

Hamilton Army Airfield Wetland Restoration Feasibility Study Appendices

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APPENDIX A
Prior Studies and Reports

Appendix A

Prior Studies and Reports

A summary of studies and reports pertaining to the Hamilton Army Airfield study is provided below.

U. S. Army Corps of Engineers

Biological Assessment to Support a Request for Concurrence with a Determination of "unlikely to Adversely Affect": for Proposed Soil Disposal Activities at Hamilton Army Air Field (HAAF). Marin County, California. San Francisco District with technical assistance from LSA Associates, Inc. Point Richmond, California. June 1997.

This document provides a description of existing natural communities at HAAF and concludes that the proposal to dispose approximately 105,000 cubic yard of soil on the project would be unlikely to have an adverse affect on these species. Species evaluated include: salt marsh harvest mouse, American peregrine falcon, California brown pelican, California clapper rail, California red-legged frog. Mitigation measures are described to avoid or minimize impacts to special status species. Letter from the U.S. Fish and Wildlife Service is flagged and includes a list of species that have the potential to occur at HAAF. Also, the red-legged frog survey, performed in April 1997, is flagged and concludes that this species does not occur on or within one mile from HAAF.

Environmental Assessment Soil Disposal Hamilton Army Airfield Marin County, California. Sacramento District, Environmental Resources Branch. June 1997

This report provides a description of the environmental setting at HAAF and evaluates affected resources and proposes mitigation for resources including, but not limited to, vegetation and wildlife, sensitive species, water and air quality, land use, and public health and safety. The report includes a refined list of species, Table 3-1, that have the potential to occur or potentially occur in areas affected by the project at HAAF and is flagged. The report concludes that there would be no adverse affects as a result of the project. Policy, procedures, and responsibilities for the assessment of the EA are outlined in Section 6.0.

Final Environmental Impact Statement Hamilton Army Airfield Disposal and Reuse Vol. 1 and Vol. 2. February 1996.

The potential environmental effects of reuse are described in volume one of this report and the effects of the disposal action proposed. A description of the affected environment, environmental consequences and mitigation measures are provided for thirteen resources. The abstract provided in the beginning of the document states that the disposal action would result in the loss of federally protected wildlife and sensitive plant communities, historic structures, and risk of flooding from reduced maintenance of flood protection facilities. The abstract also states that reuse could result in a range of impacts including loss of wetlands and destruction of cultural resources. Section 4. 11 of this report provides an overview of the biological resources at HAAF. Table E- 1 and E-2 are

lists of plants and wildlife observed at HAAF. Volume 2 includes Responses to Comments.

Flood and Drainage Baseline Study for Hamilton Army Airfield Disposal and Reuse. April 1996.

This report presents an overview of flood control and drainage constraints relative to the reuse of Hamilton Army Airfield as a tidal wetland. A summary of the drainage and flooding conditions on the Base and flood control infrastructure is provided, including the existing storm surface water runoff, tidal effects, and groundwater. The existing conditions of flood control infrastructure is reviewed, including pumping systems, drainage conveyances, flood levees, and the effects of offsite drainages, Pacheco Creek, and Ignacio Reservoir. Several flood protection scenarios are evaluated relative to the flooding risks, existing agency requirements and easements, and the cost of the alternative. Recommendations included the evaluation of expanding mitigation wetlands on the site, extending Ignacio Reservoir, and evaluating regional wetland alternatives to create wetlands across Hamilton Army Airfield, SLC Antenna Field site Commission, and California Quartet, Bel Marin Keys V lands. Figures include maps of the locations of existing levees and drainage conveyances, general directions of surface water flow, general directions of groundwater flow, storm drainage infrastructure, the limits of the 100-year flood area, and vicinity maps of Hamilton Air Base and the surrounding areas.

Environmental Assessment Remedial Work on BRAC Property Hamilton Army Airfield, Marin County, California. February 1995.

Includes life histories of special status species that have the potential to occur on the BRAC property. (We only have portions of this document)

Wetland Mitigation Plan for Hamilton Air Force Base. Novato, California. June 1993.

This report is an overview of the proposed wetland creation plan intended to mitigate the loss of 4.1 acres of wetland impacted by the construction of a cap over Landfill #26 on Hamilton Air Force Base. The plan includes the development of 12.5 acres of new wetland and 20 acres of upland habitat. The goals of the mitigation project, success criteria, implementation plan, and monitoring plan for the project are extensively reviewed. A detailed summary of the hydrology, site location, and characteristics of the existing and proposed site conditions is presented. The wetland functions and values intended to be derived from the mitigation project are also provided. The results of a reference wetland study comparing the impacted wetlands, proposed mitigation areas, and selected reference wetland sites are included in the appendix of the report. Figures include maps of jurisdictional wetlands, drainage basin areas, existing site conditions, grading plans, vegetation plans, and reference wetlands.

Hamilton Antenna Field Wetland Restoration Plan. San Francisco District, 1993.

This document provides a description of vegetation types, special status species, existing development, easements and covenants, and proposed development of adjacent lands (one of which is California Quartet, Bel Marin Keys V) for the Hamilton Antenna Field area. Vegetation types found include: ruderal herbaceous, ruderal scrub, trees, dry perennial grassland, wet perennial grassland, dry pickleweed, cattail-rush marsh, deep

ditches, shallow ditches, and tidal salt marsh. Special status wildlife and plant species that could potentially occur are included in Appendix A and is flagged. Easements and covenants were reserved by the Federal Government for the Hamilton Antenna Field property (See page 10). Attached to this document is a DRAFT outline of Restoration Goals, Objectives and Design Criteria. This outline identifies species goals i.e. maximize habitat for California clapper rail, provide a natural tidal channel system that will support special status species use for breeding and feeding, reduce predation by creating a marsh plain with no upland access, and provide habitat for salt marsh harvest mice.

Hamilton Army Airfield Flood Control Study. Novato, California. May 1989.

The report summarizes the results of on-site investigations of existing drainage patterns and tidal effects on the Hamilton Army Airfield, identifies flood problem areas, and reviews alternatives to address existing flooding problems, including the 100-year event. Recommendations regarding improvements to the existing drainage conveyances, pumping systems, and levees are provided. Potential off-site alternatives to address flood problems are also considered in the review, including modifications to Ignacio Reservoir. The review of the flood control alternatives includes environmental and cost considerations. Figures include vicinity maps, 100 year floodplain maps, a map of the limits of the 1986 flood, drainage basins, soil boring profiles, maps of ponded areas and drainage conveyances, and typical cross sections of levee improvement alternatives under consideration.

Hydrologic Engineering Report, Novato Creek and Adjacent Streams, City of Novato, Marin County, California. San Francisco District, October 1987.

This report reviews hydrologic methods used to determine the frequency of peak discharges along Novato Creek and its tributaries. Results from this study were intended for use in the Novato Flood Insurance Study. Flow frequency curves were constructed by extrapolating data from the USGS gage "Novato Creek at Novato" using unit hydrographs developed for sub-basins. A Hydrograph Combining and Routing computer program was used to verify predicted high flows with those measured at the stream gaging station. Discrepancies between predicted and known flows in Novato Creek were used to estimate roughness values and loss rate parameters. The hydrograph Combining and Routing computer program was also used to estimate flood hydrographs through Stafford Dam. These results were confirmed using several other standard routing methods. The final model is particularly sensitive to rainfall data inputs. By defining a Standard Project Storm (SPS) for Novato Creek and an Intermediate Regional Flood (IRF), flow frequency curves are presented (Plates 10- 12) for index points along Novato Creek and its tributaries.

U.S. Fish and Wildlife Service

Preliminary Draft Fish and Wildlife Coordination Act Report, for the San Francisco Bay to Stockton Deepwater Ship Channel Phase III (J.F. Baldwin). Prepared for: U.S. Army Corps of Engineers San Francisco District, California. November 1995.

This document details the effects on fish and wildlife resources that would occur as a result of the Deepwater Ship Channel Phase III project. The report includes a discussion

of disposal alternatives, one of which includes the Hamilton Army Air Field (HAAF). The report was prepared in accordance with Section 2(b) of the Fish and Wildlife Coordination Act. Section VI of the report is a mitigation policy developed by USFWS and includes a discussion of their concerns and establishes mitigation planning goals (pg. 53). Section V includes a discussion of HAAF's future if the project proceeds and would require a restoration project intended to restore tidal marsh vegetation, seasonal wetlands, and upland habitat. Habitats to be restored support several special status species which is also discussed in this report. Appendix B, provides Habitat Evaluation Procedures (HEP) analysis.

The Ecology of San Francisco Bay Tidal Marshes: A Community Profile. Prepared by Michael Josselyn. Tiburon, California. 1983.

This document provides a description of the structure and functioning values of salt and brackish tidal marshes in San Francisco Bay. Other biological information is also included such as scientific information on the plants and animals found in habitats of the bay tidal marshes.

Studies and Reports from Other Sources

Cohen, Andrew Neal. *Gateway to the Inland Coast - The Story of the Carquinez Strait.* Published by The Carquinez Strait Preservation Trust and the Carquinez Strait MOU Coordinating Council, 1996.

This book provides a history of the land and life in the Carquinez Strait region including the San Francisco Estuary.

CSW/Stuber-Stroeh Engineering Group, Inc. *Bel Marin Keys V Master Storm Water Management Plan.* Prepared for The Presidio Group. Novato, CA. January, 1996.

The report includes a master drainage plan that analyzes flood control and flooding potential for the lower reaches of Novato and San Jose Creeks with respect to the Bel Marin Keys V Development. A history of flood studies of Novato Creek, as well as the current status of storm water flows in the area of Bel Marin Keys Unit V is provided. The proposed drainage improvements for Pacheco/ San Jose Creeks and the new tidal wetland designed to reduce flooding potential in the Novato Creek watershed is provided. The report also contains information on the proposed storm water management design relative to the flooding and storm water runoff patterns influenced by tidal action. Figures include the 1 in 100 hydrograph for Pacheco/San Jose Creek, the plan for the deep water lagoon, the golf course drainage plan, plots of time vs. tidal water surface elevations in the mouth of Sonoma Creek, and several plots of storm factor hydrographs that include time vs. the flow hydrograph, tidal elevations, and pond elevations. The appendices include peak flows in Pacheco/San Jose Creeks, the nontidal wetland model, the HEC 1 model, and 1995 tidal extremes.

Environmental Science Associates. *Bel Marin Keys Unit 5 Final EIR/EIS. Volume I Revised Draft.* Prepared for Marin County Planning Department and U.S. Army Corps of Engineers San Francisco District. San Francisco, California, August 1993.

Relevant information in Volume I includes biological resources, including upland and wetland vegetation and habitat types with lists of plants and animals occurring on site. Includes figures and tables. This report also contains aquatic resources and information as well as mitigation information. There is a discussion on geology, soils, and seismicity information on site with tables and figures and hydrology, drainage and water quality information for Novato Creek, San Pablo Bay and the Bel Marin Keys site.

Environmental Science Associates. *Bel Marin Keys Unit 5 Final EIR/EIS. Volume II, Response to Comments*. Prepared for Marin County Planning Department and U.S. Army Corps of Engineers San Francisco District. San Francisco, California, August 1993. Volume II is a response to comments. These comments include biological resources comments dealing with: extent of jurisdictional wetlands on site; regional reduction of seasonally important wildlife habitat; precedent-setting nature of project in North San Pablo Baylands; off-site project components; on-site habitat components; habitat creation and restoration, wetland, aquatic, and other habitat values on site; and impacts to endangered and threatened species and other special status species.

Environmental Science Associates. *Bel Marin Keys Unit 5 Final EIR/EIS. Volume III Comments Received*. Prepared for Marin County Planning Department and U.S. Army Corps of Engineers San Francisco District. San Francisco, CA. August, 1993. Contains all written comments from the Draft EIR/EIS as well as the transcripts from the Army Corps of Engineers public hearing and the minutes from the County Planning Commission hearings. Relevant information includes: letter from the EPA commenting on the clean water act and water quality for on-site locations; letter from the U.S. Department of the Interior commenting on biological resources on site; letter from Regional Water Quality Control Board commenting on biological resources; letter from California Department of Game and Fish commenting on biological resources on site; letter from the Venture Corporation commenting on biological resources and wetland restoration; letter from the Venture Corporation commenting on biological resources and water quality on site; letter from the Environmental Forum of Marin commenting on biological and water quality resources on site; letter from Marin Audubon Society commenting on biological, geological, and water quality issues on and off-site; letter from Save San Francisco Bay Association commenting on biological, geological and flood control issues; letter from the North Marin Federation commenting on hydrology, soils and geology issues on site; letter from San Francisco Bay Chapter Sierra Club commenting on biological and flooding issues both on and off site; transcripts from Barbara Salzman commenting on biological and wetland issues; transcripts from Scott Thayer commenting on migratory birds and other biological concerns; and transcripts from Daniel Grinnell commenting on wetland restoration onsite.

Federal Emergency Management Agency. *Flood Insurance Study. City of Novato, California, Marin County*. Revised: September 29, 1989. This Flood Insurance Study describes flooding potential in the City of Novato. The document revises a 1984 Flood Insurance Study that did not consider later annexations, Hamilton Air Force Base, or the role of tidal flooding. The report includes a description of land use changes and flood history. Using detailed hydrologic data from the 1987 U.S.

Army Corps Hydrologic Engineering Report, hydraulic computations (using HEC-2) were conducted for all streams and tributaries that could cause flooding within the City limits. The report includes flood profiles for these 9 channels (Exhibit 1: Panels 1-27). The 100-year flood elevations and 100- and 500-year floodplain boundaries are delineated. The report aids the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Results from this study are intended to help determine flood insurance rates and to promote sound floodplain management.

Gahagan & Bryant Associates, Inc. and San Francisco Estuary Institute. *Tidal Wetlands Restoration Potential Using Dredged Sediments: a methodology for assessment with examples from the North Bay Area. Long-Term Management Strategy Final Report.* Submitted to: U.S. Army Corps of Engineers, San Francisco District. February 1996. In this report parcels of diked baylands are identified and categorized where tidal marshland restoration, using dredged material, would be least constrained by existing ecology, engineering, and land use. The document provides a list ecology, engineering, and land use constraints. The Baylands Atlas was used for this document, which exists on a vector-based Geographic Information System (ArcInfo) at the San Francisco Estuary Institute and includes overlays of seasonal ponding patterns and avian resources as well as infrastructure and land use zonation.

Gahagan & Bryant Associates, Inc. *Volume 1 and Volume 2: Reuse/Upland Site Ranking, Analysis and Documentation. Long-Term Management Strategy. Work Element E, Reuse/Upland Site Analysis and Documentation.* Submitted to: U.S. Army Corps of Engineers, San Francisco District. December 1995.

Volume 1 and 2 of this report provides a description of the types of sites considered for habitat restoration. Chapter 3 of volume 2 provides a description of the existing Hamilton Army Airfield Habitat Restoration Site, environmental conditions, elevations, and design constraints. Chapter 7, page 96, discusses the environmental aspects associated with the Hamilton Army Airfield Habitat Restoration Site, which includes 581 acres of historical diked wetlands. Appendix C includes the volume, capacity analysis, and assumptions for the Hamilton Site.

Grossinger, Robin Mitchell. *Historical Evidence of Freshwater Effects on the Plan Form of Tidal Marshlands in the Golden Gate Estuary. University of California Santa Cruz.* Master thesis. December 1995.

This report is a compilation of historical and recent data used to define probable salinity gradients in the historical Estuary. The document includes an analysis of the accuracy of historical maps of the tidal marshlands of the estuary and measures the plan form characteristics of tidal marshland along the gradients determined in the compilation and shown on maps in the report.

Harris, R.D. and S.L. Granholm. *Water-bird use of seasonal compared to tidal wetlands, San Francisco Bay, California.* Trans. Western Section, Wildlife Society. 1996.

A comparison of water-bird use of seasonal/nontidal, perennial/nontidal, and tidal wetlands in late April and early May on San Pablo Bay. Study was comprised of formerly tidal wetlands, which had been diked and had developed seasonal wetland characteristics.

Krone & Associates and Resource Management Associates. *Tidal Marsh Restoration at Bel Marin Keys*. Prepared for California Quartet, Ltd. Davis, California. January 17, 1996.

This report describes the rate and patterns of sediment deposition that will result from the admission of tidal waters by breaching the levee along San Pablo Bay; and predicts deposition rates by numerical models of tides, flooding and ebb currents, and sediment transport. Figures include the location of the marsh restoration project, a plot of the mean tide at the levee breaches, the finite-element solution grid, deposition patterns 20 to 60 years after breaching, and current patterns 0 to 60 years after breaching.

LSA Associates, Inc. *Delineation of Clean Water Act Jurisdiction on Proposed Bel Marin Keys Project Site, Novato, California*. Prepared for California Quartet Ltd., Point Richmond, California, September 22, 1997.

This is an analysis of the potential extent of jurisdictional waters, including wetlands, on the proposed Bel Marin Keys Unit 5 project site. This report includes a site history, including land use, vegetation types and hydrology information. There is also a section on rainfall and ponding characteristics in both agricultural and non agricultural lands. Includes information on vegetation and soils.

LSA Associates, Inc. *Draft Habitat Restoration Plan, Bel Marin Keys Unit 5, Marin County, California*. Prepared for TPG Management, Inc. Point Richmond, CA. December 21, 1995. This report details the habitat restoration plan for the Bel Marin Keys Unit 5 project. Implementation of plan would restore 784 acres of diked bayland to tidal salt water marsh as well as expansion of salt water lagoon. This report includes information on: site characterization, including historic conditions, habitat values, physical parameters and jurisdictional waters; a review of bayland restoration projects including Sonoma Baylands, Muzzi Marsh, Creekside Park, Montezuma Wetlands, Hamilton Field and Napa Marsh Unit; information on non-tidal wetland restoration including hydrology, habitat types, implementation, and monitoring and maintenance; and tidal wetland restoration including approach, design, buffers, hydrologic features and water quality testing.

LSA Associates, Inc. *Habitat Plan, Bel Marin Keys Master Plan Application*. Prepared for Bel Marin Keys Development Associates, Point Richmond, California. March 1990. A habitat assessment based on species groups or guilds (rather than individual species) and cover types. Includes habitat suitability index as well as a wetland determination, extent of seasonal ponding, existing habitat including lagoon, brackish pond, tidal salt marsh, non-tidal salt marsh, seasonal pond and ruderal areas at the Bel Marin Keys site. This report also includes land use alternatives for the above parameters on site.

Miller Pacific Engineering Group. *Letter to California Quartet regarding Novato Sanitary District Information*. San Rafael, California, April 15, 1996.

Letter responding to Marin County Community development agency's claim that the Master Plan Application was incomplete and needed more information. The letter evaluates deflection of the sewer outfall due to the proposed embankment fill and to

provide geotechnical recommendations for design of the embankments. Relevant information includes information on Novato Sanitary Sewer outfall, embankment construction, vertical settlement, horizontal elastic deformation, lateral yielding and deflection of sewer outfall. Also includes maps of fill placement and removal, embankment construction, etc. on site.

Miller Pacific Engineering Group. *Volume I: Geotechnical Investigation, Bel Marin Keys Unit 5, Marin County, California*. Prepared for California Quartet, Ltd. San Rafael, California, December 21, 1995.

Volume I contains an analysis of the geologic setting, evaluation of geologic hazards, seismicity analysis, and exploration of subsurface conditions with penetration tests and test pits. There is a discussion of the geotechnical conditions, engineering analysis of embankment settlement, static and seismic stability and design recommendations. The report is oriented towards hazards, slope stability and embankment construction for the on-site development and includes information on general geologic setting, regional geology, site geology conditions and seismicity.

Miller Pacific Engineering Group. *Volume II: Appendices, Geotechnical Investigation, Bel Marin Keys Unit 5, Marin County, California*. Prepared for California Quartet, Ltd. San Rafael, California, November 15, 1995.

Volume II contains extensive subsurface data and laboratory test results of test borings, cone penetration tests, test pits, seismicity etc. Nearly all the project area is underlain with compressible bay mud, which is common throughout the area. Relevant sections include:

1) Appendix A: Probabilistic seismic hazard evaluation, active fault map, 50 year probability; 2) Appendix B: Exploration map, soil classification chart, hydraulic sampler, boring logs, cone penetration tests, test pit logs; 3) Appendix C: Laboratory testing data, plasticity, hydrometer analysis, compression tests, compaction tests, etc.; and 4) Appendix D: Soil classification chart, boring logs, soil correlation chart and cone penetration tests.

Roberto, John Associates. *Draft Amendment to the Final Environmental Assessment for Bel Marin Keys Unit 5*. Marin County Community Development Agency, San Francisco, California. May, 1996.

A re-evaluation of the Final Environmental Assessment with respect to environmental resources at the Bel Marin Keys property. Has new (1994) and expanded policy positions on a number of agricultural, environmental and community development issues. Includes information on environmental quality; includes environmental corridors, and resource conservation areas on site.