base housing also provides a supportive community for Air Force families when enlisted personnel are called to duty overseas.

The public review period begins on February 8, 1999 and will extend for approximately 30 days before closing on March 10, 1999. All comments must be postmarked on or before March 10 in order to be assured consideration in the DEA public review process.

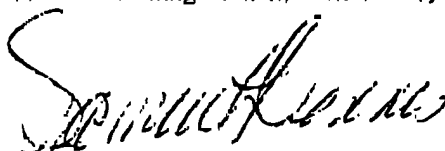
The DEA has been distributed to various federal, state, and local agencies, elected officials, special interest groups, and the public. A limited number of single copies are available at the address listed at the end of this letter. In addition, copies are available at the following libraries for public access: Solano County Public Library, Vacaville Public Library, Suisun City Public Library, and Fairfield-Suisun Community Library.

Pursuant to the Council on Environmental Quality Regulations (40 CFR Parts 1500-1508) implementing the procedural provisions of the National Environmental Policy Act (NEPA), the Department of the Navy has assisted the Air Force in the preparation of the NEPA documentation for construction of MFH on the 101-acre (41-hectare) Burke Property at Travis Air Force Base, California.

The DEA considers two alternative designs for the proposed action, a 281-unit design and a 226-unit design. A no-action alternative is also considered. The 281-unit design would use about 54 acres of the site, and directly impact less than 3 acres of aquatic and wetland habitats. The 226-unit design was developed in response to input from the Fish and Wildlife Service and Corps of Engineers, to further reduce the impact on aquatic and wetland habitats. This alternative would use about 42 acres of the site while impacting less than 1 acre of wetland and aquatic habitats.

The public review period begins on February 8, 1999 and will extend for approximately 30 days before closing on March 10, 1999. The comment letters received during the public review process will be considered in developing the Final Environmental Assessment and Finding of No Significant Impact. Please send your comments to:

Commanding Officer, Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive, San Bruno, CA 94066-5006
(Attention: Mr. Surinder Sikand, Environmental Planning Branch, Code 70311)


SAM DENNIS



CITY OF FAIRFIELD

Founded 1886

Incorporated December 12, 1901

DEPARTMENT OF PLANNING AND DEVELOPMENT

COUNCIL

Mayor
Duane Perryglow
07.428.7395
Vice Mayor
Norman O'Regan
07.428.6298
Councilmembers
07.428.6298
City Manager
John MacMillan
07.428.7449
City Attorney
Greg Stepanicich
07.428.7412
City Clerk
Lisa Day
07.428.6298
City Treasurer
Carol G. Rayos, Jr.
07.428.7497

DEPARTMENTS

Community Services
07.428.7465
Police
07.428.7490
Fire
07.428.7175
Public Works
07.428.7394
Planning & Development
07.428.7461
City Clerk
07.428.6298
City Manager
07.428.7449

May 6, 1999

Colonel David Byrd, Jr.
60 SPTG/CC
400 Brennan Circle
Travis Air Force Base, CA 94535-2856

Re: Military Housing Project

Dear Colonel Byrd:

This letter is in response to a request by Susan Harris that the City provide information to the Air Force regarding the consistency of the proposed Burke Property housing with City policies and regulations. As you are aware, this property is not within the current City limits. Even if the property is annexed to the City, the City has no jurisdiction over development of the proposed housing project, because the property is owned by the federal government and will be used for a public purpose.

The City of Fairfield continues to support projects that will provide housing for military personnel at Travis Air Force Base. Please feel free to call me at 428-7449 if you have any questions.

Sincerely,

EVE SOMJEN
Assistant Director

cc: Kevin O'Rourke, City Manager
Greg Stepanicich, City Attorney
Sean Quinn, Director of Planning and Development
Susan Harris

**-Letter 1-
East Ranch Company**

Response to Comments

- 1-A The Air Force contributes funds to both construction and maintenance activities of the Travis Unified School District. In a recent modernization of Travis Elementary School, the federal government conveyed the building to the school district at no cost and contributed \$3.7 million of the \$4.5 million cost of renovation and modernization. Ultimately, development fees such as those referred to in the comment are considered by the Air Force to constitute taxes to which the Air Force, as an arm of the federal government, is not subject.
- 1-B Federal impact aid funds from the Department of Defense in accordance with the Education Appropriation Act of 1995 (Title VIII of Public Law 103-382, Section 8003) are provided to the District. These funds currently comprise almost 20 percent of all revenues received by the school district from federal, state, and local funding sources. Of the \$5.4 million in federal impact aid received in school year 1997-98, \$400,000 was specifically identified for construction activity. For each student attending district schools (the parent or parents of whom reside on the base), the school district receives about \$2,200 annually in impact aid.
- 1-C The County benefits by Public Law 103-382 and the Payment in Lieu of Taxes Act, Public Law 97-258 (31 U.S.C. 6901-6907), which provides funds to the County based on the percentage of the County occupied by Federal Lands.

**-Letter 2-
John H. Anthony**

- 2-A The subject EA is tiered to the Environmental Impact Statement for the Realignment of Travis Air Force Base, California as described in section 1.1 of this EA. The Realignment EIS considers relocation of population to Travis AFB resulting from closures at other Air Force installations and considers the impacts of the resulting population growth on facilities and services of the affected local governments (sections 3.9 and 4.9). The Realignment EIS also considered the purchase of the Burke Property and its use for 384 units of family housing (section 2.2.3). This EA focuses on the on site-specific impacts of specific proposed and alternative housing developments on the Burke Property.

Because the Burke property has been purchased by the federal government for inclusion into Travis AFB, it is no longer subject to local zoning and land use policies. The proposed project is consistent with adjoining residential land uses on Travis Air Force Base.

- 2-B The Air Force contributes funds to both construction and maintenance activities of the Travis Unified School District. In a recent modernization of Travis Elementary School, the federal government conveyed the building to the school district at no cost and contributed \$3.7 million of the \$4.5 million cost of renovation and modernization. Ultimately, development fees such as those referred to in the comment are considered by the Air Force to constitute taxes to which the Air Force, as an arm of the federal government, is not subject.
- 2-C Federal impact aid funds from the Department of Defense in accordance with the Education Appropriation Act of 1995 (Title VIII of Public Law 103-382, Section 8003) are provided to the District. These funds currently comprise almost 20 percent of all revenues received by the school district from federal, state, and local funding sources. Of the \$5.4 million in federal impact aid received in school year 1997-98, \$400,000 was specifically identified for construction activity. For each student attending district schools (the parent or parents of whom reside on the base), the school district receives about \$2,200 annually in impact aid.
- 2-D Because the Burke property has been purchased by the federal government for inclusion into Travis AFB, it is no longer subject to local zoning and land use policies. The proposed project is consistent with adjoining residential land uses on Travis Air Force Base. The two alternative housing designs addressed in the EA (281-unit and 226-unit) are configured to preserve approximately 46 percent and 56 percent of the property, respectively, as open space.
- 2-E An existing contract between the Air Force and the Fairfield-Suisun Sewer District (FSSD) provides for all sewerage from Travis AFB to be treated by the district. Travis AFB and the FSSD are currently finalizing an agreement that will set flow capacity and rates. Unlike most private housing developments, the Burke Property Housing project includes the construction, operation, and maintenance of all sanitary sewer lines and connections by the Air Force. Thus, costs incurred by the FSSD will be substantially less per housing unit than would be the case in a similarly designed and constructed private development.

The issue of water supply was addressed in the 1994 EIS on the Realignment of Travis AFB. The EIS identified a potentially significant water supply problem during the summer and early fall. The Air Force and the City have been working together to resolve the supply problem during the peak water use months by building a 2.5 million gallon water storage reservoir and improving the capacity of the well field. Travis AFB obtains its water from two sources, the City of Vallejo and a well field owned by the base. The City of Vallejo Water Treatment Plant, which supplies its water exclusively to the base, is located immediately adjacent to the proposed Burke Property housing development and would supply the project. The Travis AFB well field provides the supply for Travis AFB as a backup when the treatment plant is not operating.

- 2-F Impacts on facilities and services of local governments resulting from the relocation of population to the Travis AFB area are addressed in the Realignment EIS (sections 3.8.6; 3.9, 4.8.7, and 4.9) from which this EA is tiered.
- 2-G The mitigation plan for this project includes 1 for 1 on-site replacement of the small area of wetland that is unavoidably impacted (less than 1.2 acres out of a total of 14.2 acres) and provides for the preservation and enhancement of the remaining 13 acres. The project also provides for additional off-site mitigation. Mitigation measures are described in section 4.3.4 of the EA.

Extensive endangered species surveys have been conducted by qualified scientists as described in section 3.3 of the EA. On-going seasonal surveys are continuing to further assure protection of threatened and endangered species. The project has been carefully coordinated with USFWS to take all necessary measures to assure compliance with the Endangered Species Act, and other natural resource laws and policies. Extensive surveys (with special care taken in wetland areas) have identified 2 individual plants of the species *Lasthenia conjugens* (Contra Costa goldfields) that would be impacted by the proposed project. Recommendations by USFWS to mitigate this impact have been included in the mitigation plan in section 4.3.4 of the EA.

-Letter 3-

California Department of Transportation

- 3-1 Approximately between 60 to 70 construction worker's vehicles are expected to be entering Travis Air Force Base for this housing project, as compared to approximately about 7,000 vehicles entering the base during the day shift between 6:30 – 7:45 A.M. Consequently the increase will have insignificant impact on the base.
- 3-2 All the construction equipment and material will be hauled via state registered and contractor bonded vehicles who pay their vehicle registration, and fuel taxes to cover the cost of use, and wear and tear of state and local highways and streets.

-Letter 4-

City of Vacaville

Thank you for your comment.

-Letter 5-

City of Fairfield

Thank you for your comment.

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APPENDIX E

Endangered Species Act and Clean Water Act Compliance

Vernal Pool Mitigation Plan—May 24, 1999

Vernal Pool Mitigation Plan

Construction Measures: Violation of any of the following construction mitigation measures, said violation to be determined by the Travis Air Force Base Representative (ROICC), may result in halting of construction activities at the MFH construction site. A review by the Air Force environmental office of site environmental resources, mitigation measures and appropriate construction procedures to safe guard site resources will then be coordinated with the USFWS and COE as appropriate. The contractor is responsible for understanding and complying with the federal Endangered Species Act (E.S.A.) and the Clean Water Act, as outlined in the projects Section 7 permit (E.S.A.) and Corps of Engineers Section 404 of the Clean Water Act Permit as they apply to the projects construction. Any cost or delays resulting from the contractors failure to comply with the mitigation requirements of the projects permits or contract specifications will be borne by the contractor. Once work is halted at a work location it will not be reinitiated without explicit direction from the Travis Air Force Base Representative (ROICC).

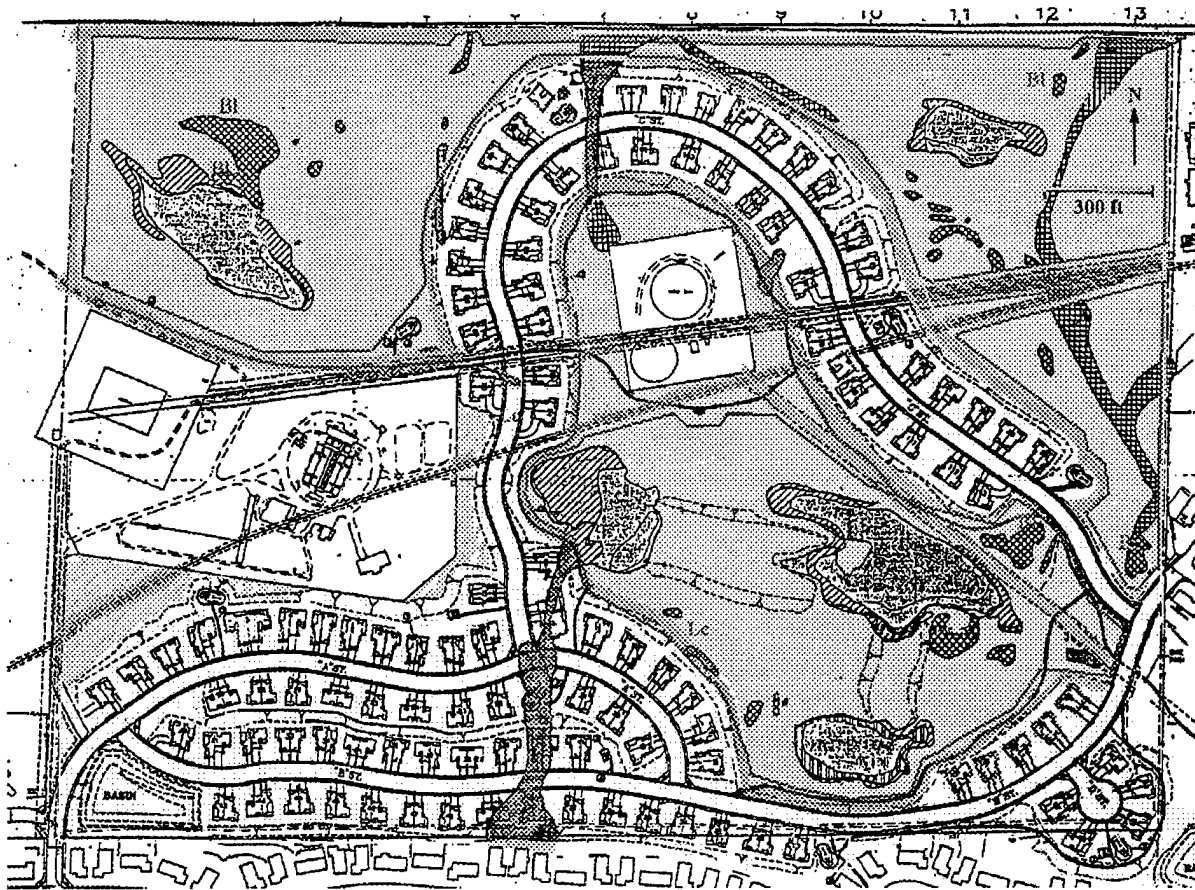
1. The contractor will provide onsite informal training (tailgate) sessions to all contractor and contractor sponsored personnel who require access to the construction site. The sessions will include a description of the sensitive and protected biological resources, guidance on how to recognize the resource, procedures to be employed to avoid impacting sensitive resources, and how to report any accidental resource impacts.
2. The contractor will designate an onsite manager who will be responsible for insuring compliance with all applicable environmental mitigation measures. Any violations of the mitigation measures will be immediately reported to the Travis AFB environmental office and the ROICC.
3. Construction fences around endangered species habitat: Fences will be constructed to provide a visual marker to prevent construction personnel and equipment from encroaching upon sensitive wetlands. Erosion control netting (silt screen) or Snow Fencing shall be located no closer than 50 feet away from all sensitive wetland areas. The control netting will be attached to metal stakes securely driven into the ground. The stakes will be placed at least every 10 linear feet. Netting primarily used to control sediment will be placed in accordance with manufacturer's instructions to prevent sediment from reaching wetlands. The contractor's site supervisor shall inspect the construction site to assure that all wetlands are fenced prior to the day's start of construction. If areas are not marked, the supervisor shall have them re-fenced prior to the start of construction activities. The initial fencing lay out must be inspected and approved by the Travis AFB environmental office. All personnel will be briefed on the significance of wetland areas.
4. All contractor personnel and contractor-initiated deliveries will remain outside fenced boundaries at all times.

5. Any disturbance of existing wetlands other than as specifically addressed in the construction plan will require restoration, re-vegetation and monitoring at the contractors expense. All work shall be concluded in accordance with requirements of the USACOE and USFWS.
6. No storage of chemicals, solvents, paints will be allowed in areas that could potentially drain into wetland or vernal pool areas, other than for immediate use. No fueling, mixing, storage or transfer of chemicals harmful to wetland ecosystems will be allowed upgradient of any sensitive wetland area.
7. Best management practices will be used to control soil erosion on the job site. At a minimum, straw bails and geotextile fabric barriers shall be erected to prevent any sediment from entering into any of the mapped wetlands.
8. Any use of seed mixtures will be approved by the Travis AFB environmental office to assure that only appropriate native plant species, sterile annual plants, or plants that can be prevented from spreading by mowing are used for erosion control.

Mitigation Measures:

1. The Air Force has reduced the size of the project from 286 units to 226 units in order to avoid significant impacts to wetlands on the "Burke" site.
2. The Air Force will set aside 40 acres of the project property as wetland / vernal pool management preserve. The primary purpose of the reserve is to protect existing wetland resources, support sensitive species and maintain a healthy watershed.

Approximately 56 acres of the 101 acre site will not be graded or developed. This area will be designated open space, and will not be developed except to provide recreation opportunities. Within the 56 acre open space area is a smaller area no less than 40 acres whose principle purpose is the protection of wetland and endangered species habitat. The 40 acre vernal pool and wetland preserve does not include areas encumbered by existing pipeline easements, firebreaks, or small areas that while not graded for development are not contiguous with the wetland protection areas.



3. A swale at least 1.5 acres in size will be created between Pond 1 and 2 as mitigation for the filling of approximately 1.5 acres of wetland swale habitat required by the project construction. The swale habitat will consist of a meandering, low flow channel cut between Ponds 1 and 2. Construction will include three small 10x20 foot depressions that will provide vernal pool type habitat and additional swale area (estimated 1 acre) and will be created between Ponds 2 and 3.
4. The new outlet of Pond 1 will be constructed at the height of the existing outlet structure and graded to the elevation of standing water in Pond 2. The Base environmental personnel, in coordination with USFWS, will adjust the flow regimes in the ponds to optimize resource values either by controlling the weir structure or by grading the earthen outlet of Pond 1.
5. The Air Force will purchase a 1-acre vernal pool easement (cost not to exceed \$70,000) on suitable mitigation bank property to compensate for any residual impacts to vernal pools and fairy shrimp due to project encroachment into vernal pool habitat not mitigated by the project. This one-time purchase is part of an existing programmatic mitigation bank developed in coordination with the USFWS and the Army COE for mitigation of vernal pools and fairy shrimp.

6. Culverts will maintain existing drainage under roadways and bicycle paths.
7. Wetland plants consistent with firebreak considerations will be allowed and encouraged to develop along drainage swales, thereby enhancing the swales wetland value. Drainage swales will function as a vernal swale offsetting the loss of some of the natural swale habitat below Pond 1.
8. Rolled curbs and open drainage swales will allow amphibian crossings throughout the project area.
9. No pets will be allowed to roam in the wetland reserve site. Owners of off-leash pets in sensitive areas will be cited by installation security police personnel
10. A list of native plant species shall be incorporated into common plantings and will include the appended plant species list as appropriate. In addition native plants shall be used to enhance the existing wetland and natural resource values located outside of the developed area.
11. A long-term management plan will be developed to gradually replace existing stands of Eucalyptus trees with native oaks and Grey pines through yearly plantings of oaks and selective removal of eucalyptus. Invasive exotic plants will not be allowed in any landscaping of the housing area, to include both the common areas and the individual areas. Examples of these exotic plants include Scotch Broom; French Broom; New Zealand Ivy; Pampas Grass. Active removal and eradication of invasive exotic species will be conducted by the base to prevent invasive species from gaining a foothold in the natural areas.
12. Travis AFB will monitor for exotic animals and, to the extent permitted by law, eradicate them in order to protect the natural resources of the site. This will be an ongoing installation responsibility..
13. Any feral cats will be trapped and removed.
14. All new tenants will be provided with educational materials on local natural resources, why they are important, and how they should protect these resources. These materials will include mandatory restrictions, such as requiring all pets to be kept leashed and kept away from protected species and habitats
15. No cats or dogs shall be allowed in units 68-73 and 109-113. These units front the most sensitive resource areas.
16. A Cross Country bicycle "fun" area originally planned for the project will be located away from sensitive resource areas. Picnic and park areas will similarly be situated to avoid sensitive areas.

17. Educational signs and billboards will be placed at trailheads providing information on the wetlands, their biology and importance.
18. Firebreaks will be managed to avoid impact to vernal pools and wetlands. Mowing near vernal pools will not be carried out until such time as the vernal pools have dried out. Firebreak disking will not be allowed within 50 feet of any wetland.

Management and Avoidance Measures:

1. Use of insecticides, herbicides or other chemicals will be prohibited where such use could contaminate wetlands or vernal pools in the MFH area. The Air Force will include, as a condition of tenancy in those houses that are located within the drainage footprints of sensitive wetlands, that the residents will not use any outdoor insecticides or herbicides unless they have been previously determined by the base environmental office to be consistent with protecting the existing wetland resources and in particular in protecting endemic vernal pool plants and the endangered vernal pool fairy shrimp.
2. Drainage into the existing vernal pools will be maintained through the use of culverts connecting the vernal pool systems watershed uphill of the development to that down hill of the development.
3. A management report on the status of wetland resources will be prepared annually for a period of five years by the base environmental staff. The report will document the condition of onsite natural and wetland values. The report shall make recommendations to the base commander on measures deemed necessary to protect and enhance wetland values. Potential protection measures include, but are not limited to, the following:
 - a. Exclusion: If studies show that vernal pools supporting sensitive species are being impacted, fences to protect vernal pools and sensitive species habitat will be installed and/or seasonal exclusion of people and animals from areas will be implemented.
 - b. Weed control: Exotic weed control operation in areas surrounding vernal pools will consist of the use of hand tools, mowing, controlled animal grazing, selective spot herbicide application and/or controlled burning. The purposes for which weed control will be implemented are enhancement of the native flora, construction and maintenance of firebreaks and reduction of wild fire fuels.
 - c. Active erosion control. During project construction and for a period of two years afterward, active erosion control measures (re-vegetation, hydromulch, matting) will be undertaken to prevent sediment from accumulating in all vernal pools and ponds. All soils disturbed during construction will be matted, hydroseeded or hydromulched to prevent sediment erosion into the pools. Hay bails, erosion control netting and other effective erosion control measures will be used to intercept and prevent any sediment from entering vernal pools and ponds.
 - d. Hydroseeding: Any hydroseeding, erosion control planting etc. will use appropriate plant species native to the local area and site. Hydroseeding will use exotic species and varieties only if they can be controlled and eradicated once they have served their soil stabilization function. At the end of the initial erosion control phase, only plants native or naturalized to the site should remain.

e. Pond management: Ponds will be managed to control of water levels and drying in ponds in order to enhance resource values. Use of environmentally benign mosquito and pest control methods (Bacillus thuringiensis, golden bear oil or other approved methods) when employed will be consistent with natural resource protection.

Enhancement Measures:

1. Planting of native perennial plant species within the reserve area: Native plant species will be planted in several groupings no closer than 100 feet of the vernal pools. These plantings will emphasize woody shrub and tree species native to the area (oak-woodland species) and that will increase wildlife resource values.
2. Planting of native perennial plant species in the developed area as part of the landscape palette: Native plant species will be substituted for traditional landscape plants in the areas fronting the wildlife reserves. Native plant species will be incorporated into landscape plantings in the rest of the project.

Monitoring (subject to funding);

1. The Travis AFB environmental staff shall conduct site monitoring yearly and will provide a report on the status of resources to the commanding officer and to USFWS. Included in the report will be a photographic record of each of the vernal pools and ponds on site evidencing their condition and a comparison to the natural pools on Travis AFB. Documentation of the filling and drying periods shall be provided in this report.
2. The Air Force shall monitor a representative sample of the vernal pools and ponds (at least three pools with shrimp and three apparently similar pools with out shrimp) for four years to document their condition as habitat for sensitive species and shall provide annual reports to the USACOE CO and the USFWS. The representative pools should be surveyed and profiled as to shape and volume. Monitoring should include at minimum: samplings of water depth, temperature (both minimum and maximum, as well as representative temperature profiles) salinity (conductivity, hardness), oxygen concentration, nitrate concentration recorded over three days every other month during the period when the pools contain water. A representative semi quantitative collection of pool invertebrates (collections made using standard methods and quantified effort) both collected and preserved and as a photographic study using microscopy should be made during the bimonthly surveys. These surveys could be conducted using either government, contractor, college or local high school scientists.

Biological Opinion



IN REPLY REFER TO:
1-1-99-F-84

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

May 28, 1999

Mr. Douglas R. Pomeroy
U.S. Department of the Navy
Engineering Field Activity, West
900 Commodore Drive
San Bruno, California 94066-5006

Subject: Formal Endangered Species Consultation on the Proposed Burke Property
Housing Project, Travis Air Force Base, Solano County, California

Dear Mr. Pomeroy :

This is in response to your April 9, 1999, request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Burke Property Housing project at Travis Air Force Base (AFB) in Solano County, California. The Air Force designated your office as its representative in this consultation in a letter to the Service dated March 31, 1999. Your request for formal consultation was received in our office on April 12, 1999. This document represents the Service's biological opinion on the effects of the proposed project on the following federally listed species in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act): the endangered Contra Costa goldfields (*Lasthenia conjugens*) and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*). We have determined that the project as proposed is not likely to adversely affect the threatened giant garter snake (*Thamnophis gigas*), and this species is not addressed further in this document.

This biological opinion is based on information provided in the *Draft Final Environmental Assessment, Travis Air Force Base Burke Property Housing*, prepared by the U.S. Navy, Engineering Field Activity West and dated April 16, 1999, (Burke Housing EA), a draft of the project application for an Army Corps of Engineers (Corps) permit under section 404 of the Clean Water Act, dated April 22, 1999, correspondence, meetings, site visits, and other information available to us. A complete administrative record of this consultation is on file in our office.

BIOLOGICAL OPINION

Description of the Proposed Action

The proposed action is the development of a 101-acre parcel in the Cordero Hills on the north side of Travis AFB, known as the Burke Property (in the northwest quarter of section 14, township 5N, range 1W, Mount Diablo meridian) (Figure 1). The proposed project would construct 226 units (113 duplexes) of military housing, roads, sidewalks, storm water detention ponds, wetland mitigation swales, underground utilities, landscaping, paths, children's recreation lots and basketball half-courts. The development will include grading, filling or otherwise disturbing approximately 45 acres of the 101 acre site during construction and development. Approximately 56 acres would be left in open space. The project would fill approximately 1.5 acres of delineated Corps-jurisdictional wetlands out of 14.2 acres on-site, including 1.3 acres of swale/marsh and 0.2 acre of vernal pools. The project would construct up to 2.0 acres of new wetlands on-site and retain most of the remaining 1.5 acres of vernal pools on-site.

County records and aerial photos of the area indicate that the property has been used for cattle and horse grazing since the early 1920's. Portions of the property may have been used as cropland. There has also been mining of soils and sandstone from the property, and the site was used as a landfill by Kaweah Construction Company in 1993. The site surrounds an 8.3-acre City of Vallejo water treatment plant and a 4.9-acre Air Force water storage tank compound. Buried water pipelines associated with the water treatment plant cross the property. An area of earth fill and concrete rubble is present in the east-central portion of the property. Five open water ponds are present in remnants of sandstone borrow pits excavated on the property in the 1930's. These ponds contained surface water throughout 1998 (Burke Housing EA).

Travis AFB also proposes the following *biological conservation measures* to minimize the impacts of the project to listed species and biological resources:

1. Design and Construction.

The proposed project (226 units) has been reduced and re-designed from an earlier plan that would have had greater impacts on wetlands and listed species habitat. Rolled rather than perpendicular curbs are proposed, to prevent trapping of California tiger salamanders (*Ambystoma californiense*), a candidate species for Federal listing, during their annual migrations to and from breeding ponds.

A variety of measures to minimize potential impacts during construction are proposed in Travis AFB's "Vernal Pool Mitigation Plan," submitted with the Air Force's section 404 Clean Water Act permit application, and attached as Appendix 1 to this biological opinion and hereby incorporated by reference. The measures include worker education and training, an on-site environmental manager during construction, marking and fencing sensitive areas, best

management practices for control of soil erosion, restrictions on storage and use of chemicals, review by the Travis AFB environmental office of any seed mixtures to be used, use of native, non-invasive plants for landscaping, and contingencies for restoration and monitoring of any unanticipated impacts.

The Air Force proposes to remove, save, and relocate the soil from around the locations of individual plants of *Lasthenia conjugens* found on the site, in order to conserve any seed stock in the soil. Relocation is tentatively planned to the edges of created vernal pools on-site. Only the top 3 inches containing the soil seed bank will be relocated using approved methodology. The final plan for use of the soil will be reviewed and approved by the Service prior to any relocation activities.

On-site drainage patterns will be maintained. Broad culverts with earthen bottoms will be provided where roads or trails obstruct drainage. Native plant landscaping will be encouraged and invasive non-native plants will be removed. Non-native animals will be removed or eradicated. Educational signs providing information on the biology and value of the wetlands will be placed at trailheads, additional educational materials and information on restricted activities will be provided to all new tenants. Firebreaks near vernal pools will be mowed after the pools have dried; disking will not be allowed within 100 feet of any wetland. Recreational areas including a "cross-country bicycle fun area" will be located to avoid and minimize impacts to sensitive biological resources.

2. Preservation.

On-site Preservation:

Travis AFB will permanently protect a 40-acre wetlands preserve on the former Burke property (Figure 2). Another 16 acres will be preserved as open space but may have constraints on management for natural values, such as underground pipeline easements or maintenance of firebreaks. The 16-acre area contains or intersects 0.08 acres of vernal pools, and contains under one acre of vernal swales and bisects a large (1.45-acre) vernal swale (VS-2). All remaining wetlands outside the development footprint, including 1.45 acres of vernal pools, are inside the 40-acre preserve area.

Off-site Preservation:

A preserve area will be established on approximately 100 acres of Grazing Management Unit 1 of Travis AFB, located along the western edge of the base south of the Travis Aero Club (township 5N, range 1W, Mount Diablo meridian, a portion of the east half of the east half of section 21). See Figure 3. This preserve will protect 2.5 acres of wetlands including a biologically valuable complex of 31 vernal pools totaling 2.21 acres (Appendix 2).

3. Restoration/Creation.

On-site:

A broad swale of approximately 1.2 acres in area will be graded between ponds 1 and 2 on-site. Within this swale, three vernal pools will be created with total area at least equivalent to those directly impacted by the project (0.214 acre). If additional wetland creation is considered desirable, another, narrower swale may be graded between ponds 2 and 3.

Off-Site:

The Air Force will purchase one acre of credits (up to \$70,000.00) in an approved vernal pool conservation bank, to minimize the impacts of the project to vernal pools and their dependent species. Travis AFB will also restore and permanently protect 0.2 acre of potential Contra Costa goldfields habitat to minimize the impact of the loss of two areas supporting the species, totaling approximately 0.06 acre. This restoration will be added to an on-going Contra Costa goldfields restoration project at Travis AFB being conducted by Dr. Sharon Collinge of the University of Colorado. The on-going restoration is being performed as compensation for impacts, unrelated to the Burke property project, that occurred to habitat near the Aero Club and Civil Engineering Training Yard on Travis AFB. Restoration acreage for impacts from the Burke property project will be added to that done for the Aero Club (B. Holmes, Travis AFB Management Agronomist, pers. comm., May 27, 1999, Appendix 2). The Contra Costa goldfields restoration project is planned to take place surrounding the airstrip of the Travis Aero Club, in the northwest corner of the base.

The Contra Costa goldfields restoration area will be preserved in perpetuity as a special ecological preserve, with protective measures and appropriate management, in the Travis AFB Land Management Plan (B. Holmes, pers. comm., May 27, 1999). The Land Management Plan will require that this designation be unchangeable in any and all future revisions. The Service will review and approve this portion of the Land Management Plan before it is adopted as final. This task will be completed before January 1, 2001.

4. Monitoring.

Subject to available funding for any contract work needed, Travis AFB will monitor the site and annually provide a report to the Service for four years post-construction. Monitoring of the Contra Costa goldfields restoration area will be conducted annually as part of the larger Aero Club restoration project for the duration of the larger project or for five years, whichever is longer (B. Holmes, pers. comm., May 27, 1999). Annual reports summarizing restoration activities including information on the hydrology, species diversity, species density of the restored Contra Costa goldfields pools will be submitted to the Service (B. Holmes, pers. comm., May 27, 1999).

5. Management and Maintenance of the On-Site Preserve

Travis AFB proposes to prohibit the use of insecticides, herbicides, or other chemicals where such use could contaminate wetlands or vernal pools, as determined by the base environmental

office. Native plant species will be substituted for traditional landscape plants in the areas fronting the preserved areas. Native plant species will be incorporated into landscape plantings in the rest of the project. Use of invasive, non-native plant species, such as but not limited to *Cotoneaster* sp., *Vinca* sp., locust, *Cistus* sp., will not be allowed. Mosquito and pest control methods most consistent with natural resource protection will be used.

If monitoring showed need for greater protection of wetland resources on-site, further measures could be implemented, including but not limited to: installing fences, planting native, non-invasive briars, or other means to keep people and animals out of sensitive habitat; controlling invasive non-native weeds by hand tools, mowing, controlled grazing, selective herbicide applications or controlled burning; additional erosion control measures; and seeding or outplanting native plants.

This concludes the biological conservation measures proposed by the Air Force.

The biological conservation measures as proposed and as further described in Appendix 1, hereby incorporated by reference, are considered part of the project evaluated by the Service in this biological opinion. Any change in these plans or their implementation that might adversely affect listed species, either directly or indirectly, requires reinitiation of consultation with the Service, as set forth in the final paragraphs of this letter.

Environmental Baseline/Species Accounts

Contra Costa goldfields

Contra Costa goldfields was listed as endangered on June 18, 1997 (62 FR 33029). It is a showy spring annual in the aster family (Asteraceae) that grows 10 to 30 centimeters (cm) (4 to 12 inches (in.)) tall and is usually branched. The leaves are opposite, light green, and usually have a feather-like arrangement with narrow clefts extending more than halfway toward the stem.

The flowers are found in terminal yellow heads. The phyllaries are one-third to one-half fused; the achenes are less than 1.5 millimeters (mm) (0.06 in.) long and always lack a pappus. *Lasthenia conjugens* flowers from March to June. The partially fused phyllaries and the lack of a pappus distinguish this species from *L. fremontii* and *L. burkei*, which it otherwise closely resembles.

Habitat for Contra Costa goldfields consists of vernal pools in open grassy areas of woodland and valley grassland communities. Dains (1995) has suggested that Contra Costa goldfields plants

prefer shallow vernal pools or vernal pool margins, and that the species' range of habitat includes marginal use of somewhat alkaline soils. Alkalinity and salinity were not distinguished in her study. Dains also reported that ryegrass (*Lolium multiflorum*) and other common non-native species can out-compete Contra Costa goldfields in the absence of grazing.

Historically, the species grew in vernal pool habitats in seven counties--Alameda, Contra Costa, Mendocino, Santa Barbara, Santa Clara, Napa, and Solano counties, California. It has been extirpated from Mendocino, Santa Barbara, and Santa Clara counties, by agricultural land conversion, urbanization, and creek channelization. Contra Costa goldfields is now found in 13 localized populations occurring in four general areas of Alameda, Contra Costa, Napa, and Solano counties (California Native Plant Society (CNPS) 1978, California Natural Diversity Database (CNDDDB) 1996). One population occurs in Contra Costa County; two in Napa County; and one in Alameda County. Nine populations are located in Solano County; eight of these clustered near the town of Fairfield and the ninth on Travis Air Force Base. With the exception of Travis Air Force Base and one on the Warm Springs Unit of the San Francisco National Wildlife Refuge near Fremont, Alameda County, all populations are on private lands. Nearly all populations are found on sites that are or were proposed for development. Because of the small number of populations of this species, protection of all remaining populations is necessary for the species' survival.

Status of the Species in the Action Area

A survey conducted in May 1998, revealed the presence of two individual Contra Costa goldfields plants in two locations on the Burke property. One plant was observed in a vernal pool (VP-1) and one in a disturbed grassland habitat not associated with its normal wetland habitat near VP-22 (Burke Housing EA pg.3-12). Contra Costa goldfields also known from elsewhere on Travis AFB near the Aero Club and Civil Engineering Training Yard (Biosystems 1994, B. Holmes, pers. comm., May 27, 1999).

Vernal pool fairy shrimp

A description of vernal pool fairy shrimp is found in 59 FR 48136, the publication of the final rule to list the species under the Act. These crustaceans are restricted to vernal pools, swales, and other seasonal pools in California. Eng *et al.* (1990) and Simovich *et al.* (1992) provide further details on the life history and ecology of the vernal pool fairy shrimp.

Fairy shrimp have delicate elongate bodies, large stalked compound eyes, no carapace, and 11 pairs of swimming legs. They swim or glide gracefully upside-down by means of complex beating movements of the legs that pass in a wavelike, anterior-to-posterior direction. Nearly all fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of detritus. The females carry the

eggs in an oval or elongate ventral brood sac. The eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. The "resting" or "summer" eggs are also called cysts. They are capable of withstanding heat, cold, and prolonged desiccation. When the pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch. The cyst bank in the soil may comprise the cysts from several years of breeding. The cysts hatch when the vernal pools fill with rainwater. The early stages of the vernal pool fairy shrimp develop rapidly into adults (Helm 1998). These active populations often disappear early in the season long before the vernal pools dry up.

The vernal pool fairy shrimp inhabits vernal pools with clear to tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands. Active vernal pool fairy shrimp have been observed from early December to early May. There are 32 known populations of the vernal pool fairy shrimp, extending from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County, and along the central coast range from northern Solano County to Pinnacles National Monument in San Benito County. Four additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County, one in the mountain grasslands of northern Santa Barbara County, one on the Santa Rosa Plateau in Riverside County, and one near Rancho California in Riverside County.

The vernal pool fairy shrimp is imperiled by habitat loss caused by a variety of human activities, primarily urban development, water supply and flood control projects, and conversion of land to agricultural use. Habitat loss occurs from direct destruction and modification of pools due to filling, grading, discing, leveling, and other activities, as well as modification of surrounding uplands which alters vernal pool watersheds. Other activities which adversely affect this species include off-road vehicle use, certain mosquito abatement measures, and pesticide/herbicide use. Only a small fraction of the habitat of this species is protected from these threats. Holland estimated that between 60 and 85 percent of the habitat that once supported vernal pools had been destroyed by 1973 (USFWS 1994). In the ensuing 26 years, a substantial amount of remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at two to three per cent per year (Holland and Jain 1988). The Sacramento District of the Corps has several thousand vernal pools under its jurisdiction (Coe 1988). It has been estimated that by the year 2008, 60 to 70 percent of these will be destroyed by human activities (Coe 1988).

In addition to direct habitat loss, the vernal pool habitat for the vernal pool fairy shrimp has been and continues to be fragmented throughout its range due to conversion of natural habitat by human activities. This fragmentation results in small isolated vernal pool fairy shrimp populations. Commonly held ecological theory predicts that such populations will be highly susceptible to extirpation due to chance events or additional environmental disturbance

(Soule 1987). Should an extirpation event occur in a population that has been fragmented, the opportunities for recolonization are reduced due to isolation from other (source) populations.

Status of the Species in the Action Area

Vernal pool fairy shrimp have been found in vernal pools on the Burke property. This determination was based on the confirmed occurrence of resting stages (cysts) of fairy shrimp of the genus *Branchinecta* (Burke Housing EA, pg. 3-13), and wet season sampling that revealed adult vernal pool fairy shrimp in three of these pools. Because of the difficulties of sampling for the species and evidence of a high rate of failure to detect the species in other studies using standard methods, the Service considers that all seasonal wetlands with suitable habitat on the site are potentially occupied by the species. The species is also found elsewhere on Travis AFB.

Effects of the Proposed Action

Contra Costa goldfields

The direct loss of occupied Contra Costa goldfields habitat is proposed to occur at two sites, in VP-1 and in an upland near VP-22. Each of these sites was found to contain a single Contra Costa goldfields during surveys conducted in May 1998, (Burke Housing EA, pg. 3-12). In addition, should other goldfields habitat remain on-site degradation to the habitat may result from long-term human disturbance, after nearby residential and industrial areas are developed, through impacts from herbicide or pesticide use, trash dumping, and uncontrolled off-road vehicle use. Off-road vehicle use and other recreational activities associated with humans can lead to wheel ruts, soil compaction, increased siltation, destruction of native vegetation, introduction of non-native vegetation, and an alteration of pool hydrology. Contra Costa goldfields relies on occupied on-site habitat as well as on surrounding upland areas that support pollinators. The Contra Costa goldfields has as its principal pollinators native solitary bees that are host-specific to the plant taxon. These pollinators, which are essential to the long term survival of this population of the goldfields, tend to nest in sparsely vegetated upland areas surrounding the vernal pools. Over time, degradation of the upland habitat may lead to reduced seed-set of the Contra Costa goldfields if solitary bees become more scarce and are replaced by less efficient, generalist pollinators. To offset the loss of the two areas supporting this species, the applicant (Travis AFB) proposes to restore and permanently protect 0.2 acre of degraded vernal pool habitat on Travis AFB (a ratio of 3:1, restoration:loss).

Vernal pool fairy shrimp

The Burke Housing project as proposed would result in direct, permanent loss of approximately 0.2 acre of vernal pool fairy shrimp habitat. All life stages of the vernal pool fairy shrimp in these pools would be killed.

The project would also have indirect effects on the vernal pool fairy shrimp. Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Individuals and their cysts may be injured or killed by several indirect effects:

Changes in hydrology: In addition to the direct impacts associated with filling, development can have impacts on the hydrology of remaining habitat and surrounding areas. Storm water drains, covering land surfaces with buildings, concrete, asphalt, irrigated lawns, turf, and landscaping, *etc.*, can affect the amount and quality of water in vernal pools, both as surface water and in the perched water tables characteristic of vernal pool areas. Seepage, draining, and flushing of water treatment and storage facilities and pipes on and adjacent to the site currently affects the hydrology of the site. Subsurface geology of the Burke site appears to be a porous sandstone. Changes to the vernal pools' surface or subsurface water supply can lead to alterations in the rate, extent, and duration of inundation (water regime) of remaining habitat. In the summer of 1998 some vernal pools on-site that had recently been dry were found inundated with water released to flush pipelines (Burke Housing EA). Such unseasonal inundation may injure or kill vernal pool fairy shrimp cysts or cause them to hatch at a time when they cannot survive or cannot reproduce. The biota of vernal pools and swales can change when the hydrologic regime is altered (Bauder 1986, 1987). Survival of aquatic organisms like fairy shrimp is linked to the water regime of their habitat (Zedler 1987). Therefore, development near vernal pool areas may, at times, result in the failure of local sub-populations of vernal pool organisms, including fairy shrimp.

Sedimentation: Erosion associated with road and housing construction can adversely affect vernal pool habitat through the transport and deposition of sediments into these areas. Deposited sediments may bury vernal pool fairy shrimp cysts and alter the chemistry and food base of vernal pools.

Roads: Grading for roads may affect the water regime of vernal pool habitat, particularly when grading involves cutting into the substrata in or near habitat areas. Exposure of sub-surface layers of soil at road cuts may hasten the loss of water from adjacent habitat by mass flow through networks of cracks, lenses of coarse material, animal burrows, old root channels, or other macroscopic channels. Any decrease in the duration of inundation of habitat can affect the reproductive success of species present, including the listed vernal pool crustacea. Roads can also change drainage patterns and cause either an increase or decrease in surface runoff, with consequent effects on vernal pool habitat. Roads in or near the watersheds of habitat areas can

lead to additional impacts through the introduction of chemically laden runoff (*i.e.*, petroleum products) from the road surfaces. Chemical contamination of habitat can kill or injure listed species by poisoning or sub-lethal effects. Roads in close proximity to habitat areas may encourage additional impacts through other human activities.

Human intrusion: Development frequently results in human intrusion into surrounding areas. Human intrusion is a mechanism by which trash or hazardous waste can be introduced into remaining habitat areas (Bauder 1986, 1987). Disposal of waste materials can release substances into pools that are toxic or that adversely affect water chemistry. Children may dig drainage channels or build dams, altering vernal pool hydrology. Bicycles, pedestrians, off-road vehicle use and other unauthorized human recreation can lead to soil compaction, increased siltation, destruction of native vegetation, and alteration of pool hydrology. Persons curious about aquatic organisms may harass or collect some vernal pool fairy shrimp.

Pesticides/Herbicides: Development often results in the introduction of pesticides or herbicides into the environment, through drift or runoff from uses on adjacent areas and roadsides. Many such chemicals can have adverse effects on vernal pool fairy shrimp and/or their cysts. Individuals may be killed directly or suffer reduced fitness through physiological stress or a reduction in their food base due to the presence of these chemicals.

Introduced predators: Development may produce conditions that are favorable for exotic predators such as bullfrogs, and mosquito fish. The stomachs of bullfrogs captured in vernal pools near Chico, California were found to contain large numbers of vernal pool tadpole shrimp (Hayes, pers. com., 1993 in 59 FR 48136). Mosquito fish can be equally devastating as predators when introduced into vernal pool habitat. Thus, listed species and their cysts may be adversely affected by the introduction of exotic predators.

The Service estimates that the proposed action would indirectly affect 0.857 acre of vernal pools on the proposed Burke Housing site that are within 250 feet of the development areas. Vernal pools outside this distance are considered avoided, and total 0.675 acre.

The proposed action would also temporarily increase construction-related disturbance in proximity to vernal pool fairy shrimp habitat, from both development and wetlands creation activities. These ground-disturbing activities may result in erosion and deposition of sediment in seasonal pools, potentially burying fairy shrimp eggs or adversely affecting water chemistry. Vehicles and heavy equipment maneuvering out-of-bounds could cause unanticipated compaction of seasonal pool bottoms, crushing of fairy shrimp eggs, and disturbance of seasonal pool watersheds. Chemical spills and leaks from construction machinery or materials may contaminate soils or waters with adverse effects on the species. Pools that may be impacted by

temporary construction-related disturbance are all included in the indirectly impacted group discussed above.

Excessive vegetative growth and thatch accumulation in the Preserve Area could degrade habitat quality for the vernal pool fairy shrimp. Aggressive non-native plant species can produce dense cover in pools inhabited by the species and may adversely alter the vernal pool habitat for egg deposition, hatching, or prey base of the fairy shrimp.

Cumulative Effects

Cumulative effects are those impacts of future non-Federal (State, local government, and private) actions on endangered and threatened species or critical habitat that are reasonably certain to occur within the action area. Future Federal actions will be subject to the consultation requirements of section 7 of the Act and, therefore, are not considered cumulative to the proposed action.

Because the vernal pool fairy shrimp is endemic to vernal pools in the Central Valley and the other areas of California, the Service anticipates that a wide range of activities will affect the species. Such activities include, but are not limited to, urban, water, flood control, highway and utility projects, chemical contamination, and conversion of vernal pools to agricultural use. Many of these activities will be reviewed under section 7 of the Act as a result of the Federal nexus provided by section 404 of the Clean Water Act. These actions constitute future Federal actions that are unrelated to the proposed action. However, an undetermined number of future projects that alter the habitat of the vernal pool fairy shrimp, likely will be not be subject to these permitting processes and, as such, are cumulative to the proposed project.

The Contra Costa goldfields exists on Federal, State, local and privately owned land in Alameda, Contra Costa, Solano and Napa counties. The Service anticipates that populations of Contra Costa goldfields will continue to experience human impacts from habitat loss and other activities, as well as impacts from degradation of habitat caused by invasive non-native plant species. Many of these activities will be reviewed under section 7 of the Act as a result of the Federal nexus provided by section 404 of the Clean Water Act. These actions constitute future Federal actions that are unrelated to the proposed action. However, an undetermined number of future projects that alter the habitat of Contra Costa goldfields, likely will be not be subject to these permitting processes and, as such, are cumulative to the proposed project.

Conclusion

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the Burke Housing project as proposed, including the proposed biological conservation measures, is not likely to jeopardize the continued existence of the Contra Costa goldfields or the vernal pool fairy shrimp. No statutory critical habitat has been designated for these species, therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

Taking that is not incidental to an otherwise lawful activity is not authorized by this incidental take statement. For example, intentional collecting or killing of listed wildlife is not permitted.

The measures described below are non-discretionary, and must be implemented by the Air Force, or made binding conditions of any contract, grant or permit it issues, in order for the exemption in section 7(o)(2) to apply. The Air Force has a continuing duty to regulate the activity covered by this incidental take statement. If the Air Force: (1) fails to adhere to the terms and conditions of the incidental take statement, through enforceable terms that are added to any contract, grant or permit document, as appropriate, or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Sections 7(b)(4) and 7(o)(2) of the Act, which refer to terms and conditions and exemptions on taking listed fish and wildlife species, do not apply to listed plant species. However, section 9(a)(2) of the Act prohibits removal, reduction to possession, and malicious damage or destruction of listed plant species on Federal lands and the removal, cutting, digging up, or damaging or destroying such species in knowing violation of any State law or regulation, including State criminal trespass law. Provided the Service determines in a biological opinion that the actions are not likely to jeopardize the continued existence of the species, actions funded, authorized or implemented by a Federal agency that could incidentally result in the damage or destruction of a listed plant species on Federal lands are not a violation of the Act.

Amount or Extent of Take

The Service anticipates that vernal pool fairy shrimp may be taken as a result of the proposed action, and that this take will be difficult to quantify due to the variable, unknown size of the resident population (including resting cysts) over time, and the difficulty of finding dead or impaired specimens. However, take of the species can be defined by loss or damage of habitat. In such situations, the Service estimates the level of take in terms of acreage of habitat loss.

The Service anticipates that an unquantifiable number of vernal pool fairy shrimp, in all life stages, would be killed in up to 0.214 acre of vernal pools to be filled on the project site. There is also potential for take of the fairy shrimp in the preserved areas on-site, due to known, indirect, accidental or unforeseen effects of the construction, operation, and maintenance of the development and the preserved areas. The Service anticipates that an unquantifiable number of vernal pool fairy shrimp, in all life stages, may be killed, injured, or harassed in up to 0.857 acre of vernal pools within the proposed preserved areas.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the vernal pool fairy shrimp, or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measure is necessary and appropriate to minimize the impacts of take on the vernal pool fairy shrimp due to the project:

1. Minimize the impacts of direct and indirect effects of the project on the species.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Air Force must comply with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

The following terms and conditions implement the reasonable and prudent measure above:

1. Implement the biological conservation measures as proposed. These measures--summarized in the biological opinion portion of this document (pages 2-5, above), attached as Appendix 1, and hereby incorporated by reference--are hereby incorporated as terms and conditions of this consultation and must be implemented. In the event of any inconsistency with Travis AFB's biological conservation measures, the terms and conditions of this incidental take statement, below, shall have precedence.
2. Before breaking ground on any portion of the project, the Air Force shall deposit seventy thousand dollars (\$70,000.00) into a Service-approved vernal pool conservation fund (currently, the Center for Natural Lands Management's Vernal Pool Conservation Fund is available). Forms for this deposit are available from our office. At present there is not a Service-approved creation bank (*i.e.*, a physical property selling credits for created and preserved vernal pools) for conservation of vernal pool fairy shrimp and their habitat in Solano County. Upon establishment of such an approved bank, the Service will direct payment of the Air Force's contribution for the purchase of credits for conservation of up to one acre of created vernal pools; or, if three years pass without the establishment of an appropriate vernal pool bank, the Service may at its discretion direct the payment for purchase of credits for conservation of up to one acre of vernal pools at a bank supporting vernal pool fairy shrimp in another county. Any remaining balance after such purchase will be refunded to the Air Force.
3. By the following measures, Travis AFB shall dedicate the areas proposed in Figure 2 ("Burke preserve areas") and Figure 3 ("off-site preserve") as preserved areas in perpetuity:
 - a. *Land Management Designation:* Designate the preserved areas as special ecological preserves, with protective measures and appropriate management, in the Travis AFB

Land Management Plan. The Land Management Plan must require that this designation be unchangeable in any and all future revisions. The Service must review and approve this portion of the Land Management Plan before it can be adopted as final. Complete this task before January 1, 2001.

- b. *Regulation:* Enact a Travis AFB regulation designating the preserved areas as special ecological preserves in perpetuity, for the purpose of conserving regional vernal pool ecosystems and their unique species, and restricting entry and uses to those not conflicting with that purpose. Complete this task before January 1, 2002.
- c. *Conservation Easement:* In the event of Travis AFB realignment or closure, any sale, disposal, or re-use of the Burke or off-site preserved areas or any portion thereof must be consistent with the ecological conservation purpose of the preserved areas in perpetuity. The Air Force must then grant a perpetual conservation easement on the preserved property, substantially in the form of the template in Appendix 3, and this easement must encumber any deed, title, or easement to the preserved property resulting from relinquishment of Air Force control over the property or any portion thereof, including but not limited to mineral or water rights. The conservation easement must be granted in favor of an organization approved by the Service, and the Air Force shall be responsible for ensuring that the cost (if any) of granting the easement is met. If the preserved areas or any portion thereof, including but not limited to mineral or water rights, is transferred to another Federal agency, the Air Force or the receiving agency must consult with the Service pursuant to section 7 of the Act regarding appropriate measures to preserve and protect the preserved areas and their unique species.
- d. *Procedures:* Establish base procedures for reviewing and revising plans and actions that might unknowingly conflict with the purpose of the preserved areas. Provide a report summarizing these procedures to the Service for our files. Complete this task before January 1, 2001.
- e. *Education:* Conduct regular educational sessions with base personnel with duties on or in the vicinity of the preserved areas, explaining the purpose, values, and restrictions on entry and use of the preserve. Provide leaflets or flyers with similar educational information to all new base personnel.
- f. *Fencing and Signs:* Fence and prominently post signs around the preserved areas, identifying them and explaining their purpose and restrictions on entry and use, to control access and discourage human intrusion into sensitive areas. Fencing suitable

for livestock control would be doubly appropriate. Post additional signs at all gates and points of entry into the preserved areas. On the Burke site, fencing should channel recreational use such as walking, jogging, and biking toward planned, sanctioned trails and facilities, and away from protected habitat. Complete this task before January 1, 2001.

- g. *Restoration:* If any vernal pool restoration work is contemplated in the off-site preservation area, such work must be coordinated with the Service and must not be allowed to adversely affect, directly or indirectly, existing wetlands in the preserve.
4. The site chosen for the "cross country bicycle fun area" must be reviewed and approved by the Service before breaking ground.
 5. Before breaking ground on any portion of the project, Travis AFB must develop a long-term management plan or plans for the preserved areas, both on and off the Burke Housing site. The plan must provide for essential management needs, such as non-native vegetation control, a livestock grazing plan, criteria by which the success of management will be judged, monitoring, and contingency conservation actions in the event that the success criteria cannot be achieved. Contingency actions should include, but not be limited to, acquisition and restoration of habitat occupied by the listed species and reintroduction of extirpated populations. The long-term management plan(s) must be acceptable to and approved by the Service.
 6. Remove existing roads, tracks, and trails in the 56-acre on-site preserve areas that are not part of the planned sanctioned trail network. Control erosion and revegetate trail-removal areas, consistent with the biological conservation measures proposed. Complete this task before the first occupancy of the proposed housing. Report progress and completion of this task to the Service. Monitor the site for the development of unplanned tracks and trails, remove and revegetate these as above, and adjust restrictions on access to prevent re-formation of new, unplanned trails.
 7. Re-vegetate disturbed areas in the wetlands creation areas, trail removal areas, and elsewhere in the open space areas, promptly and aggressively with native plants appropriate to the site. Develop a list or lists of plant species for seeding or planting into disturbed open space areas, both wetland and upland. Native species should be dominant in the mix; any non-natives included should be sterile or non-aggressive, and preferably already represented throughout the site. Even though the site is currently dominated by non-native species, recent research suggests supplemental seeding can significantly alter

the species composition and dominance structure of some grassland plant communities (Tilman 1997).

8. Monitor and report to the Service on vernal pool fairy shrimp populations and wetland functions in the on-site preserved areas for at least five years. Provide reports annually. Both existing and constructed wetlands shall be monitored. Travis AFB shall allocate adequate funding to support monitoring of fairy shrimp, vernal pool water levels, disturbance and threats to vernal pool ecosystems throughout the monitoring period.
9. Travis AFB shall ensure that water seeping, drained, released, or flushed from on-site development or City of Vallejo water facilities, including pipelines, tanks, street runoff, lawn and landscape watering, residential uses such as washing cars, pavement, *etc.*, is not allowed to change the ecosystem function of the preserved vernal pools and seasonal wetlands by altering their natural seasonal water supply or transporting contaminants.

The reasonable and prudent measure, with its implementing terms and conditions, is designed to minimize incidental take that might otherwise result from the proposed action. With implementation of this measure, the Service believes that no more than 1.07 acres of vernal pool fairy shrimp habitat will be taken. If, during the course of the action, this minimized level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Air Force must then immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Reporting Requirements

Project personnel shall be required to report immediately any information about take or suspected take of listed species. The Service shall be notified within twenty-four (24) hours of the finding of any unanticipated harm to vernal pool fairy shrimp or their habitat associated with the proposed action. Travis AFB must notify the Service within one working day of any such information. Provide the date, time, and precise location of the incident/specimen(s), and any other pertinent information. Service contacts are the Office of Ecological Services, Endangered Species Division, at (916) 979-2725, and the Division of Law Enforcement, Burlingame Office, at (415) 876-9078. Deposit any fairy shrimp found dead in the Entomology Section of the California Academy of Sciences in San Francisco. The Academy's contact is the Senior Curator at (415) 750-7239.

Travis AFB shall provide yearly Contra Costa goldfields monitoring reports and progress of the restoration actions to the Service by December 31 of each year for the duration of the monitoring period.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Endangered Species Act directs Federal agencies to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that minimize or avoid adverse effects of proposed actions on listed species or critical habitat, help implement recovery plans, or develop information.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations. We have the following recommendations:

1. Design storm drains, irrigation boxes, electrical boxes, and other on-site equipment/facilities so that they will not trap California tiger salamanders. Monitor the Burke Housing development for trapped salamanders and report entrapments to base management and the Service at least annually during the monitoring period. Modify or replace equipment/facilities that chronically trap salamanders. The Service can provide contacts with expertise in this area. We also recommend that Travis AFB coordinate with the California Department of Fish and Game regarding management for the salamander.
2. Assess the estivation habitat used on the Burke Housing site by salamanders. If estivation habitat appears to limit the population, consider creating or enhancing on-site estivation habitat, such as by encouraging a ground squirrel population or constructing artificial burrows (artificial burrows would need regular maintenance).
3. Monitor and report road kills of salamanders on the Burke Housing site and elsewhere on Travis AFB. Record the location of each road kill. If there are any road segments where salamanders are chronically killed, install broad, earth-bottomed culverts under such segments and barriers to divert migrating salamanders to the culverts.
4. In consultation with the Service, Travis AFB should develop and implement a strategy to survey for and monitor solitary bees in the Contra Costa goldfields restoration area. This

information will assist in determining the amount of upland area necessary to support these goldfields pollinators.

5. Continue to coordinate closely with the Service and CDFG to minimize impacts to salamanders and native pollinators, and to restore and enhance their populations in the Preserve Areas. Provide management goals and actions for the salamanders and native pollinators in the Travis AFB Land Management Plan, including enhancement of estivation and nesting sites.
6. The Travis AFB Land Management Plan should contain contingency actions in the event that plant surveys or other observations detect a decline in the number of Contra Costa goldfields or in the area the plants occupy in the restoration area or in other natural populations on-site. These contingency actions should include acquisition of occupied habitat and restoration of extirpated populations.
7. If herbicides are used, use wick applicators to apply any herbicides to be used within 10 meters (33 feet) of living Contra Costa goldfields plants. Sprayed applications beyond 10 meters should only be performed when winds are completely calm (imperceptible to the operator and other personnel).

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the proposed Burke Housing project. As provided in 50 CFR §402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals that the agency action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the project is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Mr. Douglas Pomeroy

20

Please contact David Wright (animals) or Elizabeth Warne (plants) at (916) 979-2725, if you have any questions regarding this document.

Sincerely,

A handwritten signature in black ink, reading "Cay C. Goude". The signature is written in a cursive, flowing style.

Cay C. Goude
Acting Field Supervisor

Enclosures

cc: PARD (ES), Portland, OR
Carl Wilcox, CDFG, Yountville, CA

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FIGURE 1

226-Unit Housing Design
for the Burke Property,
Travis AFB

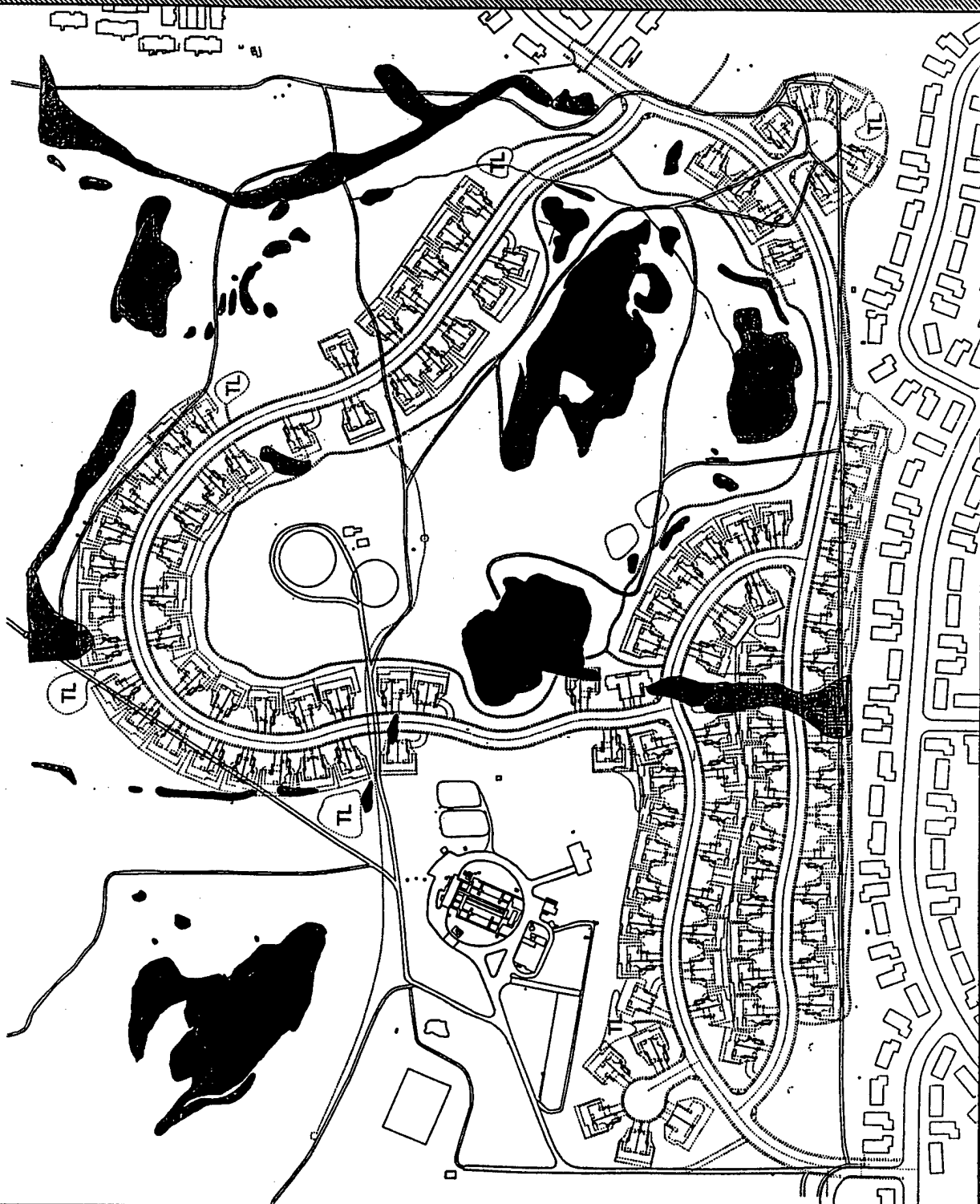
- Aquatic, wetland, vernal pool
and vernal swale habitats
- Existing Development
- 226 Unit Housing Design
- TL Tot Lot



30 0 30 60 Meters

200 0 200 400 Feet

Source: ASL Consulting Engineers, 1998



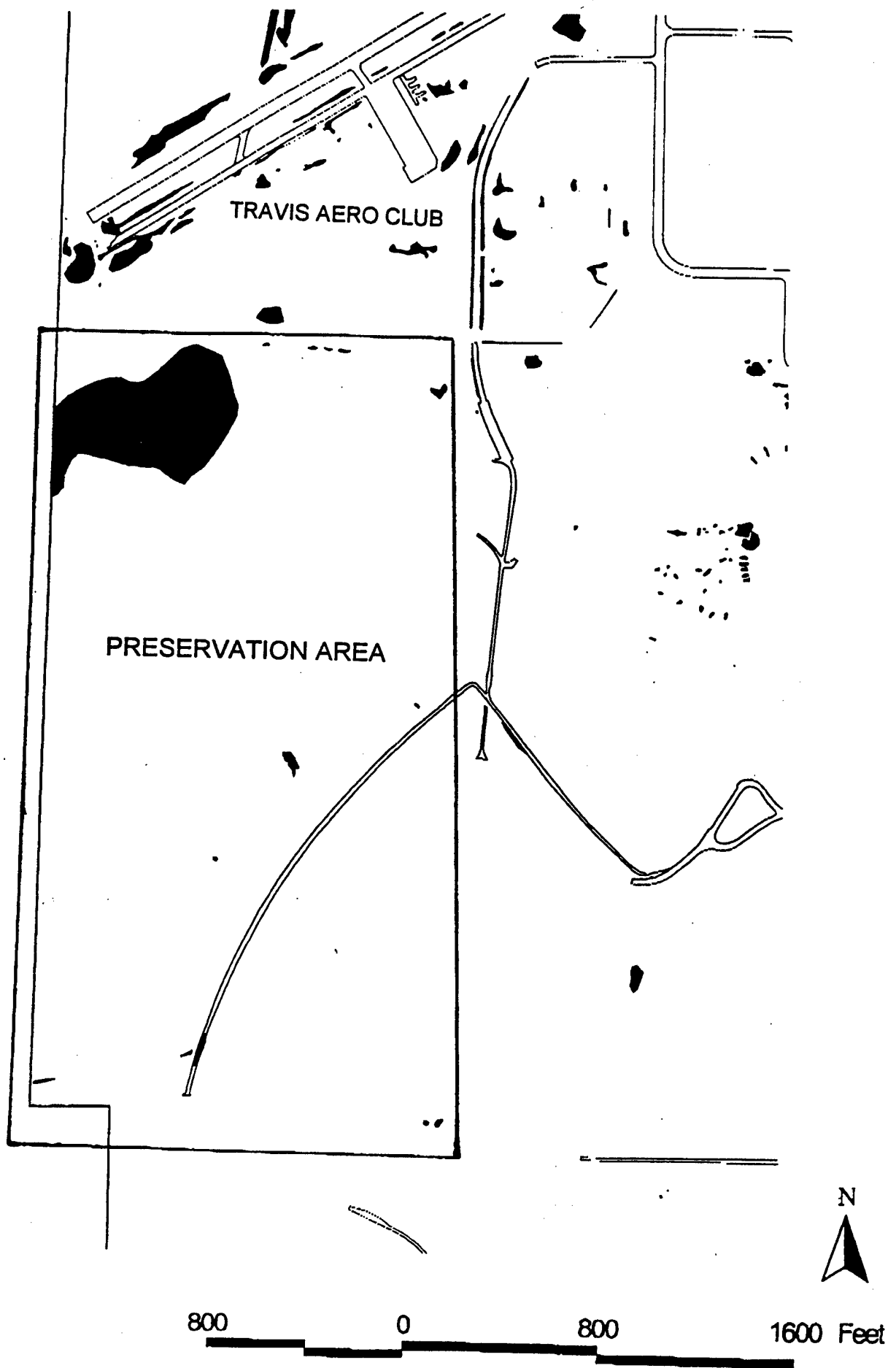


FIGURE 3 - OFF-SITE PRESERVE

APPENDIX 1

Vernal Pool Mitigation Plan

Construction Measures: Violation of any of the following mitigation measures, said violation to be determined by the Travis Air Force Base Representative (ROICC), will result in an immediate cessation of construction activities at the MFH construction site. A review by the Air Force environmental office of site environmental resources, mitigation measures and appropriate construction procedures to safe guard site resources will then be coordinated with the USFWS and COE as appropriate. Any cost or delays resulting from violations of the mitigation measures will be borne by the contractor. Once work is halted at a work location it will not be reinitiated without explicit direction from the Travis Air Force Base Representative (ROICC).

1. The contractor will provide onsite informal training (tailgate) sessions to all contractor and contractor sponsored personnel who require access to the construction site. The sessions will include a description of the sensitive and protected biological resources, guidance on how to recognize the resource, procedures to be employed to avoid impacting sensitive resources, and how to report any accidental resource impacts.
2. The contractor will designate an onsite manager who will be responsible for insuring compliance with all applicable environmental mitigation measures. Any violations of the mitigation measures will be immediately reported to the Travis AFB environmental office and the ROICC.
3. Construction fences around endangered species habitat: Fences will be constructed to provide a visual marker to prevent construction personnel and equipment from encroaching upon sensitive wetlands. Erosion control netting (silt screen) or Snow Fencing shall be located no closer than 50 feet away from all sensitive wetland areas. The control netting will be attached to metal stakes securely driven into the ground. The stakes will be placed at least every 10 linear feet. Netting primarily used to control sediment will be placed in accordance with manufacturer's instructions to prevent sediment from reaching wetlands. The contractor's site supervisor shall inspect the construction site to assure that all wetlands are fenced prior to the day's start of construction. If areas are not marked, the supervisor shall have them re-fenced prior to the start of construction activities. The initial fencing lay out must be inspected and approved by the Travis AFB environmental office. All personnel will be briefed on the significance of wetland areas.
4. All contractor personnel and contractor-initiated deliveries will remain outside fenced boundaries at all times.
5. Any disturbance of existing wetlands other than as specifically addressed in the construction plan will require restoration, re-vegetation and monitoring at

the contractors expense. All work shall be concluded in accordance with requirements of the USACOE and USFWS.

6. No storage of chemicals, solvents, paints or construction materials will be allowed on site, other than for immediate use. (Immediate use is defined as for use during that day.) All chemicals, paints, solvents and construction material shall be removed from the site at the end of the workday. No fueling, mixing or transfer of chemicals harmful to wetland ecosystems will be allowed upgradient of any sensitive wetland area.
7. Best management practices will be used to control soil erosion on the job site. At a minimum, straw bails and geotextile fabric barriers shall be erected to prevent any sediment from entering into any of the mapped wetlands.
8. Any use of seed mixtures will be approved by the Travis AFB environmental office to assure that only appropriate native plant species, sterile annual plants, or plants that can be prevented from spreading by mowing are used for erosion control.

Mitigation Measures:

1. The Air Force has reduced the size of the project from 286 units to 226 units in order to avoid significant impacts to wetlands on the "Burke" site.
2. The Air Force will set aside 40 acres of the project property as mitigation open space reserve. The primary purpose of the reserve is to protect existing wetland resources, support sensitive species and maintain a healthy watershed.
3. A swale at least 1.2 acres in size will be created between Pond 1 and 2 (see final design map) as mitigation for the filling of approximately 1.2 acres of wetland swale habitat required by the project construction. The swale habitat will consist of a meandering, low flow channel cut between Ponds 1 and 2. Construction will include three small 10x20 foot depressions that will provide vernal pool type habitat and additional swale area (estimated 1 acre) and will be created between Ponds 2 and 3.
4. The new outlet of Pond 1 will be constructed at the height of the existing outlet structure and graded to the elevation of standing water in Pond 2. The Base environmental personnel, in coordination with USFWS, will adjust the flow regimes in the ponds to optimize resource values either by controlling the weir structure or by grading the earthen outlet of Pond 1.
5. The Air Force will purchase a 1-acre vernal pool easement (cost not to exceed \$70,000) on suitable mitigation bank property to compensate for any residual impacts to vernal pools and fairy shrimp due to project encroachment into vernal pool habitat not mitigated by the project. This one-time purchase is part

of an existing programmatic mitigation bank developed in coordination with the USFWS and the Army COE for mitigation of vernal pools and fairy shrimp.

6. Culverts will maintain existing drainage under roadways and bicycle paths.
7. Wetland plants consistent with firebreak considerations will be allowed and encouraged to develop along drainage swales, thereby enhancing the swales wetland value. Drainage swales will function as a vernal swale offsetting the loss of some of the natural swale habitat below Pond 1.
8. Rolled curbs and open drainage swales will allow amphibian crossings throughout the project area.
9. No pets will be allowed to roam in the wetland reserve site. Owners of off-leash pets in sensitive areas will be cited by installation security police personnel
10. A list of native plant species shall be incorporated into common plantings and will include the appended plant species list as appropriate. In addition native plants shall be used to enhance the existing wetland and natural resource values located outside of the developed area.
11. A long-term management plan will be developed to gradually replace existing stands of Eucalyptus trees with native oaks and Grey pines through yearly plantings of oaks and selective removal of eucalyptus. Invasive exotic plants will not be allowed in any landscaping of the housing area, to include both the common areas and the individual areas. Examples of these exotic plants include Scotch Broom; French Broom; New Zealand Ivy; Pampas Grass. Active removal and eradication of invasive exotic species will be conducted by the base to prevent invasive species from gaining a foothold in the natural areas.
12. Travis AFB will monitor for exotic animals and, to the extent permitted by law, eradicate them in order to protect the natural resources of the site. This will be an ongoing installation responsibility..
13. Any feral cats will be trapped and removed.
14. All new tenants will be provided with educational materials on local natural resources, why they are important, and how they should protect these resources. These materials will include mandatory restrictions, such as requiring all pets to be kept leashed and kept away from protected species and habitats
15. No cats or dogs shall be allowed in units 68-73 and 109-113. These units front the most sensitive resource areas.
16. A Cross Country bicycle "fun" area currently planned for the project will be located away from sensitive resource areas. Picnic and park areas will similarly be situated to avoid sensitive areas.

17. Educational signs and billboards will be placed at trailheads providing information on the wetlands, their biology and importance.
18. Firebreaks will be managed to avoid impact to vernal pools and wetlands. Mowing near vernal pools will not be carried out until such time as the vernal pools have dried out. Firebreak discing will not be allowed within 100 feet of any wetland.

Management and Avoidance Measures:

1. Use of insecticides, herbicides or other chemicals will be prohibited where such use could contaminate wetlands or vernal pools in the MFH area. The Air Force will include, as a condition of tenancy in those houses that are located within the drainage footprints of sensitive wetlands, that the residents will not use any outdoor insecticides or herbicides unless they have been previously approved by the determined by the base environmental office.
2. Drainage into the existing vernal pools will be maintained through the use of culverts connecting the vernal pool systems watershed uphill of the development to that down hill of the development.
3. A management report on the status of wetland resources will be prepared annually for a period of five years by the base environmental staff. The report will document the condition of onsite natural and wetland values. The report shall make recommendations to the base commander on measures deemed necessary to protect and enhance wetland values. Potential protection measures include, but are not limited to, the following:
 - a. Exclusion: If studies show that vernal pools supporting sensitive species are being impacted, fences to protect vernal pools and sensitive species habitat will be installed and/or seasonal exclusion of people and animals from areas will be implemented.
 - b. Weed control: Exotic weed control operation in areas surrounding vernal pools will consist of the use of hand tools, mowing, controlled animal grazing, selective spot herbicide application and/or controlled burning. The purposes for which weed control will be implemented are enhancement of the native flora, construction and maintenance of firebreaks and reduction of wild fire fuels.
 - c. Active erosion control. During project construction and for a period of two years afterward, active erosion control measures (re-vegetation, hydromulch, matting) will be undertaken to prevent sediment from accumulating in all vernal pools and ponds. All soils disturbed during construction will be matted, hydroseeded or hydromulched to prevent sediment erosion into the pools. Hay bails, erosion control netting and other effective erosion control measures will be used to intercept and prevent any sediment from entering vernal pools and ponds.
 - d. Hydroseeding: Any hydroseeding, erosion control planting etc. will use appropriate plant species native to the local area and site. Hydroseeding will use exotic species and varieties only if they can be controlled and eradicated once they have served their soil stabilization function. At the end of the initial erosion control phase, only plants native or naturalized to the site should remain.

e. Pond management: Ponds will be managed to control of water levels and drying in ponds in order to enhance resource values. Use of environmentally benign mosquito and pest control methods(Bacillus Thurginsus, golden bear oil or other approved methods) when employed will be consistent with natural resource protection.

Enhancement Measures:

1. Planting of native perennial plant species within the reserve area: Native plant species will be planted in several groupings no closer than 100 feet of the vernal pools . These plantings will emphasis woody shrub and tree species native to the area (oak-woodland species) and that will increase wildlife resource values.
2. Planting of native perennial plant species in the developed area as part of the landscape palette: Native plant species will be substituted for traditional landscape plants in the areas fronting the wildlife reserves. Native plant species will be incorporated into landscape plantings in the rest of the project.

Monitoring (subject to funding);

1. The Travis AFB environmental staff shall conduct site monitoring yearly and will provide a report on the status of resources to the commanding officer and to USFWS. Included in the report will be a photographic record of each of the vernal pools and ponds on site evidencing their condition and a comparison to the natural pools on Travis AFB. Documentation of the filling and drying periods shall be provided in this report.
2. The Air Force shall monitor a representative sample of the vernal pools and ponds (at least three pools with shrimp and three apparently similar pools with out shrimp) for four years to document their condition as habitat for sensitive species and shall provide annual reports to the USACOE CO and the USFWS. The representative pools should be surveyed and profiled as to shape and volume. Monitoring should include at minimum: samplings of water depth, tempreture (both minimum and maximum, as well as representative temperature profiles) salininty (conductivity, hardness), oxygen concentration, nitrate concentration recorded over three days every other month during the period when the pools contain water. A representative semi quantitative collection of pool invertebrates (collections made using standard methods and quantified effort) both collected and preserved and as a photographic study using micoscopy should be made during the bimonthly surveys. These surveys could be conducted using either government, contractor, college or local high school scientists.

APPENDIX 2

Authnol: HOLMES-BOB CIV 60RMW EMP <BOB.HOLMES@travis.af.mil> at INTERNET

Date: 05/25/1999 2:30 PM

Priority: Normal

TO: David Wright at IPO-SCES2

TO: Bill Van Peeters <wvpeeters@efawest.navfac.navy.mil> at "INTERNET

CC: David Gwisdalla <David.Gwisdalla@travis.af.mil> at "INTERNET

CC: Kevin Neurer <kevin.neurer@travis.af.mil> at "INTERNET

CC: Robert Nichols <Robert.Nichols@travis.af.mil> at "INTERNET

CC: Sanford Bennett <Sanford.Bennett@travis.af.mil> at "INTERNET

Subject: Burke Property project Vernal Pool Preservation area and Mit

David

This is to confirm what was discussed late yesterday afternoon between you, Betty Warne and myself.

The Air Force (Travis AFB) would like to use the \$70,000.00 mentioned in the mitigation plan for the purchase of constructed wetlands/vernal pools in a bank to be named.

Additionally as discussed Travis will set aside an area containing two (2) acres of "Natural" vernal pools somewhere on base but not at the Burke site. The best site on base is along the western edge of the base south of the Aero Club. This site can be permanently set aside from development and protected from other impacts which would degrade the existing wetlands. This area already contains 44 vernal pools of various sizes. 31 of these pools occur in a single complex. The remaining 13 are scattered over the 100 acre site.

If this follows what was discussed yesterday I will develop a color map of the site and FedEx it to your office.

Robert Holmes
Management Agronomist, Travis AFB

Received: from mxgate.travis.af.mil [132.33.132.7] by mail.fws.gov (ccMail Link to SMTP R8.20.00.25)

; Tue, 25 May 1999 15:30:46 -0700

Return-Path: <Bob.Holmes@travis.af.mil>

Received: from SMTP (pc-216036.travis.af.mil [132.33.216.36])

by mxgate.travis.af.mil (8.8.7/8.8.7) with SMTP id OAA20863;

Tue, 25 May 1999 14:30:41 -0700 (PDT)

Received: from fsxdm01.travis.af.mil ([132.33.201.19]) by 132.33.216.36

(Norton AntiVirus for Internet Email Gateways 1.0);

Tue, 25 May 1999 21:31:02 0000 (GMT)

Received: by FSXDMT01 with Internet Mail Service (5.5.2448.0)

id <LTBDGH29>; Tue, 25 May 1999 14:30:38 -0700

Message-ID: <10F1354526E8D211AE4900805FA7F239F27D6E@EXCLUST1>

From: Holmes Bob Civ 60AMW EMP <Bob.Holmes@travis.af.mil>

To: David Wright <david_wright@mail.fws.gov>,

Bill Van Peeters

<wvpeeters@efawest.navfac.navy.mil>

Cc: David Gwisdalla <David.Gwisdalla@travis.af.mil>,

kevin neurer

<kevin.neurer@travis.af.mil>,

Robert Nichols

<Robert.Nichols@travis.af.mil>,

Sanford Bennett

<Sanford.Bennett@travis.af.mil>

Subject: Burke Property project Vernal Pool Preservation area and Mitigati
on Bank

Date: Tue, 25 May 1999 14:30:37 -0700

MIME-Version: 1.0

X-Mailer: Internet Mail Service (5.5.2448.0)

Content-Type: multipart/alternative;

boundary="----=_NextPart_001_01BEA6F5.D49CD5D0"

Author: Holmes Bob Civ 60AMW EMP <Bob.Holmes@travis.af.mil> at "internet"
Date: 05/26/1999 9:44 AM
Priority: Normal
TO: David Wright at LPO-SCES2
TO: Bill Van Peeters <wvpeeters@efawest.navfac.navy.mil> at "INTERNET"
CC: David Gwisdalla <David.Gwisdalla@travis.af.mil> at "INTERNET"
CC: kevin neurer <kevin.neurer@travis.af.mil> at "INTERNET"
CC: Sanford Bennett <Sanford.Bennett@travis.af.mil> at "INTERNET"
CC: Robert Nichols <Robert.Nichols@travis.af.mil> at "INTERNET"
CC: Will Summers <Will.Summers@scott.af.mil> at "INTERNET"
Subject: Mitigation for Lasthenia c
David

As was discussed earlier this week it would be very beneficial for the base if the .2 acres of mitigation for the loss of the L. conjugens is added to the Aero Club mitigation work. Sharon Collinge the head researcher on that project has said that it would not be a problem. If you have any questions please call.

Robert Holmes
Management Agronomist, Travis AFB

Received: from mxgate.travis.af.mil [132.33.132.7] by mail.fws.gov (cMail Link to SMTP R8.20.00.25)

: Wed, 26 May 1999 10:45:00 -0700

Return-Path: <Bob.Holmes@travis.af.mil>

Received: from SMTP (pc-216036.travis.af.mil [132.33.216.36])
by mxgate.travis.af.mil (8.8.7/8.8.7) with SMTP id JAA20898;

Wed, 26 May 1999 09:44:36 -0700 (PDT)

Received: from fsxdtm01.travis.af.mil ([132.33.201.19]) by 132.33.216.36
(Norton AntiVirus for Internet Email Gateways 1.0) ;

Wed, 26 May 1999 16:45:08 0000 (GMT)

Received: by FSXDMT01 with Internet Mail Service (5.5.2448.0)
id <LTBDGN0L>; Wed, 26 May 1999 09:44:34 -0700

Message-ID: <10F1354526E8D211AE4900805FA7F239F2819C@exclust1.travis.af.mil>

From: Holmes Bob Civ 60AMW EMP <Bob.Holmes@travis.af.mil>

To: David Wright <david_wright@mail.fws.gov>,
Bill Van Peeters

<vwpeeters@efawest.navy.mil>
<David.Gwisdalla@travis.af.mil>,
kevin neurer

<kevin.neurer@travis.af.mil>,
Sanford Bennett

<Sanford.Bennett@travis.af.mil>,
Robert Nichols

<Robert.Nichols@travis.af.mil>,
Will Summers <Will.Summers@scott.af.mil>

Subject: Mitigation for Lasthenia c

Date: Wed, 26 May 1999 09:44:32 -0700

MIME-Version: 1.0

X-Mailer: Internet Mail Service (5.5.2448.0)

Content-Type: multipart/alternative;

boundary="----=_NextPart_001_01BEA797.082A3C20"

Nationwide 26 Permit Authorization



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

JUN 4 1999

Regulatory Branch

SUBJECT: Housing Project Nationwide Permit Verification Letter, File Number 23753N

Colonel David Bird
Commander, 60th Support Group
Travis Air Force Base
400 Brennen Circle
Travis Air Force Base, California 94535-2176

Dear Colonel Bird:

This is in reference to your 22 April 1999, application for Department of the Army authorization to place fill in 1.5 acres of wetlands, including 0.2 acres of vernal pools, during construction of 226 units of military housing on a 101 acre project site. This project site, also known as the Burke property, is located north of Cannon Drive on Travis Air Force Base in Fairfield, Solano County, California. This project is described in Figure 2-3 "226-Unit Housing Design for the Burke Property, Travis AFB", included in the "Draft Environmental Assessment, Travis Air Force Burke Property Housing" dated 4 February 1999.

Based on a review of your application and the supporting documents, we have determined that the placement of fill during construction of this housing project is authorized by Department of the Army Nationwide Permit 26 Headwaters & Isolated Waters, (61 FR 65874, Dec. 13, 1996), pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344).

In order for this authorization to be valid, the Air Force must comply with the General Conditions cited in Enclosure 1 and all Special Conditions specified in this letter. Upon **completion of the project and all associated mitigation requirements, you shall sign and return the enclosed Certification of Compliance, Enclosure 2, verifying compliance with the terms and conditions of the permit.** Non-compliance with any condition could result in the revocation, suspension or modification of this project's nationwide permit authorization. Should this occur the Air Force could be required to obtain an individual permit from the Corps of Engineers. This nationwide permit authorization does not obviate the need to obtain other State or local approvals required by law.

This authorization will remain valid until **September 15, 1999** at which time Nationwide Permit 26 is scheduled to expire. If you have commenced work or are under contract to commence work prior to the suspension, or revocation of the nationwide permit and the project would not comply with the resulting nationwide permit authorization, you have twelve (12) months from that date to complete the project under the present terms and conditions of the nationwide permit.

-2-

This authorization will not be effective until you have obtained Section 401 water quality certification or a waiver of certification from the San Francisco Regional Water Quality Control Board (RWQCB). If the RWQCB fails to act on a valid request for certification within two (2) months after receipt, the Corps will presume a waiver of water quality certification has been obtained. You shall submit a copy of the certification or waiver to the Corps prior to the commencement of work.

To ensure compliance with the nationwide permit, the following special conditions shall be implemented.

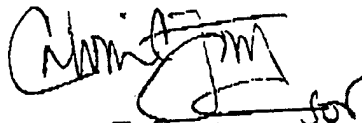
1. High visibility construction fencing shall be placed around all the wetlands the Air Force is not authorized to fill for the duration of the construction activities on the project site. All construction workers shall be receive instruction in recognizing the marked areas and shall be instructed to avoid them.
2. No later than 3 months after construction of the project, the Air Force shall conduct a wetland delineation of the parcel to demonstrate that it has not placed fill in any wetlands which it was not authorized to fill. The field sheets and jurisdictional map generated by this delineation shall be submitted to the Corps no later than 6 months after construction is completed. This delineation map shall have a scale no smaller than 1 inch: 200 feet.
3. The Air Force shall implement the attached Vernal Pool Mitigation Plan with the following exception: the created wetland shall have an area of at least 1.5 acres. The mitigation area shall be monitored for a minimum of five years or until the Corps concurs that suitable vernal pool and vernal swale habitat has been created. The annual monitoring reports shall be submitted by 31 January each year. Each monitoring report shall reference Corps of Engineers file number 23753N prominently on its first page.
4. As an attachment to the fifth year monitoring report, the Air Force shall submit a wetland delineation of the 40 acre open space preserve. This map shall be at the same scale as the wetland delineation map generated for compliance with Special Condition 1. The purpose of this map is to demonstrate that at least 1.5 acres of wetland has been created and to track the effect the housing project has on the size of the other wetlands on this preserve.
5. Wetland mitigation construction shall commence in advance of or concurrently with project construction.

-3-

6. A conservation easement shall be recorded for the mitigation area by 31 December 1999. If a conservation easement is not practical due to the mitigation area being located on an Air Force Base, the Air Force shall propose an alternative method for long-term protection of the mitigation area by 31 December 1999. This alternative method must be approved in writing by the Corps.

Please refer any questions regarding this authorization to Debra O'Leary of the Regulatory Branch at (415) 977-8442. All correspondence should reference the file number 23753N.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter T. Grass", with a stylized flourish at the end.

Peter T. Grass
Lieutenant Colonel, Corps of Engineers
District Engineer

Enclosures

Copies Furnished:

US F&WS, Sacramento, CA
US EPA, San Francisco, CA
CD F&G, Yountville, CA
CA RWQCB, Oakland, CA

Correspondence



DEPARTMENT OF THE AIR FORCE
60TH AIR MOBILITY WING (AMC)

U.S. Fish and Wildlife Service
ATTN: Ms. Betty Warne
3310 El Camino Ave. suite 130
Sacramento CA 94821-6340

31 MAR 1999

60 AMW/EM
580 Hickam Avenue, Bldg. 246
Travis AFB CA 94535-2176

RE: Travis AFB "Burke" Property Mitigation Measures

Dear Ms. Warne

Engineering Field Activity West, as agent for Air Mobility Command, has consulted with your office while preparing plans for a 226 unit housing development located on the former Burke Property at Travis AFB. The AF has done the following to avoid impacts to federally listed Threatened and Endangered Species (T&E), candidate species and other natural resources associated with the proposed project site.

The Air Force has completed an EA as required by NEPA, and has thoroughly investigated the site for T&E species. Two listed species and one candidate species occur on site. Fairy Shrimp (*Branchinecta lynchi*) occurs in 5 vernal pools. Two individual plants of *Lasthenia conjugens* were documented and one dead individual adult tiger salamander was found on site. On-going wet season surveys have not detected fairy shrimp or larval salamanders in any additional locations. Another small population of *Lasthenia* (species indeterminate at this time but assumed for planning to be *conjugens*) is in an area that will not be impacted. The plans for the project avoids all impacts to T&E and candidate species, and avoids impacts to 90 percent of the existing wetland resources on site. Under COE requirements, the AF will mitigate on a one to one basis on-site for the impacts to vernal swales. In addition, the Air Force will purchase credits in an approved vernal pool mitigation bank (up to \$70,000) to mitigate for project residual and indirect impacts to vernal pool dependant species.

The Air force has modified the project as requested by the USFWS to avoid most (90 percent) of the impacts to wetlands. The plans now call for rolled street curbs and modified drainage to prevent potential obstructions to any tiger salamanders that potentially exist on-site. The Air Force will remove, save and relocate the soil from around the two individual plants of *Lasthenia conjugens* in order to conserve any seed stock in the soil. The Air Force further agrees to implement the attached measures, as project avoidance, mitigation and enhancement measures subject to continued funding and as allowed by federal law.

The Air Force believes that the implementation of these measures will fully protect the federally listed Fairy Shrimp, mitigate the loss of two individual plants of *Lasthenia conjugens*, protect and enhance the sites vernal pools and other wetlands and allow their continued use by dependant plant and animal species.

We request your concurrence on our finding that with the rigorous implementation of the attached measures no adverse effect is likely to occur to threatened, endangered, candidate species or their critical habitat.

Robert E. Nichols II

ROBERT E. NICHOLS II, Lt. Col. USAF
Director, Environmental Management

Vernal Pool Mitigation Plan

Construction Measures: Violation of the following mitigation measures as determined by the Travis Air Force Base Representative will result in an immediate cessation of work at the offending construction site. A review by the Air Force environmental office of site environmental resources, mitigation measures and appropriate construction procedures to safe guard site resources will then be coordinated. Any delay due to review or training cost will be borne by the contractor. Once the resource issues are resolved, work at the infraction location will stop and will not be restarted without explicit direction from Travis Air Force Base Representative.

1. The contractor will provide tailgate sessions to all contractor and contractor sponsored personnel who require access to the construction site. The sessions will include a description of the sensitive and protected biological resources, how to recognize the resource, how avoid impacting sensitive resources, and how to report any accidental resource impacts.
2. The contractor will designate the onsite manager who will be responsible for insuring compliance with all environmental mitigation measures. Any violations of the mitigation measures will be immediately reported to the Travis AFB environmental office.
3. Construction fences around endangered species habitat: Fences will be constructed to provide a visual marker to keep personnel and equipment out of sensitive wetlands. Erosion control netting (silt screen) shall be located no closer than 50 feet between any construction activity and all sensitive wetland areas. The control netting will be attached to metal stakes securely driven into the ground. The stakes will be placed at least every 10 linear feet. Netting actually used to control sediment will be placed in accordance with manufactures instructions to prevent sediment from reaching wetlands. The site supervisor shall inspect the construction site to assure that all wetlands are fenced prior to the day's start of construction. If areas are not marked, the supervisor shall have them remarked prior to the start of construction activities. All personnel will be briefed on the significance of wetland areas.
4. All contractor personnel and contractor-initiated deliveries will remain outside flagged boundaries at all times.
5. Any disturbance of existing wetlands other than as explicitly required by the construction plan will require repair, restoration, re-vegetation and monitoring at the contractor's expense. All work shall be concluded in accordance with requirements of the USACOE and USFWS.
6. No storage of chemicals, solvents, paints or construction materials will be allowed on site other than those required for immediate use. (Immediate use is defined as for use

during that day.) All chemicals, paints, solvents and construction materials shall be removed from the site at the end of the workday. No fueling, mixing or transfer of chemicals harmful to wetland ecosystems will be allowed up-gradient of any sensitive wetland area.

7. Best management practices will be used to control erosion on the job site. At minimum, straw bails and fabric barriers shall be erected to prevent any sediment from entering into any of the mapped wetlands.
8. Any use of seed mixtures will be approved by the Travis AFB environmental office to assure that only appropriate native plant species, sterile annual plants, or plants that can be prevented from spreading by mowing are used for erosion control.

Mitigation Measures:

1. The Air Force has reduced the size of the project from 281 units to 226 units in order to avoid significant impacts to wetlands on the "Burke" site.
2. The Air Force will set aside 40 acres of the project property as mitigation open space reserve. The primary purpose of the reserve is to protect existing wetland resources, support sensitive species and maintain a healthy watershed.
3. A swale at least 1.2 acres in size will be created between Pond 1 and 2 (see final design map) as mitigation for the filling of approximately 1.2 acres of wetland habitat, required by the project construction. The swale habitat will consist of a meandering low flow channel cut between Ponds 1 and 2. Construction will include three small 10x20-foot depressions that will provide vernal pool type habitat and additional swale area (estimated one acre) will be created between Ponds 2 and 3.
4. The new outlet of pond 1 will be constructed at the height of the existing outlet structure and graded to the mean elevation of standing water in pond 2. The Base environmental personnel in coordination with USFWS will adjust the flow regimes in the ponds to optimize resource values either by installing a weir structure or by grading the earthen outlet of Pond 1.
5. The Air Force will purchase a one-acre vernal pool easement (cost not to exceed \$70,000) on suitable mitigation bank property to compensate for any residual impacts to vernal pools and fairy shrimp due to project encroachment into vernal pool habitat not mitigated by the project. This one-time purchase is part of an existing programmatic mitigation bank developed in coordination with the USFWS and the Army COE for mitigation of vernal pools and fairy shrimp.
6. Box culverts will maintain existing drainage under roadways and bicycle paths.

7. Wetland plants consistent with firebreak considerations will be allowed and encouraged to develop within the swale enhancing its wetland value. The swale will function as a vernal swale offsetting the loss of some of the swale habitat below Pond 1.
8. Rolled curbs and open drainage swales will allow amphibian crossings throughout the project area.
9. No pets will be allowed to roam in the wetland reserve site. Owners of off-leash pets in sensitive areas will be cited.
10. A list of native plant species shall be incorporated into common plantings and will include the appended plant species list as appropriate. In addition native plants shall be used to enhance the existing wetland and natural resource values located outside of the developed area.
11. A long term management plan will be developed to gradually replace existing stands of Eucalyptus trees with native oaks and Grey pines through yearly plantings of oaks and selective removal of eucalyptus. Invasive exotic plants will be prohibited from use in any landscaping in the housing area in both the common areas and the individual areas. These plants include Scotch Broom; French Broom; New Zealand Ivy; Pampas Grass. Active removal and eradication of invasive exotic species will be conducted by the base to prevent invasive species from gaining a foothold in the natural areas.
12. Monitoring and eradication of exotic animals will be an on-going base responsibility to protect the natural resources of the site.
13. Any feral cats will be trapped and removed.
14. All new tenants will be provided with educational materials that provide information about the local natural resources and their importance as well as how to protect them. These materials will include restrictions such as keeping all dogs on leash and away from protected habitats when in the natural resource areas and on trails.
15. No cats or dogs shall be allowed in units 68-73 and 109-113, These units front the most sensitive resource areas.
16. A Cross Country bicycle "fun" area will be located away from sensitive resource areas within this housing area. Picnic and park areas will be located to direct uses away from the sensitive areas.
17. Signs and educational billboards will be placed at trailheads providing information on the wetlands, their biology and importance.

18. Firebreaks will be managed to avoid impact to vernal pools and wetlands. Mowing near vernal pools will be conducted after the vernal pools have dried out. All firebreak discing will not run within 100 feet of any wetland.

Management and Avoidance Measures:

1. Use of insecticides, herbicides or other chemicals will be prohibited where use could contaminate the wetland and vernal pool areas. The Air Force will include, as a condition of tenancy in those houses that are located within the drainage footprints of sensitive wetlands, that the residents will not use any outdoor insecticides or herbicides unless they have been previously determined by the base environmental office to be consistent with the conservation of wetland resource values.
2. Drainage into the existing vernal pools will be maintained at approximately their existing levels, through the use of collection of water up hill of the development (Road C) and conveyance to the pool complex.
3. A management report on the status of wetland resources will be prepared annually, for a period of five years, by the base environmental staff. The report will document the condition of natural and wetland values on the site. The report shall make recommendations to the base commander for measures necessary to protect and enhance wetland values. Potential protection measures include:
 - a. Exclusion: Fences to protect vernal pools and sensitive species habitat and/or seasonal exclusion of people and animals from areas will be implemented if vernal pools supporting sensitive species show signs of impact.
 - b. Weed control: Exotic weed control operation in areas surrounding vernal pools will consist of use of hand tools, mowing, controlled animal grazing, selective spot herbicide application or controlled burning. The purposes for which weed control will be implemented are enhancement of the native flora, construction and maintenance of firebreaks and reduction of wild fire fuels.
 - c. Active erosion control: During project construction and for a period of two years afterward, active erosion control measures (re-vegetation, hydromulch, matting) will be undertaken to prevent sediment from accumulating in all vernal pools and ponds. All disturbed soils will be matted hydroseeded or hydromulched to prevent sediment erosion into the pools. Hay bails, erosion control netting and other effective erosion control measures will be used to intercept and prevent any sediment from entering vernal pools and ponds.
 - d. Hydro-seeding: Any hydro seeding, erosion control planting, etc., will use appropriate plant species native to the local area and site. Hydro seeding will use exotic species and varieties only if they can be controlled and eradicated once they

have served their soil stabilization function. At the end of the initial erosion control, phase only plants native or naturalized to the site should remain.

e. Pond management: Ponds will be managed to control water levels and drying in order to enhance resource values. Use of environmentally benign mosquito and pest control methods (Bacillus Thurginsus, golden bear oil) will be consistent with natural resource protection.

Enhancement Measures:

1. Planting of native perennial plant species within the reserve area: Native plant species will be planted in several groupings around the reserve area, outside a 100-ft buffer area around vernal pools. These plantings will emphasize woody shrub and tree species native to the area (oak-woodland species) that will increase wildlife resource values.
2. Planting of native perennial plant species in the developed area as part of the landscape palette: Native plant species will be substituted for traditional landscape plants in the areas fronting the wild life reserves. Native plant species will be incorporated into landscape plantings in the balance of the project.

Monitoring:

1. The Travis AFB environmental staff shall conduct site monitoring yearly and will provide a report on the status of resources to the commanding officer and to USFWS. Included in the report will be a photographic record of each of the vernal pools and ponds on site, their condition and a comparison to the natural pools on Travis AFB. Documentation of the filling and drying periods shall be provided in this report.
2. The Air Force shall monitor a representative sample of the vernal pools and ponds for five years to assess the habitat condition of sensitive species and shall provide annual reports to the USACOE CO and to the USFWS.



DEPARTMENT OF THE AIR FORCE
60TH AIR MOBILITY WING (AMC)

31 MAR 1999

U.S. Army Corps of Engineers
ATTN: Liz Varnhagen
Regulatory Branch
333 Market Street
San Francisco CA 94105-2197

60 AMW/EM
580 Hickam Ave, Bldg 246
Travis AFB CA 94535-2176

RE: REQUEST CONCURRENCE ON USE OF NATIONWIDE PERMIT 26 FOR
IMPACTS TO 1.5 ACRES OF WETLANDS LOCATED AT TRAVIS AIR FORCE BASE
101-ACRE HOUSING PROJECT

Dear Ms. Varnhagen

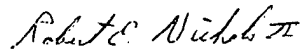
The Air Force, as part of a BRAC realignment of a KC 10 Tanker Wing to Travis AFB, plans to build 226 housing units on 101 acres of land purchased for that purpose, and located on the northern boundary of Travis AFB. This project was discussed in a 1994 BRAC relocation EIS, and is the subject of a recently completed tiered EA. The property was previously used for grazing and included a sandstone quarry. The latter operation significantly changed the topography of the site, lowering elevations in places by over 40 feet, and creating to a large degree the existing topography and drainage. A COE wetland delineation has been accomplished by an Air Force contractor, and provided for review to your staff. Some minor changes in the boundaries have been recommended by your staff and have been incorporated into the latest map delineation. These changes are not expected to significantly change the area or location of the mapped wetlands. The property includes approximately 15 acres of wetlands (fresh water ponds, wet swales, drainages and vernal pools) of which 1-1.5 acres of vernal swale would be filled as part of the proposed project.

We surveyed the site in detail for both biological and cultural resources, and coordinated closely with USFWS to avoid impacts to threatened and endangered species and to minimize impacts to wetlands and wetland-dependant species. The project has been sited to avoid impacts to wetlands; provide on-site mitigation on a one to one basis for the vernal swales that cannot be avoided; and provide enhancement and preservation measures for more than 50% of the 101 acre site (including the unimpacted 90% of the sites wetlands). The project will also purchase mitigation credits in a USFWS approve

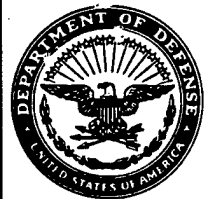
The Air Force believes and the USFWS agrees that the implementation of the mitigation program as outlined will fully protect the federally listed species identified on site:

1. Fairy shrimp, *Branchinecta lynchi*, found in 5 of the sites vernal pools;
2. Two individual *Lasthenia conjugens* plants, to be relocated outside the construction area and protection to any plants located outside the construction area and;
3. Protection of habitat critical to the candidate 1 listed tiger salamander, *Ambystoma tigrinum californiense* that may occur on site. The proposed project will preserve and enhance most of the site's important wetland resources and will allow their continued use by dependant plants and animal.

We request your concurrence that the project, with the avoidance, mitigation and management implemented as outlined above, may proceed under Nation Wide Permit 26. Based on consultation with the USFWS, natural and cultural resource surveys conducted as part of the project's recently completed NEPA document, the Air Force is preparing a FONSI and FONPA (for unavoidable take and mitigation of 1.5 acres of wetlands). We propose to sign this document on or before June 1 1999, provided we have your concurrence.



ROBERT E. NICHOLS II, Lt. Col, USAF
Director, Environmental Management



DEPARTMENT OF THE NAVY

ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-5006

IN REPLY REFER TO:

5090.1B

Ser 7032wp/1726

21 April 1999

Mr. Stephen L. Berger
Associate Water Resources Control Engineer
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, suite 1400
Oakland, CA 94612

Dear Mr. Berger:

As previously discussed in phone conversations between yourself and Mr. Van Peeters of my staff, Mr. Van Peeters is acting as an agent for the U.S. Air Force in applying for certification under section 401(b) of the Water Pollution Prevention and Control Act (WPPCA) for the filling of 1.5 acres of wetland on the Travis AFB 101 acre Housing Site. I request certification that the proposed military housing project as described in the Environmental Assessment, the US Army Corps of Engineers (COE) section 404 permit (WPPCA) and the proposed Vernal Pool Mitigation Plan (enclosed), meet the San Francisco Bay Regional Water Quality Control Board (RWQCB) criteria, and request consideration under a regional permit or waiver if appropriate. We will be providing a check to your office for \$1,500 as our required processing fee as discussed, within the next two weeks.

This project is part of the Congressionally approved relocation of an Air Force KC-10 tanker squadron to Travis Air Force Base. The relocation and housing project were the subject of the FINAL ENVIRONMENTAL IMPACT STATEMENT REALIGNMENT OF TRAVIS AIR FORCE BASE CALIFORNIA dated June 1994 and the more recent DRAFT FINAL ENVIRONMENTAL ASSESSMENT TRAVIS AIR FORCE BASE BURKE PROPERTY HOUSING dated 16 April 1999.

The project will construct 226 housing units (as 113 Duplexes) along with roads, utilities, play lots and basketball courts on a 101 acre site purchased for this purpose, and now part of Travis Air Force Base. The project will construct storm sewer systems, drainage swales, and storm water retention basins on site to handle storm water runoff from the project. The projects building contractor (not yet selected) will be required to seek appropriate storm water permits from the RWQCB prior to construction. The project will connect storm drains and sewage lines to existing systems on Travis Air Force Base.

We have consulted with the United State Fish and Wildlife Service, Sacramento Wildlife Office, on the presence of two federally listed endangered species on site, the Fairy Shrimp *Branchinecta lynchi* found in five of the vernal pools on site, but avoided by the proposed project, and two individual plants of Contra Costa Goldfields *Lasthenia conjugens* and anticipate a nonjeopardy biological opinion from them by the end of May. The construction plan includes avoidance and mitigation measures to full protect these species. The project also incorporates avoidance, mitigation and enhancement measures to minimize the projects impacts to wetlands and and to fully protect the remaining 90% of wetlands on site.

The project will require the filling or disturbance of 1.5 acres subject to COE jurisdiction out of approximately 15 acres of wetlands existing on site. Approximately .2 acres of the 1.5 acres of wetlands are vernal pools. We have submitted a permit application to the COE and have requested consideration of the project under Section 404 of the WPPCA, Nationwide Permit number 26. We believe the project is fully compliant with the general conditions of Nationwide 26.

We need your certification prior to our scheduled project contract award deadline of June 1, 1999. Please contact Mr. William Van Peeters by telephone at (650) 244-3017 or Fax (650) 244-3206 if you require further information. His E-Mail address is wvpeeters@efawest.navfac.navy.mil.

Thank you for your assistance in accomplishing this important Air Force Project.

Sincerely,

A handwritten signature in cursive script, reading "Douglas R. Pomeroy".

Douglas R. Pomeroy
Group Leader
Base Conversion/ Biology Section
Environmental Planning Branch

Enclosures:

Daft Final EA Travis AFB Burke Property Housing dated 22 March 1999
Vernal Pool Mitigation Plan
COE 404 Permit Application
Wetlands Delineation Maps



DEPARTMENT OF THE NAVY

ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94068-5006

IN REPLY REFER TO:

5090.1B/EP9 1717
7032 wvp
9 April 1999

Ms. Cay Goude, Assistant Field Supervisor
Sacramento Office, USFWS
3310 El Camino Av. Suite 130
Sacramento, CA 95821-6355

Dear Ms. Goude;

The Navy Engineering Field Activity West (EFA West) as an agent for Travis Air Force Base, requests initiation of formal Section 7 consultation as required under the Endangered Species Act for potential affects to two listed endangered species (Fairy Shrimp, *Branchinecta lynchi* and Contra Costa Goldfields, *Lasthenia conjugens*) located on a 101 acre military housing development site (please see attached maps). This new housing site is required for personnel being relocated to Travis as part of the Defense Base Realignment and Closure (BRAC) process approved by the Congress and accepted by the President.

EFA West, initiated informal consultation with members of your staff in early September 1998, in order to avoid adverse effects to T&E species associated with the housing development plan. Project information was provided and discussed in detail with your staff as it was developed in several documents including: 1. Draft Environmental Assessment, dated 4 Feb. 1999; 2. Dry Season Surveys for Special Status Shrimp Species at Travis Air Force Base, California; 3. Wetland Delineation on a Proposed Project Site for Travis Air force Base California Jan 1999; 3. BRAC Family housing 220 unit Phase 4 Plans and specifications dated 29 Jan 1999, 4. Avoidance Mitigation and Enhancement Measures Memo dated 3 Feb 1999.

The Air Force investigated the site for Threatened and Endangered (T&E) species, wetlands and other natural resources. Two listed species and one candidate species occur on site. All vernal pools were evaluated during extensive dry and wet season surveys and *Branchinecta lynchi* were found in five of 42 vernal pools. Cysts consistent with *Branchinecta spp.* were found in all five of the pools but adult *B. lynchi* were found in only three pools during the wet season surveys. Two individual plants of *Lasthenia conjugens* were found on site were found on site. Extensive wet season surveys did not find *B. lynchi* at any of the other vernal pools. A small population of *Lasthenia* (species indeterminate, but assumed for planning purposes to be *L. conjugens*) was found in an area not affected by the project.

The Air Force and EFA West have maintained close coordination with your office since September, with the goal of avoiding impacts to T&E species. With your staff's assistance, the Air Force developed and incorporated avoidance and mitigation measures into the plan, and the plan itself was extensively modified to avoid affecting T&E species. The proposed plan was reduced in scope from 281 to 226 housing units. This reduced the total wetland fill required by the project from 2.81 acres (20% of the total wetlands on site) to 1.18 acres (8%) of primarily wet swale but including approximately 0.20 acres of vernal pools. As now proposed the project will not affect any vernal pool containing *B. lynchi*, and will only disturb the location of a single annual *L. conjugens* plant (see attached maps taken from the project's Environmental Assessment).

The Air Force will mitigate on a one for one basis on site, for the impacts to wetlands and vernal pools taken during construction. In addition, the Air Force will purchase one acre of credits in an approved vernal pool mitigation bank (up to \$70,000) to mitigate for project residual and indirect impacts to vernal pools and their dependant species. The Air Force will remove, save and relocate the soil from around the two individual plants of *Lasthenia conjugens* in order to conserve any *L. conjugans* seed stock in the soil. Additional avoidance and mitigation measures have been developed with your office and are being included in the Final Environmental Assessment and plan contract specifications.

During recent telephone discussions with Mr. David Wright, we were informed that despite the extensive proposed avoidance measures, we could not completely avoid indirect affects to endangered species and that therefore we must seek a formal Section 7 Consultation.

Due to the critical schedule for this project (the Air Force projects a deadline for contract award of 1 June 1999) and in consideration for the long period of informal Section 7 consultation that we have completed, we request your assistance in the expedited processing of the formal Section 7 Consultation, with completion by early May 1999 if possible. Navy and Air Force personnel are available to assist your staff in any actions necessary to complete this process and confirm our previous informal consultation. For additional information our point of contact is: Mr. William Van Peeters, telephone (650) 244-3017.

Sincerely,

ORIGINAL SIGNED BY

Douglas R. Pomeroy,
Group Leader, Base Closure/ Biology Section

APPENDIX F
Air Quality Record of Non-Applicability (RONA)

RECORD OF NON-APPLICABILITY FOR CLEAN AIR ACT CONFORMITY

The proposed action falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

Proposed Action.

Activity: Travis Air Force Base
Proposed Action Name: Burke Property Family Housing, Travis Air Force Base, California
Proposed Action & Emissions Summary: The air quality analysis in the Environmental Assessment of the proposed action (EA) determined that construction activities would be below the de minimis thresholds and therefore would show conformity under the 1990 CAA (U.S. Navy 1999). The EA also determined that operational emissions would be reduced from current levels, as the proposed action would reduce vehicle miles traveled within the project region. As a result, the net change in operational emissions from the proposed action would not exceed the de minimis thresholds and would show conformity under the 1990 CAA.
Affected Air Basin(s): San Francisco Bay Area Air Basin (SFBAAB)
Date RONA prepared: May 21, 1999
RONA prepared by: Chris Crabtree, air quality specialist, Science Applications International, Inc., (805) 966-0811.

Proposed Action Relative to Exemptions. The proposed action does not require a Conformity Determination, because its emissions would not exceed de minimis levels nor represent 10 percent of the area's total emissions budget for nonattainment pollutant(s).

Attainment Area Status and Emissions Evaluation Conclusion. The attainment status of the affected air basin relative to priority pollutants is: nonattainment for ozone (O₃) and maintenance/attainment for carbon monoxide (CO). In 1995, the EPA redesignated the SFBAAB to attainment of the national O₃ standard, after data showed that the region had not violated the standard for at least three years. The official classification for the region was an O₃ maintenance area. Soon after redesignation, the region experienced several violations of the O₃ standard, requiring the EPA to redesignate the SFBAAB as an O₃ nonattainment area in 1997 (the EPA provides no classification on the severity of the nonattainment condition). For conformity purposes, it is assumed that the region has a moderate nonattainment status for O₃. The annual de minimis thresholds for these pollutants to show conformity are therefore 100 tons for CO and nitrogen oxides (NO_x) and 50 tons for volatile organic compounds (VOC) (NO_x and VOC are precursors to O₃ formation). The Navy's evaluation leads to the conclusion that de minimis thresholds for these pollutants in the nonattainment/maintenance areas would not be exceeded. The Navy therefore concludes that further formal Conformity Determination procedures are not required, resulting in this Record of Non-Applicability.

RONA Approval:

Signature: Robert E. Nichols II

Name/Rank: NICHOLS, ROBERT E. II

Position: Commanding Officer

LT COL

Date: 8 JUN 99

Activity: DIRECTOR, ENVIRONMENTAL MANAGEMENT
60 AMW/EM

APPENDIX G
Other Correspondence

APPENDIX G

OTHER CORRESPONDENCE

**Letter
Reference**

Commentor

1. City of Vallejo, Department of Public Works, Water Division
2. Fairfield-Suisun Sewer District



CITY OF VALLEJO

DEPARTMENT OF PUBLIC WORKS
Water Division

555 SANTA CLARA STREET • P.O. BOX 3068 • VALLEJO • CALIFORNIA • 94590-5934 • (707) 648-4307
FAX (707) 648-4691

May 20, 1999

Mr. Sanford E. Bennett
Architect
Department of the Air Force
60th Civil Engineering Squadron (AMC)
Travis AFB, CA 94535

Subject: Water Supply for 226 new houses at Travis AFB, CA
File: Water Availability - General Correspondence

Dear Mr. Bennett,

The proposed 226 new houses at Travis Air Force Base would impose an additional average day demand of about 185,000 gallons per day (gpd) on the existing water treatment facility. On maximum day demand (such as in summer days) this additional demand can go as high as 300,000 gpd. While this may be deemed considerable, Vallejo's existing Travis Water Treatment Plant has the capacity to provide this additional demand.

In 1995, the City of Vallejo and the U.S. Air Force upgraded and expanded the facility to enable the Plant to meet the State and Federal Water Treatment Standards and to increase its treatment capacity to 7.5 million gallons per day (MGD). Currently, the plant demands are 5.0 MGD on average day and peak day demand is 6.4 MGD. The plant therefore already has the excess capacity built in to serve the added demand of 226 new homes. The City also has ample raw water supply to cover the additional demand.

We hope this letter satisfactorily addresses the questions with regards to the housing's impact on Vallejo's water supply and water treatment capacity.

Very truly yours,


EXEQUIEL G. GANDINO, JR.
Water Superintendent

JM/mjl

cc: Mark Akaba, Public Works/Utilities Director



Fairfield-Suisun Sewer District

Richard F. Luthy, Jr.

General Manager/District Engineer

May 21, 1999

Mr. Sanford E. Bennett
Architect/Project Manager
60 CES/CECC
Travis AFB, CA 94535

Subject: Proposed Housing Development at Travis AFB, CA

Dear Mr. Bennett:

The Fairfield-Suisun Sewer District is aware of the proposed Burke Property housing development which would add 226 new family housing units on Travis AFB.

Sewer service is provided to Travis AFB under the terms of a utility service contract, which is currently being renegotiated. The new housing project is being considered in that negotiation, and the Sewer District anticipates no unmitigated impacts to the sewer system.

If you have any questions or comments, please contact me.

Very truly yours,

Richard F. Luthy, Jr.
General Manager/District Engineer

/ac



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