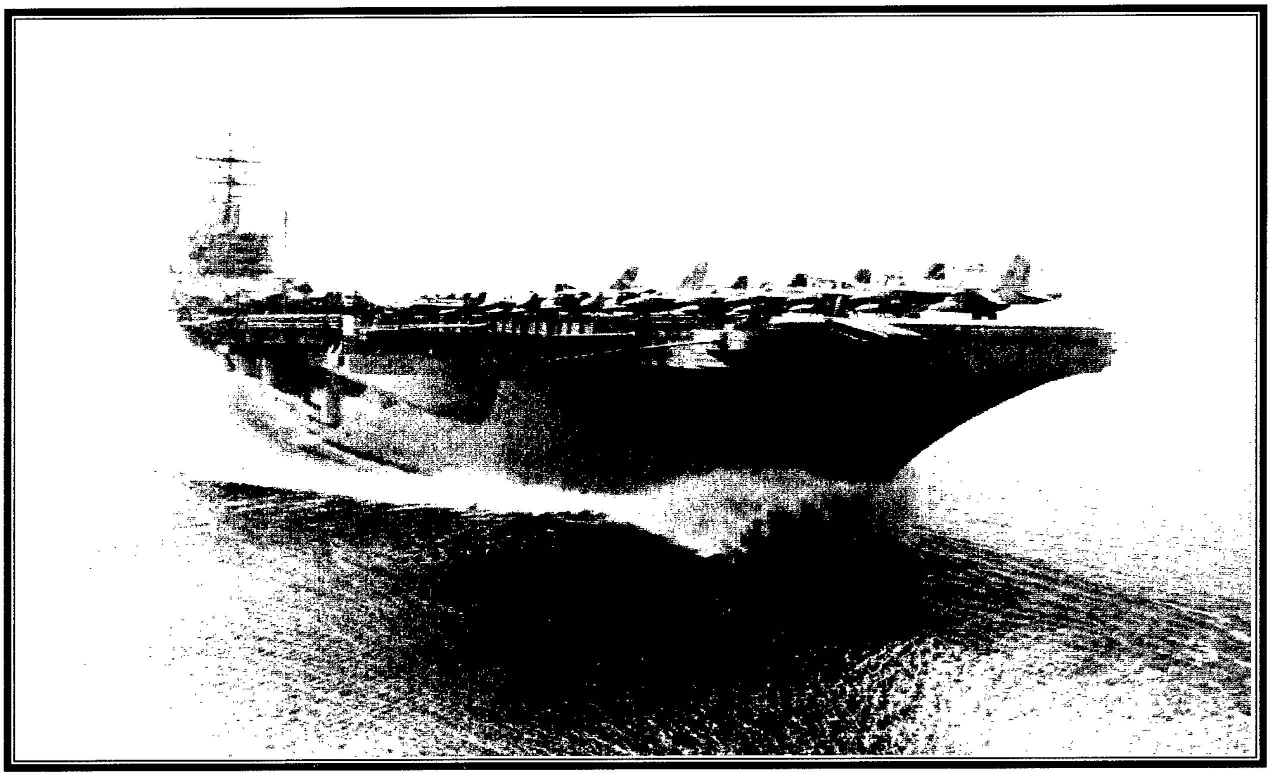
Final Environmental Impact Statement for

Developing Home Port Facilities for Three NIMITZ-Class Aircraft Carriers in Support of the U.S. Pacific Fleet

Coronado, California • Bremerton, Washington
Everett, Washington • Pearl Harbor, Hawaii



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Department of the Navy

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Please send your comments to Bob Hexom (Code 4PLR.BH), Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Highway, San Diego, California 92132, fax (619) 532-1096 or e-mail address at CVN_HOMEPORTING@efdsw.navfac.navy.mil. For additional information or to leave a message call 1-888-428-6440. Written comments must be postmarked by August 23, 1999.

PUBLIC NOTICE

The Department of the Navy has prepared and filed with the U.S. Environmental Protection Agency a Final Environmental Impact Statement (FEIS) for Developing Home Port Facilities for Three NIMITZ-Class Nuclear Powered Aircraft Carriers in Support of the United States Pacific Fleet. The Notice of Availability (NOA) for the FEIS will be published in the *Federal Register* on July 9, 1999. Federal, state, local governments, as well as interested individuals and organizations, are invited to provide written comments on the FEIS. The public comment period of 45 days will end on August 23, 1999. There will be no public hearing on the FEIS.

The Environmental Impact Statement (EIS) analyzes potential environmental impacts resulting from constructing and operating the facilities and infrastructure needed to support the homeporting for three NIMITZ-class nuclear-powered aircraft carriers (CVNs) within the U.S. Pacific fleet at four facility concentrations: (1) San Diego, California; (2) Bremerton, Washington; (3) Everett, Washington; and (4) Pearl Harbor, Hawaii.

The Navy proposes to construct and operate the appropriate facility and infrastructure needed to support the homeporting of three CVNs in the Pacific Fleet. Two CVNs will join the U.S. Pacific Fleet, replacing two conventionally powered aircraft carriers (CVs) homeported at Naval Air Station North Island (NASNI) in the Naval Complex San Diego, California. The current location of a third CVN at Naval Station (NAVSTA) Everett also will be reevaluated in order to increase efficiency of support infrastructure, maintenance and repair capabilities, and to enhance crew quality of life.

The need for the proposed action is the lack of acceptable CVN home port facilities and infrastructure in the U.S. Fleet area of responsibility (AOR). The purpose of the proposed action is to provide support facilities and infrastructure for the selected home port locations for the three CVNs (two new, and one currently at NAVSTA Everett) in the U.S. Pacific Fleet.

The Navy currently prefers Alternative Two, which would provide facilities and infrastructure to home port two additional CVNs at NASNI (for a total of three CVNs), home port a total of two CVNs in the Pacific Northwest (one at PSNS and one at NAVSTA Everett), and would not have any CVNs at Pearl Harbor Naval Complex. Alternative Two would result in significant but mitigable impacts on marine biological resources at NASNI and PSNS. All other environmental impacts associated with Alternative Two would be less than significant.

No decision on the proposed action will be made until the National Environmental Policy Act process has been completed and the Secretary of the Navy, or a designated representative, releases the Record of Decision. The FEIS includes resolution of written and oral comments received during the public comment period (August 28, 1998 until November 12, 1998) on the DEIS.

Final Environmental Impact Statement for

Developing Home Port Facilities for Three NIMITZ-Class Aircraft Carriers in Support of the U.S. Pacific Fleet

ABSTRACT

This Environmental Impact Statement (EIS) analyzes potential environmental impacts resulting from constructing and operating the facilities and infrastructure needed to support the capacity to homeport three NIMITZ-class nuclear-powered aircraft carriers (CVNs) within the U.S. Pacific Fleet at four facility concentrations: (1) San Diego, California; (2) Bremerton, Washington; (3) Everett, Washington; and (4) Pearl Harbor, Hawaii. The Navy proposes to construct and operate the appropriate facility and infrastructure needed to support the homeporting of three CVNs in the Pacific Fleet. Two CVNs will join the U.S. Pacific Fleet, replacing two conventionally powered aircraft carriers (CVs) homeported at Naval Air Station North Island (NASNI) in the Naval Complex San Diego, California. The current location of a third CVN at Naval Station (NAVSTA) Everett also will be reevaluated in order to increase efficiency of support infrastructure, maintenance and repair capabilities, and to enhance crew quality of life. Decisions are needed to accommodate planned arrival schedules of the CVNs to the Pacific Fleet and to prepare for upcoming ship maintenance periods. The Navy must select home ports and construct facilities as required for two new CVNs to be added to the U.S. Pacific Fleet; the first by 2002, and the second by 2005. The need for the proposed action is the lack of acceptable CVN home port facilities and infrastructure in the U.S. Fleet area of responsibility (AOR). The purpose of the proposed action is to provide support facilities and infrastructure for the selected home port locations for the three CVNs (two new, and one currently at NAVSTA Everett) in the U.S. Pacific Fleet. Because the proposed action could result in an additional CVN at PSNS, relocating up to four Fast Combat Logistic Support Ships (AOEs) currently homeported there is considered in this EIS. This EIS analyzes the potential environmental effects of the proposed action for six alternatives with varying levels of CVN homeporting facilities and infrastructure (such as dredging) development. This EIS addresses new facility requirements (dredging and pier construction) at PSNS Bremerton that have been identified after the decision was made in 1995 to establish PSNS as a permanent CVN home port as a result of the 1993 BRAC action to close NAS Alameda. The "No Action Alternative" is defined to mean that no new facilities or infrastructure would occur. The Navy currently prefers Alternative Two, which would provide facilities and infrastructure to home port two additional CVNs at NASNI (for a total of three CVNs), home port a total of two CVNs in the Pacific Northwest (one at PSNS and one at NAVSTA Everett), and would not have any CVNs at Pearl Harbor Naval Complex. Alternative Two would result in significant but mitigable impacts on marine biological resources at NASNI and PSNS. All other environmental impacts associated with Alternative Two would be less than significant.

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EXECUTIVE SUMMARY

INTRODUCTION

This Environmental Impact Statement (EIS) is being prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the environmental effects resulting from constructing and operating the facilities and infrastructure needed to create the capacity to home port three NIMITZ-class nuclear-powered aircraft carriers (CVNs) within the U.S. Pacific Fleet at four potential naval concentrations: (1) San Diego, California; (2) Bremerton, Washington; (3) Everett, Washington; and (4) Pearl Harbor, Hawaii (see Figures ES-1 through ES-3).

This EIS has been prepared in compliance with NEPA 42 U.S. Code (USC) 4321 et seq, as implemented by the Council on Environmental Quality (CEQ) regulations (Title 40 Code of Federal Regulations [C.F.R.] Parts 1500-1508 [1997]), 32 C.F.R. Part 775 (1997), and the guidelines contained in the Chief of Naval Operations Environmental and Natural Resources Program Manual Instruction (OPNAVINST) 5090.1B of November 1, 1994. It is intended to provide a full and fair discussion of significant environmental impacts associated with a range of alternatives and to inform decisionmakers and the public. This EIS will be used in conjunction with other relevant materials to plan actions and to make decisions.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The Navy has established a Pacific Fleet Force Structure consisting of six aircraft carriers. Home port capabilities for five of these vessels have been established at Navy installations in the continental United States. Home port facilities and infrastructure for two conventionally powered carriers (CV) and one nuclear powered carrier (CVN) currently exist at Naval Air Station North Island (NASNI), Coronado, California; home port facilities and infrastructure for one CVN exist at Naval Station Everett (NAVSTA Everett), Washington; and home port facilities and infrastructure for one CVN exist at Puget Sound Naval Shipyard (PSNS), Bremerton, Washington. Facilities and infrastructure exist in Japan to accommodate a forward-deployed CV.

As aging CVs reach the end of their service life and are replaced by CVNs, the Navy has a need to create the capacity to home port these new CVN assets. The U.S. Pacific fleet is currently undertaking the replacement of two such CVs within the U.S. Pacific Fleet area of responsibility (AOR). Additionally, the U.S. Pacific fleet is reevaluating the existing CVN home port capacity at NAVSTA Everett to determine if those facilities and infrastructure can efficiently support a CVN in terms of maintenance and repair capabilities and crew quality of life.

Of the six aircraft carriers homeported in the U.S. Pacific Fleet, three are currently NIMITZ-class CVNs. The CVN is a newer class of aircraft carrier requiring different homeporting shore infrastructure (e.g., electrical power and water depth). Examination of CVN Home Port Objectives and Requirements is fundamental in identifying locations to create the additional home port capacity required to support the three CVNs examined in this EIS. In broad terms, these CVN Home Port Objectives and Requirements can be described in four categories:

- Operations and training
- Facilities and infrastructure
- Maintenance
- Quality of Life (QOL) for Navy personnel

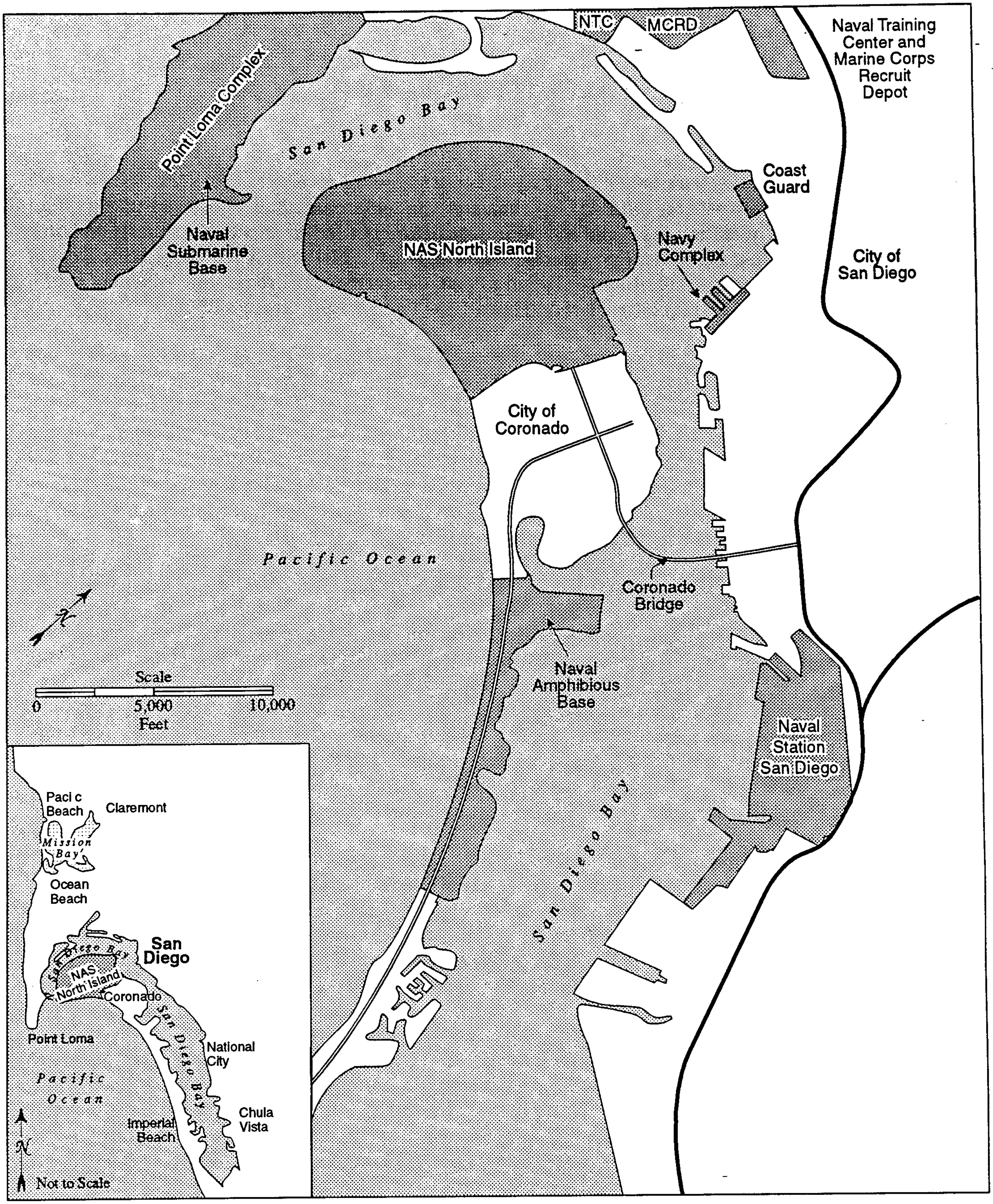

Figure ES-1. NASNI Coronado Vicinity Map

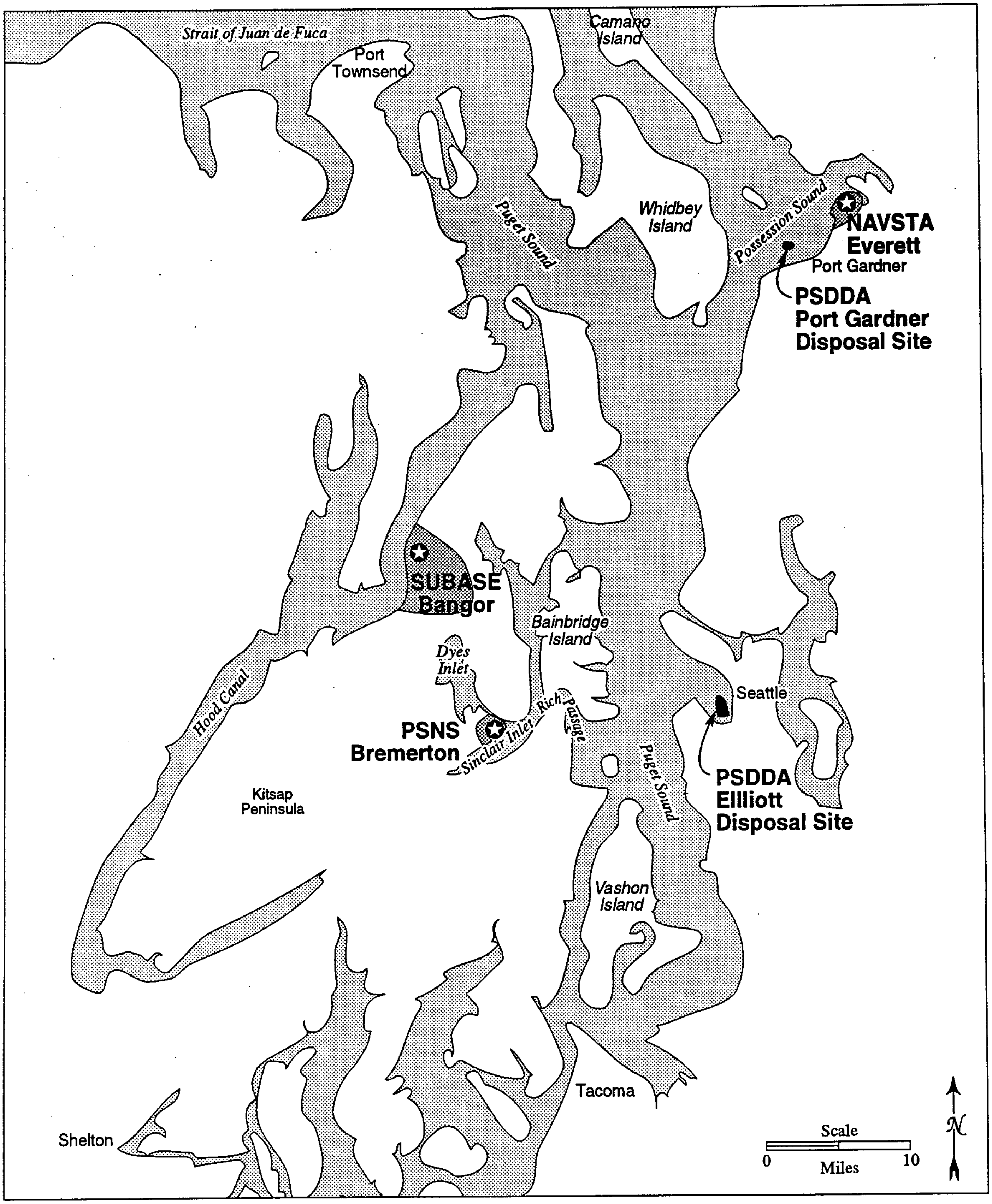

Figure ES-2. Puget Sound Vicinity Map

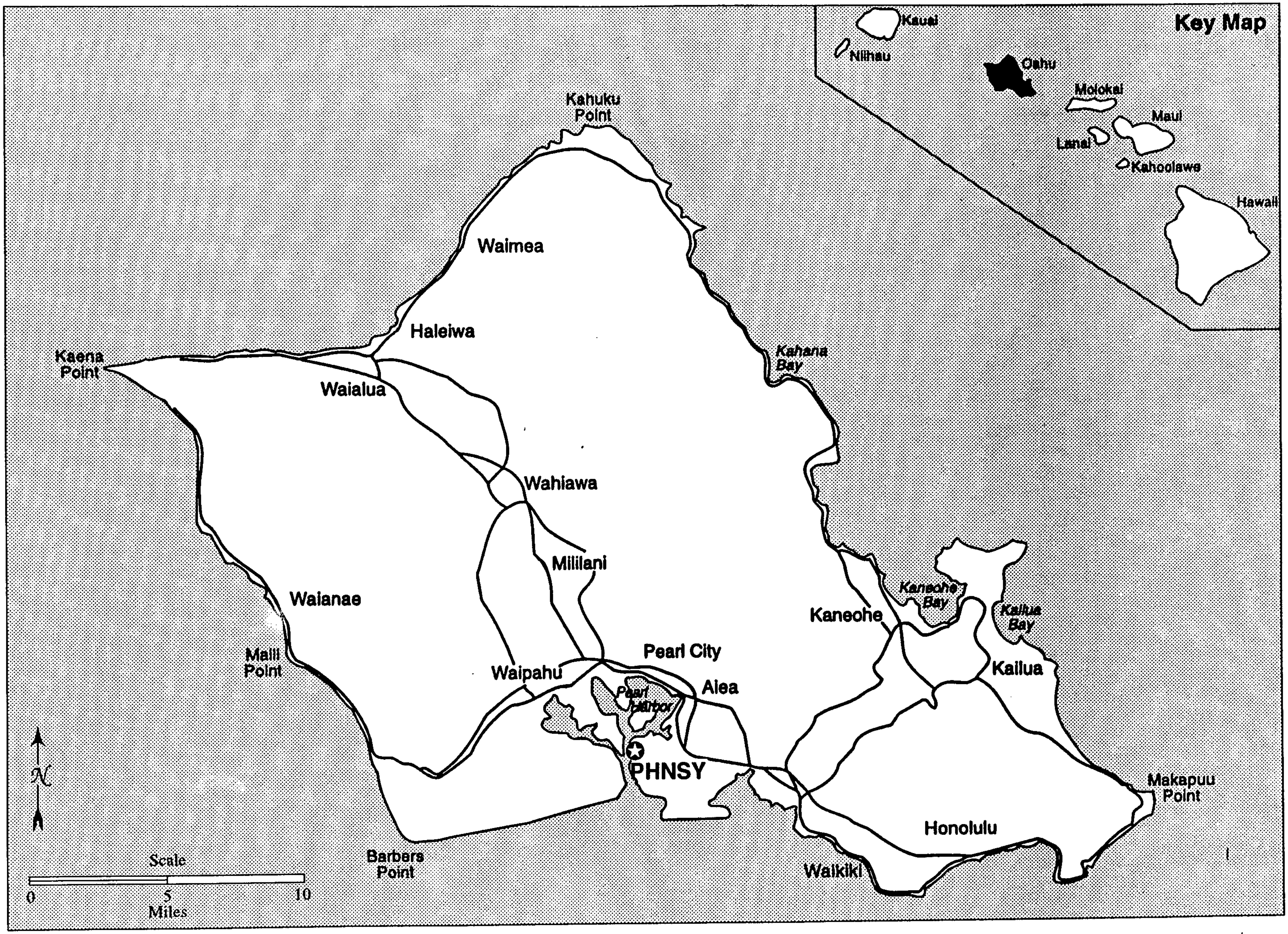

Figure ES-3. Pearl Harbor Naval Complex Vicinity Map

This EIS discusses how the CVN Home Port Objectives and Requirements listed above are considered in developing alternative home port locations for achieving the proposed action.

PROPOSED ACTION

To meet the projected CVN homeporting needs of the U.S. Pacific Fleet, both in terms of new CVN assets and reevaluation of the NAVSTA Everett home port capacity, the Navy proposes to select locations within the Pacific Fleet AOR for the construction of the facilities and infrastructure required to create the capacity to home port CVNs. The Navy does not propose to reevaluate the CVN home port capacity created at NASNI and PSNSY as a result of the 1993 BRAC process.

PREFERRED ALTERNATIVE

The Navy's preferred alternative is Alternative Two, which would upgrade the current facilities and infrastructure at NASNI (which has the homeport capacity to support one CVN and two CVs) with the additional capacity required to support a total of three CVNs and would maintain the existing CVN homeport capacity at NAVSTA Everett. The Navy's preference for this home port combination is based on NASNI's accessibility to the sea and training ranges; PHNSY's inaccessibility to training ranges and the lack of facilities to support a carrier air wing; and the operational and quality of life advantages of the existing CVN home port at NAVSTA Everett and the assumption that depot maintenance for that CVN can be successfully completed without a significant adverse impact on crew quality of life or maintenance schedules and costs.

This assumption is based upon the expectation that the Department of the Navy or Washington State/local governments will be able to develop programs to:

1) **Minimize quality of life impacts including commuting times, Navy Personnel Tempo of Operations (PERSTEMPO), and quality and availability of housing for the Everett ship's crew and their families; and**

2) **Avoid unacceptable impacts on shipyard and ship's force maintenance work and costs associated with that work, during the Everett carrier's PIA and pre and post-PIA maintenance.**

Throughout the EIS process, the Navy will continue to update information relating to its selection of a preferred alternative. Because NAVSTA Everett only recently assumed its role as a CVN home port with the arrival of the USS ABRAHAM LINCOLN (LINCOLN) in January 1997, validation of the assumption upon which the preferred alternative is based may not occur until completion of the 1999 PIA for the LINCOLN, now occurring April to October 1999. New information developed during this first PIA for a CVN homeported at NAVSTA Everett will be carefully reviewed by the Navy, especially information necessary to ensure that impacts on quality of life and maintenance work and costs have in fact been successfully mitigated. The regulations implementing NEPA require the Navy to prepare a supplemental EA or EIS should significant new information relevant to environmental concerns bearing on the impacts of the proposed action become available.

ADDITIONAL CONSIDERATIONS

In addition to addressing the development of homeporting facilities and infrastructure for these three CVNs, this EIS addresses the following issues:

- The preservation of an existing transient CVN berth at NASNI
- The modernization of existing CVN home port facilities at PSNS
- Relocation of up to four Fast Combat Logistic Support Ships (AOEs) homeported at PSNS

The transient berth at NASNI provides direct land access from the ship berth to an airfield for air wing logistic support, including aircraft onloads and offloads for Pacific Northwest homeported CVNs. The majority of the CVNs' underway training is off southern California (SOCAL) and the only carrier access to a West Coast airfield is at NASNI. Therefore, it is essential that transient CVNs remain able to moor temporarily at NASNI to load and off-load their air wing.

Modernization of existing CVN berthing facilities at PSNS is based on new criteria established by the Navy for CVN home port facilities. Specifically, existing berths must be dredged and existing piers must be widened to comply with current criteria.

Creating additional CVN home port capacity at PSNS would require relocating up to four AOEs currently homeported at that location. Therefore, impacts of relocating up to four AOEs will be analyzed in this EIS.

DEVELOPMENT OF ALTERNATIVES

The CVN Home Port Objectives and Requirements discussed below that must be met for a location to be reasonably considered as a CVN home port. Some level of facility improvements are needed to provide an adequate CVN home port at all locations. The level of facility improvements would be specific to the location and number of CVNs homeported at that location. Candidate locations were selected for consideration in this EIS if they could satisfy the objectives and requirements after the application of the following three criteria:

- location within the U.S. Pacific Fleet's Area of Responsibility;
- capable of avoiding the need for extensive modifications to or construction of shore infrastructure and facilities; and
- capable of providing CVN maintenance in the ship's home port area with the goal of minimizing the impact on crew quality of life.

Using the broad objectives outlined above, the Navy identified (DON 1997a) three concentrations of naval presence within the Pacific Fleet for consideration: San Diego, the Pacific Northwest, and Hawaii.

Specific locations for homeport capacity were arrived at by examining existing ports within the three concentrations described above, to determine how well they were capable of satisfying the following CVN Home Port Objectives and Requirements:

- Operations and Training;
- Facilities;
- Maintenance; and
- Quality of Life for Navy Personnel.

From this examination, four locations were identified as candidates: NASNI, PSNS, NAVSTA Everett, and PHNSY. All other locations were rejected from consideration in this EIS due to their inability to meet the CVN homeporting objectives and requirements stated above.

The Navy (DON 1997a) used the CVN Home Port Objectives and Requirements to determine what facility construction would be necessary at each of the four CVN homeporting locations to support a CVN. The analysis also included evaluating the feasibility of homeporting more than one CVN at each location with respect to (1) the additional construction projects that would be required and (2) other related (but not CVN-specific) projects that might be required based on the number of CVNs homeported.

The Navy then determined a reasonable range of combinations of CVNs and AOEs for each location (DON 1997a). Some combinations of CVNs and AOEs were considered but eliminated as they did not satisfy the CVN Home Port Objectives and Requirements. Finally, combinations of CVNs at locations were brought together into five alternatives, each capable of providing home ports for the three CVNs addressed in this EIS. Each alternative requires a varying level of facilities development, but satisfies CVN Home Port Objectives and Requirements. In addition to the reasonable range of five alternatives, a No Action Alternative is included as required by NEPA. The results of the analysis determining a range of reasonable home port alternatives used in this EIS are displayed in Table ES-1. Table ES-1 is also reproduced at the end of Volume 1.

CVN Home Port Facility and Infrastructure Improvements

Table ES-2 illustrates the facilities and improvements required for each of the five CVN Home Port alternatives in order to satisfy the CVN Home Port Objectives and Requirements. No improvements would occur under the No Action Alternative.

CVN HOMEPORTING ALTERNATIVE COSTS

The costs associated with each of the CVN homeporting alternatives are compared below based on "best information available" estimates. Costs are normalized over a 30-year life cycle. Alternative Six (the No Action Alternative) costs purposefully have been calculated at zero by subtracting "status quo" and "baseline" costs to facilitate homeporting alternative comparisons. The status quo is defined as: two CVs at NASNI, four AOEs at PSNS, and one CVN at NAVSTA Everett. The cost of the status quo is $1,263,564,754, representing the operations and housing costs of these ships. The baseline cost, $43,167,039, is the cost associated with operating, maintaining, and housing the three CVNs and four AOEs as described in Alternative Six. Status quo and baseline costs have been subtracted from all alternatives in order to accurately reflect the incremental cost of each alternative.

Alternatives	*Cost*
Alternative One	$143,064,637
Alternative Two	$191,043,560
Alternative Three	$580,851,882
Alternative Four	$214,583,470
Alternative Five	$399,995,135
Alternative Six	$0

Table ES-1. Homeport Capacity Alternatives for CVNs and AOEs within the U.S. Pacific Fleet

	Capacity Alternatives (Numbers of Ships)					
	One	*Two*	*Three*	*Four*	*Five*	*Six (No Action)*
Home Port Locations						
NASNI	3	3	3	2	1	2
PSNS	2	1(4)	1(4)	1(4)	2(2)	2(4)
NAVSTA Everett	0(4)	1	0	2	1(2)	1
PHNSY	0	0	1	0	1	0

Alternative One	
NASNI	Facilities for Two Additional CVNs: Capacity for Total of Three CVNs
PSNS	Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs
NAVSTA Everett	Facilities for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs
PHNSY	Facilities for No CVN: No Change
Alternative Two	
NASNI	Facilities for Two Additional CVNs: Capacity for Total of Three CVNs
PSNS	Facilities for No Additional CVN: No Change – Capacity for Total of One CVN
NAVSTA Everett	Facilities for No Additional CVN: No Change – Capacity for Total of One CVN
PHNSY	Facilities for No CVN: No Change
Alternative Three	
NASNI	Facilities for Two Additional CVNs: Capacity for Total of Three CVNs
PSNS	Facilities for No Additional CVN: No Change – Capacity for Total of One CVN
NAVSTA Everett	Facilities for Removal of Existing CVN: Capacity for Total of No CVNs
PHNSY	Facilities for One CVN: Capacity for Total of One CVN
Alternative Four	
NASNI	Facilities for One Additional CVN: Capacity for Total of Two CVNs
PSNS	Facilities for No Additional CVN: No Change – Capacity for Total of One CVN
NAVSTA Everett	Facilities for One Additional CVN: Capacity for Total of Two CVNs
PHNSY	Facilities for No CVN: No Change
Alternative Five	
NASNI	Facilities for No Additional CVN: Capacity for Total of One CVN
PSNS	Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs
NAVSTA Everett	Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN
PHNSY	Facilities for One CVN: Capacity for Total of One CVN
Alternative Six	**(No Action Alternative)**
NASNI	No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs
PSNS	No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs
NAVSTA Everett	No Additional CVN: No Change –Total of One CVN
PHNSY	No CVN: No Change

Notes: Numbers given are total number of CVNs for which capacity would be available at a site. NASNI and PSNS each have one CVN assigned and they are not addressed by this EIS action.
(2) – Location of Two AOEs
(4) – Location of four AOEs

Table ES-2. Construction Projects Needed to Support CVN Homeporting Capacity Alternatives
(page 1 of 2)

		Alternative One
NASNI	Two Additional CVNs Total Three CVNs	Construct CVN berthing wharf and miscellaneous structures Modifications to Berth L
PSNS	One Additional CVN Total Two CVNs	Pierside and turning basin dredging Pier D replacement Utility upgrades to both sides of Pier D
NAVSTA Everett	No CVNs Addition of Four AOEs	Mooring dolphin for AOEs Electrical upgrade for AOEs North Wharf: Dredging, Utilities, Structural repairs
PHNSY	No CVNs	No projects
		Alternative Two
NASNI	Two Additional CVNs Total Three CVNs	Construct CVN berthing wharf and miscellaneous structures Modifications to Berth L
PSNS	No Additional CVN Total One CVN	Pierside and turning basin dredging Pier D replacement Electrical upgrades to one side of Pier D
NAVSTA Everett	No Additional CVN Total One CVN	No projects
PHNSY	No CVNs	No projects
		Alternative Three
NASNI	Two Additional CVNs Total Three CVNs	Construct CVN berthing wharf and miscellaneous structures Modifications to Berth L
PSNS	No Additional CVN Total One CVN	Pierside and turning basin dredging Pier D replacement Electrical upgrades to one side of Pier D
NAVSTA Everett	Remove Existing CVN No CVN	No projects
PHNSY	One CVN Total One CVN	Dredging and turning basins Controlled industrial facility (CIF); Pump/valve testing facility Pure water production facility Utility and structural upgrade Parking garage Drydock #4 upgrade Personnel support facilities

Table ES-2. Construction Projects Needed to Support CVN Homeporting Capacity Alternatives (page 2 of 2)

Alternative Four		
NASNI	One Additional CVN Total Two CVNs	Construct CVN berthing wharf and miscellaneous structures
PSNS	No Additional CVN Total One CVN	Pierside and turning basin dredging Pier D replacement Electrical upgrades to one side of Pier D
NAVSTA Everett	One Additional CVN Total Two CVNs	Parking structure Electrical conversion to 4,160-V Expand hazardous waste facility Expand steam plant and add two oil waste tanks Pier A: Dredging North Wharf: Dredging, Utilities, Structural repairs
PHNSY	No CVN	No projects
Alternative Five		
NASNI	No Additional CVNs Total One CVN	No projects
PSNS	One Additional CVN Total Two CVNs Removal of Two AOEs	Pierside and turning basin dredging Pier D replacement Utility upgrades to both sides of Pier D
NAVSTA Everett	No Additional CVNs Total One CVN Addition of Two AOEs	Mooring dolphin and electronic upgrade for AOEs North Wharf: Dredging, Utilities, Structural repairs, Expand Hazardous waste facility expansion
PHNSY	One CVN	Dredging and turning basins CIF Pump/valve testing facility Pure water production facility Utility and structural upgrades Parking garage Drydock #4 upgrade Personnel support facilities
Alternative Six		
NASNI	One Additional CVN Total Two CVNs	No projects
PSNS	One Additional CVN Total Two CVNs	No projects
NAVSTA Everett	No Additional CVNs Total of One CVN	No projects
PHNSY	No CVN	No projects

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ENVIRONMENTAL COMPARISON OF ALTERNATIVES

This EIS analyzes the potential environmental effects of the proposed action at various locations with varying numbers of CVNs and AOEs, including any associated facilities and infrastructure development and dredging. Environmental resource areas addressed in this EIS include: geology, topography, and soils; dredging, hydrology, and water quality; pollution prevention; socioeconomics, environmental justice, schools, and housing; transportation/circulation/parking; public facilities and recreation; safety and environmental health; aesthetics; and utilities. Issue analysis includes an evaluation of the direct, indirect, short-term, and cumulative impacts associated with the proposed actions.

Table ES-3 summarizes the analysis and comparison of the environmental impacts associated with the proposed project alternatives presented in Chapters 3, 4, 5, and 6. The table presents significant impacts and mitigation measures for each alternative. The agency responsible for monitoring each measure is listed in parentheses after the measure.

CVN HOME PORT LOCATIONS ELIMINATED FROM CONSIDERATION

Those alternative home port sites considered but eliminated in the Coronado area included the following: NAVSTA San Diego; Naval Amphibious Base, Coronado; Navy Pier; and Naval Submarine Base, San Diego. These sites would require construction, dredging, and increased utilities capacity to accommodate a homeported CVN. None of these sites could reasonably satisfy CVN homeporting requirements due to space and logistical constraints. Within the Puget Sound area, Naval Submarine Base (SUBASE) Bangor (a Trident submarine home port located on the shores of the Hood Canal in Kitsap County, 12 miles northwest of Bremerton) was considered. This site was rejected because all basic CVN support facilities including a pier would need to be constructed. In the Pearl Harbor Naval Complex, Ford Island Pier F5 was considered inferior due to the extent of improvements necessary to accommodate a CVN, and NAVSTA Berths B22 and B23 were considered inferior to Piers B2 and B3 due to the need for greater dredging, structural improvements, and utility upgrades.

Those scenarios for CVN homeporting facility development considered but eliminated included the following: a third additional CVN at NASNI (a total of four CVNs); a second additional CVN at PSNS (a total of three CVNs); a second additional CVN at NAVSTA Everett (a total of three CVNs), and a second CVN at PHNSY (total of two CVNs). These actions would not reasonably satisfy the Navy's CVN Home Port Objectives and Requirements.

Additionally, the concept of establishing an air wing in Hawaii was considered but eliminated from further consideration because it is not economically feasible nor operationally supportable in light of the requirements to (1) establish an air station from which to operate and (2) for the air wing to return to CONUS for extended periods to accomplish the majority of its training. The option of constructing a Depot Maintenance Facility at NAVSTA Everett was examined but deemed to be unreasonable. Both cost and close proximity to depot maintenance facilities at Puget Sound Naval Shipyard were significant factors in this decision. Construction of more propulsion plant depot maintenance capacity in the Pacific Northwest would create excess regional maintenance infrastructure, and would be counter to BRAC efforts to reduce excess infrastructure.

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Table ES-3. Summary of Significant Environmental Impacts and Mitigations (page 1 of 5)

Resource	*Alternative One*	*Alternative Two*	*Alternative Three*	*Alternative Four*	*Alternative Five*	*Alternative Six (No Action)*
Topography, Geology, and Soils	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Terrestrial Hydrology and Water Quality	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Marine Water Quality	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Sediment Quality	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Marine Biology	*Impact 1*: Dredging for CVN berths and relocation of the flag/ferry landing at NASNI would impact marine and eelgrass habitats.	*Impact 1*: Dredging for CVN berths and relocation of the flag/ferry landing at NASNI would impact marine and eelgrass habitats.	*Impact 1*: Dredging for CVN berths and relocation of the flag/ferry landing at NASNI would impact marine and eelgrass habitats.	*Impact 1*: Dredging for CVN berths and relocation of the flag/ferry landing at NASNI would impact marine and eelgrass habitats.	*Impact 1*: Dredging and marine construction between March 15 to June 15 at PSNS and at NAVSTA Everett North Wharf for the relocated FFGs during the peak juvenile salmon outmigration window, and at NAVSTA Everett during the Dungeness crab molting period, would impact these species' reproductive success and survival.	Not significant.
	Mitigation 1: Construct habitat mitigation area at NASNI of equivalent size in consultation with affected regulatory agencies (COE, CDFG, USFWS, NMFS, EPA, and USCG, who would provide notice to mariners during construction).	*Mitigation 1*: Construct habitat mitigation area at NASNI of equivalent size in consultation with affected regulatory agencies (COE; CDFG; USFWS; NMFS; EPA; and USCG, who would provide notice to mariners during construction).	*Mitigation 1*: Construct habitat mitigation area at NASNI of equivalent size in consultation with affected regulatory agencies (COE; CDFG; USFWS; NMFS; EPA; and USCG, who would provide notice to mariners during construction).	*Mitigation 1*: Construct habitat mitigation area at NASNI of equivalent size in consultation with affected regulatory agencies (COE; CDFG; USFWS; NMFS; EPA; and USCG, who would provide notice to mariners during construction).	*Mitigation 1*: Avoid dredging and marine construction between March 15 and June 15 (COE; WDFW; WDOE).	

Table ES-3. Summary of Significant Environmental Impacts and Mitigations (page 2 of 5)

Resource	*Alternative One*	*Alternative Two*	*Alternative Three*	*Alternative Four*	*Alternative Five*	*Alternative Six (No Action)*
Marine Biology	*Impact 2:* Losses of California least tern and brown pelican foraging habitat due to fill at Pier J/K (1.5 acres) and shading (1.5 acres), and potential disturbance during in-water activities for in-bay sediment disposal at NAB during the nesting season could adversely affect the foraging and nesting success of California least turns at the Delta Beach colony adjacent to NAB Habitat Enhancement Area.	*Impact 2:* Losses of California least tern and brown pelican foraging habitat due to fill at Pier J/K (1.5 acres) and shading (1.5 acres), and potential disturbance during in-water activities for in-bay sediment disposal at NAB during the nesting season could adversely affect the foraging and nesting success of California least turns at the Delta Beach colony adjacent to NAB Habitat Enhancement Area.	*Impact 2:* Losses of California least tern and brown pelican foraging habitat due to fill at Pier J/K (1.5 acres) and shading (1.5 acres), and potential disturbance during in-water activities for in-bay sediment disposal at NAB during the nesting season could adversely affect the foraging and nesting success of California least turns at the Delta Beach colony adjacent to NAB Habitat Enhancement Area.	*Impact 2:* Losses of California least tern and brown pelican foraging habitat due to fill at Pier J/K (1.5 acres) and shading (1.5 acres), and potential disturbance during in-water activities for in-bay sediment disposal at NAB during the nesting season could adversely affect the foraging and nesting success of California least turns at the Delta Beach colony adjacent to NAB Habitat Enhancement Area.		
	Mitigation 2: Construct equivalent area of shallow water habitat disturbed by construction and shading near Pier B. Schedule dredging and in-water demolition and construction outside of the California least tern breeding season (April 15 to September 1) to the maximum extent feasible. Use best management practices (BMPs) if avoidance infeasible to limit the spread of turbidity (COE, CDFG, USFWS, NMFS).	*Mitigation 2*: Construct equivalent area of shallow water habitat disturbed by construction and shading near Pier B. Schedule dredging and in-water demolition and construction outside of the California least tern breeding season (April 15 to September 1) to the maximum extent feasible. Use best management practices (BMPs) if avoidance infeasible to limit the spread of turbidity (COE, CDFG, USFWS, NMFS).	*Mitigation 2*: Construct equivalent area of shallow water habitat disturbed by construction and shading near Pier B. Schedule dredging and in-water demolition and construction outside of the California least tern breeding season (April 15 to September 1) to the maximum extent feasible. Use best management practices (BMPs) if avoidance infeasible to limit the spread of turbidity (COE, CDFG, USFWS, NMFS).	*Mitigation 2*: Construct equivalent area of shallow water habitat disturbed by construction and shading near Pier B. Schedule dredging and in-water demolition and construction outside of the California least tern breeding season (April 15 to September 1) to the maximum extent feasible. Use best management practices (BMPs) if avoidance infeasible to limit the spread of turbidity (COE, CDFG, USFWS, NMFS).		

Table ES-3. Summary of Significant Environmental Impacts and Mitigations (page 3 of 5)

Resource	*Alternative One*	*Alternative Two*	*Alternative Three*	*Alternative Four*	*Alternative Five*	*Alternative Six (No Action)*
Marine Biology	*Impact 3:* Marine mammals and turtles may pass through the dredging and construction areas on a very infrequent basis, if at all. *Mitigation 3:* Inform construction staff in writing of the possibility of such occurrences and the general appearance of whales (especially gray whales), dolphins, seals/sea lions, and green turtles. Instruct staff to temporarily suspend activities until the animal(s) move out of the active construction area of ongoing construction (COE, CDFG, USFWS, NMFS).	*Impact 3:* Marine mammals and turtles may pass through the dredging and construction areas on a very infrequent basis, if at all. *Mitigation 3:* Inform construction staff in writing of the possibility of such occurrences and the general appearance of whales (especially gray whales), dolphins, seals/sea lions, and green turtles. Instruct staff to temporarily suspend activities until the animal(s) move out of the active construction area of ongoing construction (COE, CDFG, USFWS, NMFS).	*Impact 3:* Marine mammals and turtles may pass through the dredging and construction areas on a very infrequent basis, if at all. *Mitigation 3:* Inform construction staff in writing of the possibility of such occurrences and the general appearance of whales (especially gray whales), dolphins, seals/sea lions, and green turtles. Instruct staff to temporarily suspend activities until the animal(s) move out of the active construction area of ongoing construction (COE, CDFG, USFWS, NMFS).	*Impact 3:* Marine mammals and turtles may pass through the dredging and construction areas on a very infrequent basis, if at all. *Mitigation 3:* Inform construction staff in writing of the possibility of such occurrences and the general appearance of whales (especially gray whales), dolphins, seals/sea lions, and green turtles. Instruct staff to temporarily suspend activities until the animal(s) move out of the active construction area of ongoing construction (COE, CDFG, USFWS, NMFS).		
	Impact 4: Dredging and marine construction between March 15 to June 15 at PSNS and at NAVSTA Everett North Wharf for the relocated FFGs during the peak juvenile salmon outmigration window, and at NAVSTA Everett during the Dungeness crab molting period, would impact these species' reproductive success and survival.	*Impact 4*: Dredging and marine construction between March 15 to June 15 at PSNS during the peak juvenile salmon outmigration window would impact species' reproductive success and survival.	*Impact 4* Dredging and marine construction between March 15 to June 15 at PSNS during the peak juvenile salmon outmigration window would impact species' reproductive success and survival.	*Impact 4*: Dredging and marine construction between March 15 to June 15 at PSNS and at NAVSTA Everett North Wharf for the relocated FFGs during the peak juvenile salmon outmigration window, and at NAVSTA Everett during the Dungeness crab molting period, would impact these species' reproductive success and survival.	*Impact 2:* If dredged materials are used to create CDF/CAD sites at PSNS, the permanent loss of deep-water marine habitat would be a significant impact.	Not significant.
	Mitigation 4: Avoid dredging and marine construction between March 15 and June 15 (COE; WDFW; WDOE).	*Mitigation 4:* Avoid dredging and marine construction between March 15 and June 15 (COE; WDFW; WDOE).	*Mitigation 4:* Avoid dredging and marine construction between March 15 and June 15 (COE; WDFW; WDOE).	*Mitigation 4:* Avoid dredging and marine construction between March 15 and June 15 (COE; WDFW; WDOE).	*Mitigation 2:* Compensate by creation of shallow marine habitat at the CAD site (COE; WDFW; WDOE; WDNR; USFWS, NMFS, EPA).	

Table ES-3. Summary of Significant Environmental Impacts and Mitigations (page 4 of 5)

Resource	*Alternative One*	*Alternative Two*	*Alternative Three*	*Alternative Four*	*Alternative Five*	*Alternative Six (No Action)*
Marine Biology	*Impact 5:* If dredged materials are used to create CDF/CAD sites at PSNS, the permanent loss of deep-water marine habitat would be a significant impact.	*Impact 5:* If dredged materials are used to create CDF/CAD sites at PSNS, the permanent loss of deep-water marine habitat would be a significant impact.	*Impact 5:* If dredged materials are used to create CDF/CAD sites at PSNS, the permanent loss of deep-water marine habitat would be a significant impact.	*Impact 5:* If dredged materials are used to create CDF/CAD sites at PSNS, the permanent loss of deep-water marine habitat would be a significant impact.		
	Mitigation 5: Compensate by creation of shallow marine habitat at the CAD site (COE; WDFW; WDOE; WDNR; USFWS, NMFS, EPA).	*Mitigation 5:* Compensate by creation of shallow marine habitat at the CAD site (COE; WDFW; WDOE; WDNR; USFWS, NMFS, EPA).	*Mitigation 5:* Compensate by creation of shallow marine habitat at the CAD site (COE; WDFW; WDOE; WDNR; USFWS, NMFS, EPA).	*Mitigation 5:* Compensate by creation of shallow marine habitat at the CAD site (COE; WDFW; WDOE; WDNR; USFWS, NMFS, EPA).		
Terrestrial Biology	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Land Use	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Socioeconomics	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Ground Transportation	Not significant.	Not significant	*Impact 1*: An increase in daily trips associated with the PHNSY CVN crew and families would impact local transportation network.	*Impact 1*: An increase in daily trips associated with an additional NAVSTA Everett CVN crew and families would impact local transportation network.	*Impact 1* An increase in daily trips associated with the PHNSY CVN crew and families would impact local transportation network.	Not significant.
			Mitigation 1: Provide road widening improvements in the local area and implement peak hour trip reduction program during PIA/DPIAs (U.S. Navy; Hawaii State Department of Transportation).	*Mitigation 1*: Provide road widening improvements in the local area and implement peak hour trip reduction program during PIA/DPIAs (City of Everett, if implemented).	*Mitigation 2*: Provide road widening improvements in the local area and implement peak hour trip reduction program during PIA/DPIAs (U.S. Navy; Hawaii State Department of Transportation).	
Vessel Transportation	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Air Quality	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Noise	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Aesthetics	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Cultural Resources	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.

Table ES-3. Summary of Significant Environmental Impacts and Mitigations (page 5 of 5)

Resource	*Alternative One*	*Alternative Two*	*Alternative Three*	*Alternative Four*	*Alternative Five*	*Alternative Six (No Action)*
General Services	Not significant.	Not significant.	Not significant	Not significant.	Not significant.	*Impact 1*: Substantial deficiencies in general services at PSNS would result due to the demand associated with additional crew members and their families, resulting in exceedance of PSNS infrastructure capacities.
						Mitigation 1: None, consistent with No Action.
Health and Safety	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Utilities	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	*Impact 1*: Substantial deficiencies in utilities at PSNS would result due to the demand associated with additional crew members and their families, resulting in exceedance of PSNS infrastructure capacities. *Mitigation 1*: None, consistent with No Action.
Environmental Justice	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.

U.S. Army Corps of Engineers [COE]
California Department of Fish and Game [CDFG]
U.S. Fish and Wildlife Service [USFWS]
National Marine Fisheries Service [NMFS]
Environmental Protection Agency [EPA]
U.S. Coast Guard [USCG]
Washington State Department of Fish and Wildlife [WDFW]
Washington State Department of Ecology [WDOE]
Washington State Department of Natural Resources [WDNR]

RADIOLOGICAL ASPECTS OF NIMITZ-CLASS AIRCRAFT CARRIER HOMEPORTING

The Naval Nuclear Propulsion Program (NNPP) provides comprehensive technical management of all aspects of Naval nuclear propulsion plant design, construction, and operation including careful consideration of reactor safety, radiological, environmental, and emergency planning concerns. The record of the NNPP's environmental and radiological performance at the operating bases and shipyards presently used by nuclear-powered warships demonstrates the continued effectiveness of this management philosophy. This effectiveness is demonstrated by the fact that Naval reactors have accumulated over 4,900 reactor-years of operation without a reactor accident or any other problem having a significant effect on the environment. It further demonstrates that application of the environmental practices that are standard throughout the NNPP would assure the absence of any adverse radiological environmental effect at any home port site.

CUMULATIVE IMPACTS

The cumulative analysis was based on projects that are proposed for construction after 1998 (the projected baseline for implementing the proposed action), or reasonably anticipated to be built within the years 1998 to 2005. The cumulative impact region of influence encompassing the homeporting location varied in extent depending upon the environmental resource assessed. For example, the region of influence for terrestrial hydrology and water quality included the watershed surrounding the home port location, the area in which local water sources interact. Where appropriate, past projects or previous development that have influenced the environmental resource's region of influence were also considered. In analyzing the proposed action's incremental contribution to regional cumulative impacts, the action that would have the greatest potential for adverse environmental impact on each particular home port location environmental resource was used to provide a potential worst case cumulative analysis. For example, at NASNI, no additional home port facilities for no additional CVN (Alternative Five) would have the greatest effect on socioeconomics, while creating facilities to home port two additional CVNs (Alternatives One, Two, or Three) would have the greatest environmental effect on terrestrial hydrology and water quality.

Past, present, and reasonable foreseeable projects in the area may have incremental adverse impacts related to geologic hazards, hydrology, marine water quality, sediment quality in the Bay's biological resources, and cultural resources. The proposed action would also have impacts that, while not exceeding the thresholds of significance on an individual project basis, do add to the effects already resulting from other projects in the area.

NASNI

The proposed action (Alternatives One, Two or Three) would add incrementally to impacts to property and human safety associated with geologic hazards and erosional hazards; however, measures incorporated into the project including building code regulations, and flood control measures, appropriate soil compaction, and standard erosion control measures reduce the incremental effects such that there would not be a cumulatively significant impact. Cumulative effects of reasonably foreseeable development projects and the proposed action on hydrology and marine water quality would be reduced to less than significant levels with incorporation of federal, state, and local regulatory procedures. Cumulative changes to sediment quality from historical inputs combined with other past, present, and future projects could constitute a significant impact to beneficial uses in specific water segments of San Diego Bay. Potential impacts from construction and operations associated with creating capacity to home port two additional CVNs (Alternatives One, Two, or Three) would include impacts to eelgrass and shallow water communities from dredging and filling as well as short-term disruption of California least tern foraging in the vicinity of Pier J/K, and at a proposed mitigation site. However, these cumulative effects would be temporary and would be reduced to less than significant levels by construction of the mitigation site. The proposed action, in combination with reasonably foreseeable projects on NASNI, the Silver Strand, and elsewhere in and around San Diego Bay, could significantly impact these sensitive resources by incrementally reducing habitat areas, reducing population sizes for sensitive plant and animal species, or affect their survival and reproductive success. The mitigation measures proposed as part of the proposed action, however, would reduce the incremental impact on sensitive plant species such that there would not be a cumulatively significant impact. Cumulative impacts due to shading on marine biology from the proposed action together with past, present, and reasonably foreseeable projects would be less than significant. The proposed action of creating the capacity to home port two additional CVNs (Alternatives One, Two, or Three) would not contribute to cumulative impacts on cultural resources adjacent to or on ancient shorelines.

PSNS

The cumulative impact of the proposed action (Alternatives One through Five) and reasonably foreseeable projects on geological resources could be potentially significant. However, measures incorporated into the proposed action, including building code regulations, flood control measures, appropriate soil compaction, and standard erosion control measures, reduce the incremental effects such that there would not be a cumulatively significant impact. Cumulative effects of reasonably foreseeable development projects and the proposed action on hydrology and marine water quality would be reduced to less than significant levels with incorporation of federal, state, and local regulatory procedures. Soil and groundwater remediation related to creating the facilities to home port one additional CVN (Alternative Five), in conjunction with any similar remediation occurring during other related project development in the vicinity, would be a beneficial cumulative impact. The proposed action (Alternatives One through Five) would not incrementally contribute to cumulative impacts on salmonid species as dredging and construction would occur outside the salmon outmigration window. Although there is the potential for reasonably foreseeable projects to impact cultural resources within the greater Sinclair Inlet area, the proposed action's incremental contribution to this cumulative impact would be less than significant. Cumulative impacts resulting from reasonably foreseeable projects and the proposed action would be localized and would end upon completion of construction such that effects on environmental justice associated with noise and air quality impacts would be less than significant. The proposed action (all alternatives) would not increase vessel traffic within the Suquamish Tribe's Usual and Accustomed Fishing Grounds.

NAVSTA Everett

The proposed action (Alternatives One, Four, and Five) would add incrementally to impacts to property and human safety associated with geologic hazards and erosional hazards; however, measures incorporated into the project including building code regulations, flood control measures, appropriate soil compaction, and standard erosion control measures reduce the incremental effects such that there would not be a cumulatively significant impact. Cumulative effects of reasonably foreseeable development projects and the proposed action on hydrology and marine water quality would be reduced to less than significant levels with incorporation of federal, state, and local regulatory procedures. The proposed action, in conjunction with those of other reasonably foreseeable projects, would have a small, localized, and temporary contribution to the total watershed-based inputs of contaminants into Puget Sound. The proposed action's incremental contribution to this cumulative impact would be less than significant. The proposed action (Alternatives One, Four, and Five) would not contribute to cumulative impacts on salmonid species and Dungeness crabs because measures incorporated into the project, including scheduling dredging and construction during non-peak outmigration months, would avoid impacts to salmon and other fish, such that there would not be a cumulatively significant impact. The proposed action of creating the capacity to homeport one additional CVN (Alternative Four) along with reasonably foreseeable projects would result in a significant cumulative impact on traffic. Measures incorporated into the project, including roadway and intersection improvements outside of NAVSTA Everett, would reduce the incremental effects such that there would not be a cumulatively significant impact. Cumulative impacts resulting from reasonably foreseeable projects and the proposed action would be localized and would end upon completion of construction such that effects on environmental justice associated with noise and air quality impacts would be less than significant. Creating the capacity to home port additional vessels or increase the number of vessel movements in the waters around NAVSTA Everett (Alternative One, Four, and Five) would encroach within the Tulalip Tribe's "Usual and Accustomed fishing places." This impact would be short term, and would not cause a disproportionately high and adverse impact on tribal members. The proposed action and the relocation of the CCDG-3 cruiser-destroyer group would not substantially impact environmental justice issues related to Native American fishing activity and would not represent a significant incremental impact to regional cumulative impacts.

PHNSY

Cumulative effects of reasonably foreseeable development projects and the proposed action (Alternative Three and Five) on hydrology and marine water quality would be reduced to less than significant levels with incorporation of federal, state, and local regulatory procedures. Creating the capacity to home port one CVN (Alternative Three and Five) would add a small incremental potential for contamination of soil, stormwater runoff, and the nonpotable caprock aquifer to the geographical region of influence. The proposed action (Alternative Three and Five) and other reasonably foreseeable development projects' potential impacts on hydrology, marine water quality, and sediment quality would be reduced to less than significant levels with incorporation of federal, state, and local regulatory procedures. The proposed action's (Alternative Three and Five) incremental contribution to marine biological impacts would also be less than significant. The cumulative effects on marine and terrestrial biological impacts of the proposed action and reasonably foreseeable project impacts would be less than significant. The effects of projected annual growth in the region plus the traffic generated by a homeported CVN (Alternative Three and Five) would be significant. The proposed action (Alternatives Three, and Five) would add incrementally to impacts on traffic. However, measures incorporated into the project, including implementation of roadway and intersection improvements outside of PHNSY, reduce the incremental effect such that there would not be a cumulatively significant impact. The proposed action (Alternatives Three, and Five) would add incrementally to impacts on cultural resources. However, measures incorporated into the project, including implementing Section 106 evaluation process requirements that mandate the systematic inventory, assessment, and mitigation of significant effects, reduce the incremental effect such that there would not be a cumulatively significant impact.

GROWTH INDUCEMENT

Growth-inducing impacts are actions or circumstances that produce growth in excess of projections by local jurisdictions or regional associations of governments. Growth-inducing impacts are generally related to the availability of public services, the potential for increased development densities, and increased development pressures on adjacent properties. The extension of public facilities through an area lacking those facilities could encourage development between the newly served area and the community providing the service. These extensions of public facilities would include roads, sewer trunk lines, water transmission lines, etc. These public facilities would have an additional capacity to serve new development or they can eliminate an impediment to growth. Development of property for residential uses could raise the value of surrounding undeveloped land and increase economic pressures on those property owners to convert their land to a more intensive land use.

For this EIS, the potential economic growth associated with those CVN home port capacity alternative components that would produce a net future increase in employment would be less than significant, except at NAVSTA Everett for the one Additional CVN (Alternative Four) and at PHNSY (Alternatives Three and Five) with one CVN. The preferred CVN homeporting alternative (Alternative Two) would not result in this growth inducement potential.

Utility upgrades needed to support homeporting facility and infrastructure requirements would not remove a constraint on surrounding undeveloped areas at any of the locations for any of the alternatives. The expansion of utilities to serve the proposed action would not require extension of public utilities in undeveloped areas and would not allow for the possibility of major land expansion because the areas surrounding NASNI, PSNS, NAVSTA Everett, and PHNSY are already developed areas.

In conclusion, there would be no growth-inducing impacts associated with implementation of the Preferred Alternative (Alternative Two). There would be growth-inducing impacts associated with the implementation of Alternative Four at NAVSTA Everett with two CVNs and at PHNSY if either Alternative Three or Five is selected.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Under the Navy's preferred action (Alternative Two), the following irreversible and irretrievable commitment of resources would occur:

The proposed creation of capacity to home port two additional CVNs at NASNI and related dredging operations would result in the replacement of existing land uses with construction of a new pier to replace the existing Pier J/K, a relocated ferry/flag landing, and electrical upgrades. Intertidal and shallow subtidal habitat that supports eelgrass would be permanently replaced by the fill area. A mitigation program to replace the lost habitat is proposed as part of the proposed action. The proposed action would result in the consumptive use of certain nonrenewable energy resources required to operate dredge support systems, barges, tugs, trucks, pumps, and equipment as well as energy expended during the construction and operation of support facilities. The dredged material disposed as backfill for construction of a new pier, at the in-bay disposal site at NAB to create shallow water habitat, at the LA-5 designated ocean disposal site, or used to enhance endangered bird habitat at NASNI would be irreversibly and irretrievably committed to the disposal process.

The proposed creation of CVN home port capacity including facilities and infrastructure improvements at PSNS and related dredging operations under Alternative Two would result in the permanent replacement of existing land uses with a new Pier D to replace the existing one. The proposed action would result in the consumptive use of certain nonrenewable energy resources required to operate dredge support systems, barges, tugs, trucks, pumps, and equipment as well as energy expended during the construction and operation of support facilities. The dredged material suitable for disposal would be disposed of at a designated disposal site in Elliott Bay near Seattle and would be irreversibly and irretrievably committed to the disposal process. Disposal of the sediment not suitable for ocean disposal in an upland landfill or CDF/CAD would be irreversible and irretrievably committed to that area.

Under Alternative One, four AOEs would be relocated at NAVSTA Everett. Additional dredging and construction would be required at the NAVSTA Everett North Wharf to accommodate FFGs relocated from Pier A. The dredged material suitable for disposal would be disposed of at a designated disposal site in Elliott Bay near Seattle and would be irreversibly and irretrievably committed to the disposal process. Under Alternative Two, a CVN would continue to be homeported at NAVSTA Everett and no irreversible and irretrievable commitment of resources would result.

Under either Alternative One or Two, no CVN would be homeported at PHNSY. No irreversible and irretrievable commitment of resources would result.

An irreversible commitment of facilities at any of the alternative locations would be avoided by incorporating design features that would allow complete and economical decommissioning when determined necessary by the Navy.

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The short-term uses of the environment related to the proposed action would increase the overall operational efficiency of NASNI and potentially PSNS if it is selected as a home port site for one of the NIMITZ-class aircraft carriers. The dredging operations would provide berthing for NIMITZ-class aircraft carriers that would support the Navy's mission. The long-term productivity of NASNI, PSNS, and NAVSTA Everett would thus increase as a result of the proposed action and related dredging activities. The long-term environmental consequences of the proposed action on a local level would be minimal.

The proposed action would not contribute to a further degradation of productivity of San Diego Bay because it would include measures to protect fish and wildlife habitat areas from potential adverse effects of construction, dredging, and dredged material disposal activities.

The proposed action may affect Sinclair Inlet adjacent to PSNS. The dredging effects would be short term. This action would not degrade the productivity of the Sinclair Inlet because it would include measures to protect fish and wildlife habitat areas from potential adverse effects of construction, dredging, and dredged material disposal activities.

COORDINATION AND PUBLIC INVOLVEMENT

A Notice of Intent (NOI) for the Draft EIS was published in the *Federal Register* on 3 December 1996. Four scoping hearings were held, as follows: in Bremerton, Washington, on 3 February 1997; in Everett, Washington, on 4 February 1997; in Pearl City, Hawaii, on 6 February 1997; and in Coronado, California on 10 February 1997. A summary of issues identified at the scoping sessions and in letters received in responses to the NOI are included in Appendix B.

In addition to the scoping sessions, meetings were held with the following agencies:

- City of Coronado
- City of Bremerton Planning Department
- U.S. Army Corps of Engineers, Seattle and Los Angeles Districts
- U.S. Environmental Protection Agency, Region IX and Region X
- U.S. Fish and Wildlife Service (Olympia, Washington and San Diego, California)
- U.S. National Marine Fisheries Service (Olympia, Washington and San Diego, California)
- California Department of Fish and Game
- California Department of Toxic Substances Control
- Hawaii Department of Health, Clean Water Branch
- Department of Business, Economics, Development and Tourism, Coastal Zone Management Program
- Hawaii State Historic Preservation Office
- Kitsap County Department of Community Development
- Puget Sound Dredged Disposal Analysis (PSDDA) Agencies
- Washington Dept. of Natural Resources
- Washington Department of Ecology, Northwest Regional Office
- Suquamish Tribe
- Tulalip Tribe

PUBLIC NOTICE ACTIVITIES

The Draft EIS was circulated for a 75-day period. Public hearings were held approximately 4 to 5 weeks after the *Federal Register* publication of the Notice of Availability (NOA) for the Draft EIS. Public hearings were held in Bremerton, Washington, Everett, Washington, Honolulu, Hawaii, Coronado, California, and San Diego, California. The exact hearing dates, times, and locations appeared as a notice in local newspapers two weeks before the public hearings. The notice also included the addresses of local libraries where the Draft EIS could be reviewed. The notice was mailed to approximately 300 individuals who had attended the scoping meetings for the Draft EIS, to all individuals who requested to be included on the EIS mailing list, and to other agencies, offices, and individuals who requested copies of the Draft EIS. Information on the dates and times of public hearings were available from the Navy by phone, fax, or e-mail.

STRUCTURE OF THE EIS

The EIS has been organized to maximize the document's usefulness to the reader. It is briefly described below.

Volume 1 contains information to provide an understanding of purpose and need and the proposed action, environmental setting, environmental consequences, and mitigation measures. Environmental impacts associated with homeporting facilities needed to support CVNs and relocated AOEs for each location are discussed beginning with the action requiring the least amount of improvements, through those requiring the most amount of improvements. Volume 1 has been designed to minimize technical, quantitative data, which are included in Volumes 2 through 6 (bound together) and are described below.

Volume 2 contains appendices that include supporting environmental technical data generic to a particular environmental issue area. For example, the volume contains descriptive detail regarding noise characteristics and methods of measurement.

Volume 3 contains supporting environmental technical data specific to the NASNI CVN homeporting location. Sections referring to various issue areas are numbered corresponding to the Volume 1 contents. For example, all supporting environmental technical data for Volume 1, section 3.1, Topography, Geography, and Soils at NASNI are included in Volume 3, section 3.1. Not all environmental issue area discussions in Volume 1 refer to supporting environmental technical data, so they are not represented in this volume.

Volume 4 contains supporting environmental technical data specific to the PSNS Bremerton CVN homeporting location. Sections referring to various issue areas are numbered corresponding to the Volume 1 contents. For example, all supporting environmental technical data for Volume 1, section 4.1, Topography, Geography, and Soils at PSNS Bremerton, are included in Volume 4, section 4.1. Not all environmental issue areas discussions in Volume 1 refer to supporting environmental technical data, so they are not represented in this volume.

Volume 5 contains supporting environmental technical data specific to the NAVSTA Everett CVN homeporting location. Sections referring to various issue areas are numbered corresponding to the Volume 1 contents. For example, all supporting environmental technical data for Volume 1, section 5.1, Topography, Geography, and Soils at NAVSTA Everett, are included in Volume 5, section 5.1. Not all environmental issue areas discussions in Volume 1 refer to supporting environmental technical data, so they are not represented in this volume.

Volume 6 contains supporting environmental technical data specific to PHNSY CVN homeporting location. Sections referring to various issue areas are numbered corresponding to the Volume 1 contents. For example, all supporting environmental technical data for Volume 1, section 6.1, Topography, Geography, and Soils at PHNSY, are included in Volume 6, section 6.1. Not all environmental issue areas discussions in Volume 1 refer to supporting environmental technical data, so they are not represented in this volume.

Volumes 7-10 include comments made on the Draft EIS and Navy responses: Volume 7 for Coronado, California (due to its size, Volume 7 has been split into two documents: 7A and 7B); Volume 8 for Bremerton, Washington; Volume 9 for Everett, Washington; and Volume 10 for Pearl Harbor, Hawaii.

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

This Environmental Impact Statement (EIS) analyzes potential environmental impacts which would result from constructing and operating the facilities and infrastructure needed to create the capacity to home port three NIMITZ-class nuclear-powered aircraft carriers (CVNs) within the U.S. Pacific Fleet at four potential naval concentrations: (1) San Diego, California; (2) Bremerton, Washington; (3) Everett, Washington; and (4) Pearl Harbor, Hawaii (see Figures 1-1 through 1-3).

This EIS has been prepared in compliance with NEPA 42 USC 4321 et seq, as implemented by the Council on Environmental Quality (CEQ) regulations (Title 40 Code of Federal Regulations [C.F.R.] Parts 1500-1508 [1997]), 32 C.F.R. Part 775 (1997), and the guidelines contained in the Chief of Naval Operations Environmental and Natural Resources Program Manual Instruction (OPNAVINST) 5090.1B of November 1, 1994. This EIS is intended to provide a full and fair discussion of significant environmental impacts associated with a range of alternatives and to inform decisionmakers and the public. This EIS will be used in conjunction with other relevant materials to plan actions and to make decisions.

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

The Navy has established a Pacific Fleet Force Structure consisting of six aircraft carriers. Home port capabilities for five of these vessels have been established at Navy installations in the continental United States. Home port facilities and infrastructure for two conventionally powered carriers (CV) and one nuclear powered carrier (CVN) currently exist at Naval Air Station North Island (NASNI), Coronado, California; homeport facilities and infrastructure for one CVN exists at Naval Station Everett (NAVSTA Everett), Washington; and homeport facilities and infrastructure for one CVN exists at Puget Sound Naval Shipyard (PSNS), Bremerton, Washington. Facilities and infrastructure for a sixth carrier exist in Japan to accommodate a forward-deployed CV.

As aging CVs reach the end of their service life and are replaced by CVNs, the Navy has a need to create the capacity to home port these new CVN assets. The U.S. Pacific fleet is currently undertaking the replacement of two such CVs within the U.S. Pacific Fleet area of responsibility (AOR). Additionally, the U.S. Pacific fleet is reevaluating the existing CVN home port capacity at NAVSTA Everett to determine if those facilities and infrastructure can efficiently support a CVN in terms of maintenance and repair capabilities and crew quality of life.

Of the six aircraft carriers homeported in the U.S. Pacific Fleet, three are NIMITZ-class CVNs. The CVN is a newer class of aircraft carrier requiring additional homeporting shore infrastructure (e.g., electrical power and water depth). Examination of CVN Homeport Objectives and Requirements is fundamental in identifying locations to create the additional home port capacity required to support the three CVNs examined in this EIS. In broad terms, these CVN Home Port Objectives and Requirements can be described in four categories:

- Operations and training
- Facilities and infrastructure
- Maintenance
- Quality of Life (QOL) for Navy personnel

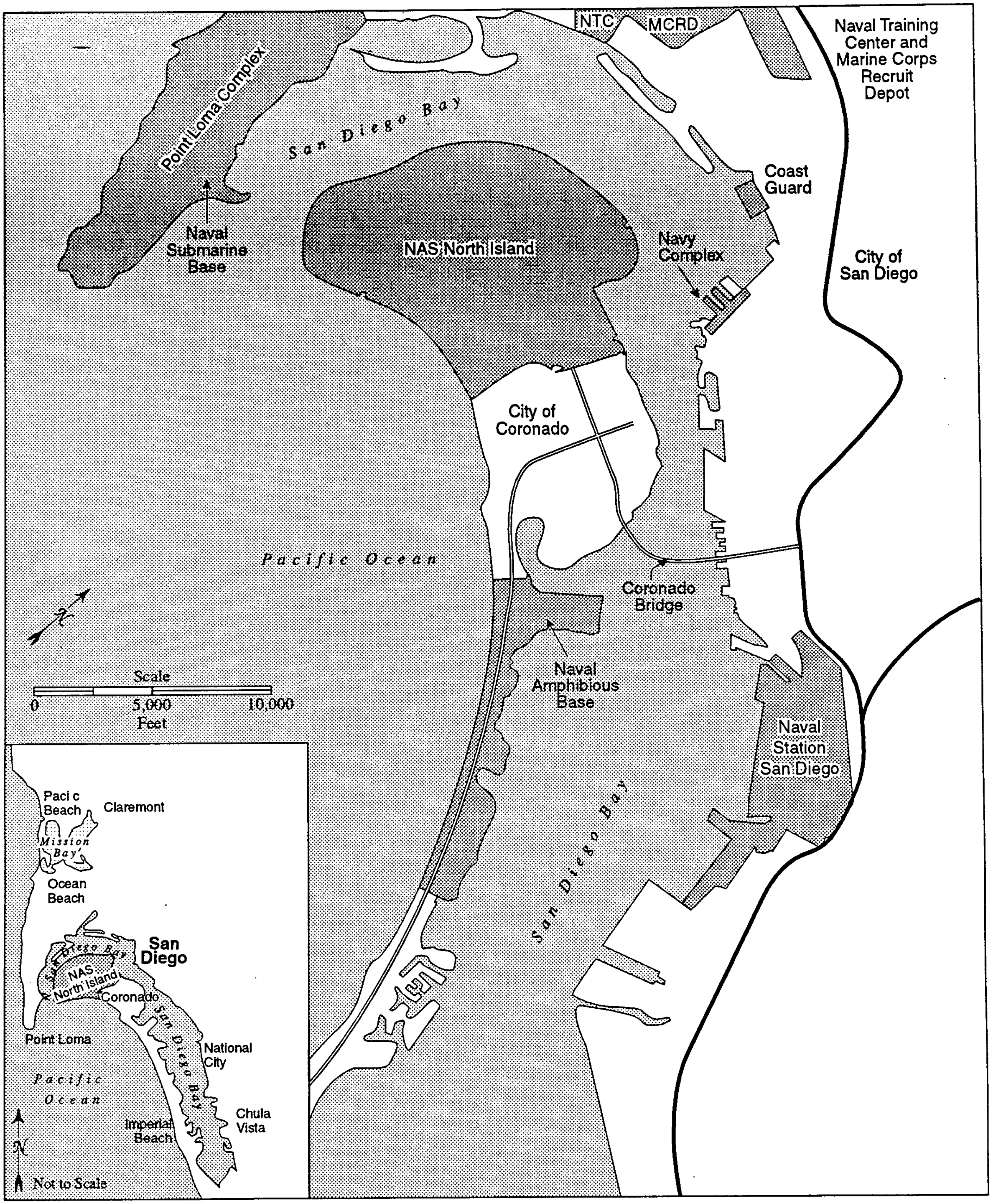


Figure 1-1. NASNI Coronado Vicinity Map

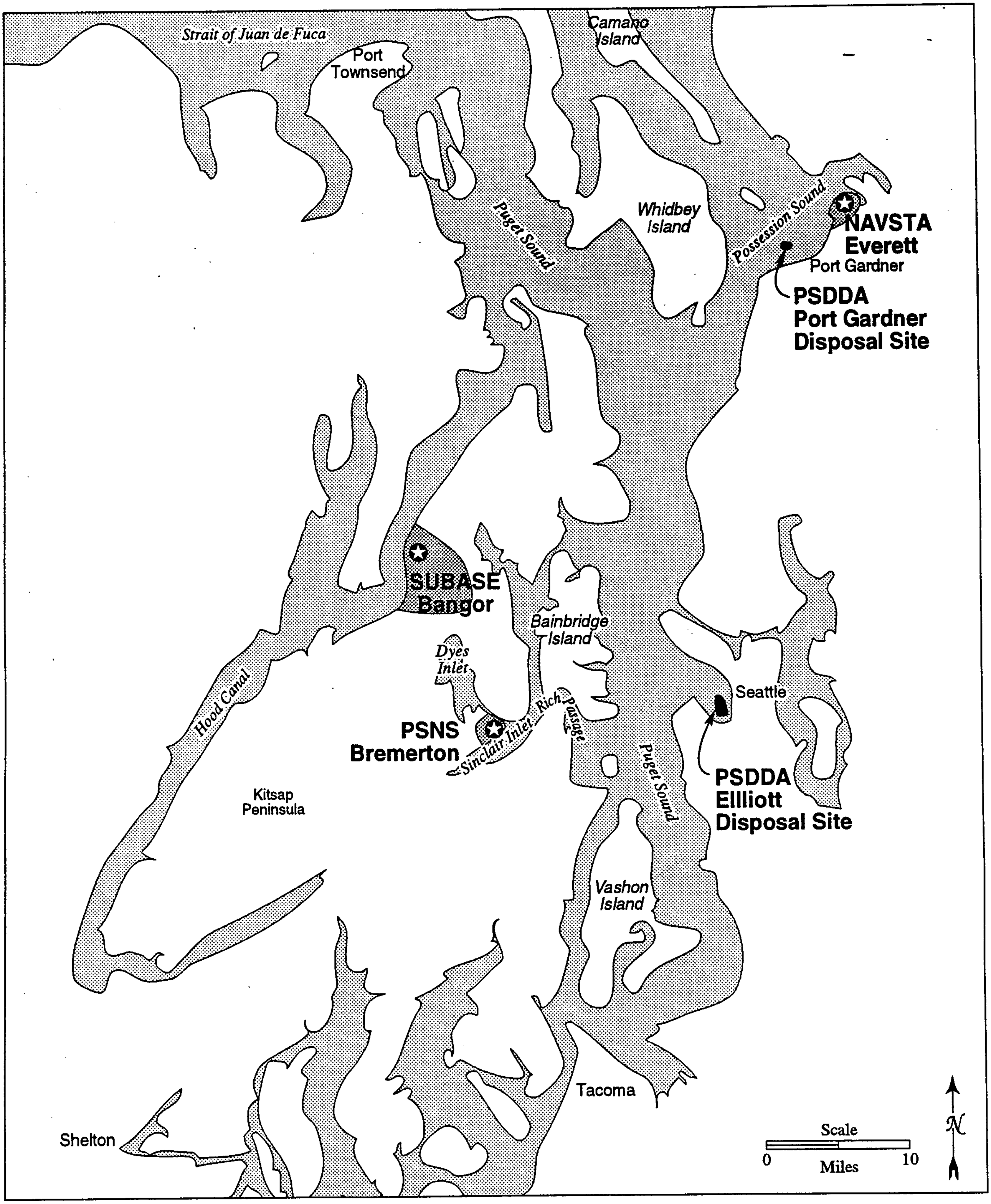


Figure 1-2. Puget Sound Vicinity Map

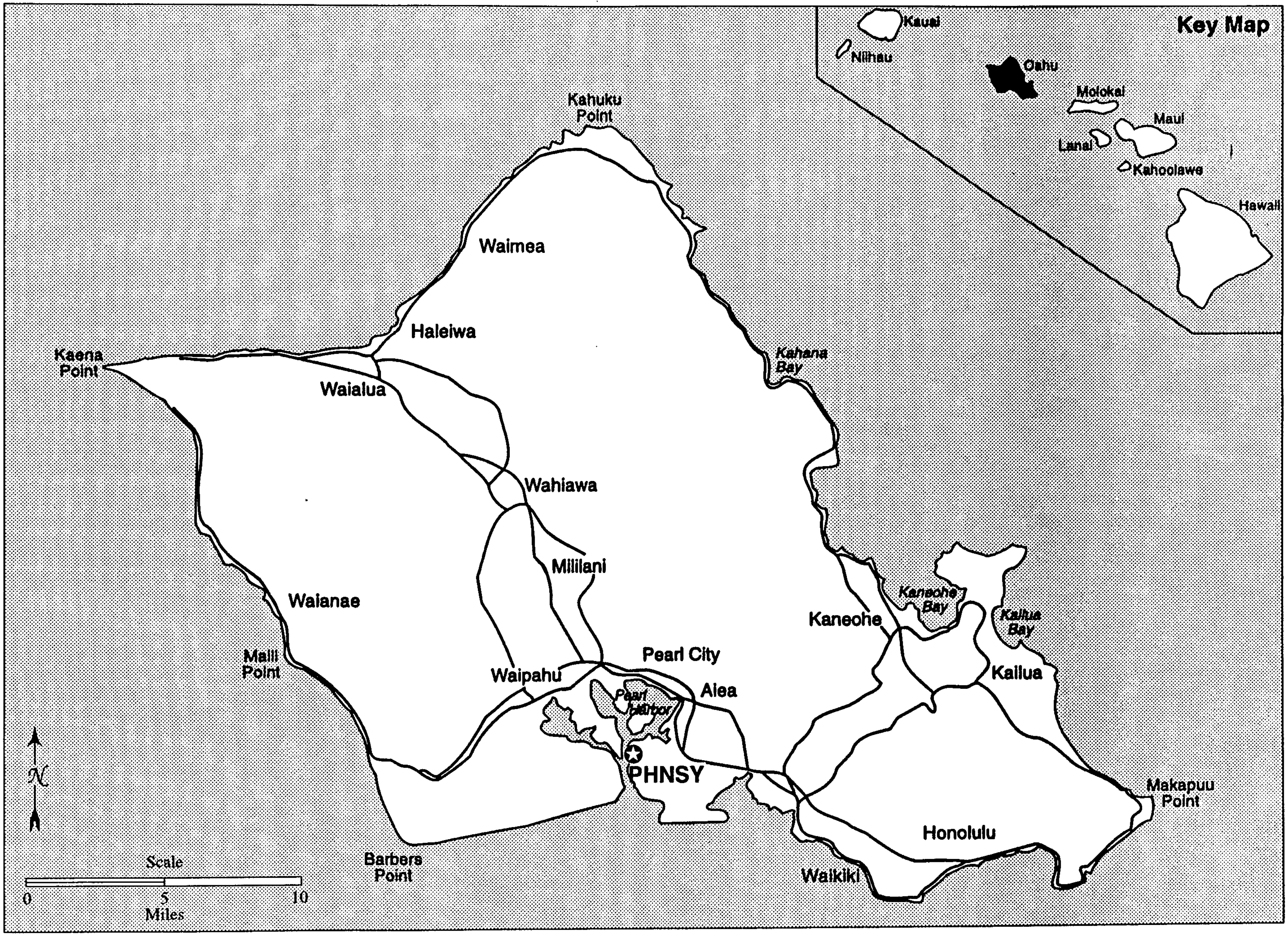


Figure 1-3. Pearl Harbor Naval Complex Vicinity Map

The operational and maintenance demands for CVNs results in a two-year operating cycle. Approximately six months of a cycle are dedicated to intense, major maintenance including work on the propulsion systems and lengthy alterations to the ship's war-fighting capability. This maintenance period is usually followed by nearly a year of training for the ship and embarked airwing. The training includes ship/airwing unit training, integrated battle group training conducted with several ships, as well as Fleet-sized multi-ship exercises. Additionally, the carrier must provide the "deck" (landing target) for both Fleet pilots undergoing refresher training as well as student naval aviators performing their initial carrier landing qualifications. During this period, the ship is in and out of port on an irregular but continuing basis, sometimes for as long as six weeks when participating in Fleet-wide training. When in port, routine, short-duration maintenance continues to be performed throughout the ship. Following the training or "work-up" period, the ship and airwing deploys overseas for six months, thus ending the two-year operational cycle. From the above, it is clear that a carrier's schedule is dynamic and results in considerable time at-sea, even when it is between deployments.

Homeporting capabilities for two CVNs were previously relocated from NAS Alameda as a result of the closure of that naval air station. The 1993 Defense Base Realignment and Closure Commission (BRAC) recommended closure of NAS Alameda and directed relocation of CVN homeporting capabilities from NAS Alameda to the San Diego area and the Pacific Northwest. The capability to homeport one CVN was established at NASNI and PSNS.

1.3 PROPOSED ACTION

To meet the projected CVN homeporting needs of the U.S. Pacific Fleet, both in terms of new CVN assets and reevaluation of the NAVSTA Everett homeport capacity, the Navy proposes to select locations for the construction of the facilities and infrastructure within the Pacific Fleet AOR required to create the capacity to homeport CVNs. The Navy does not propose to reevaluate the CVN homeport capacity created at NASNI and PSNS as a result of the 1993 BRAC process.

This EIS discusses how the CVN Home Port Objectives and Requirements listed in section 1.2 above are considered in developing alternative home port locations for achieving the proposed action.

1.4 ADDITIONAL CONSIDERATIONS

In addition to addressing the development of homeporting facilities and infrastructure for these three CVNs, this EIS addresses the following issues:

- The preservation of an existing transient CVN berth at NASNI
- The modernization of existing CVN home port facilities at PSNS
- Relocation of up to four Fast Combat Logistic Support Ships (AOEs) homeported at PSNS

The transient berth at NASNI provides direct land access from the ship berth to an airfield for air wing logistic support, including aircraft onloads and offloads for Pacific Northwest homeported CVNs. The majority of the CVNs' underway training is off southern California (SOCAL) and the only carrier access to a West Coast airfield is at NASNI. Therefore, it is essential that transient CVNs remain able to moor temporarily at NASNI to load and off-load their air wing.

Modernization of existing CVN berthing facilities at PSNS is based on new criteria established by the Navy for CVN home port facilities. Specifically, existing berths must be dredged and existing piers must be widened to comply with Navy policy. See section 2.3.2.2 for further background on CVN home port facility requirements.

Creating additional CVN homeport capacity at PSNS would require relocating up to four AOEs currently homeported at that location. Therefore, impacts of relocating up to four AOEs will be analyzed in this EIS.

1.5 RELEVANT FEDERAL, STATE, AND LOCAL STATUTES

The Navy, in its EIS for this project, is considering several federal, state, and local laws, regulations and other authorities, in addition to regulatory agency review and permitting authority. The pertinent authorities are listed below and are described in greater detail in Appendix A (Volume 2) of this EIS.

1.5.1 General Environmental Policy

The National Environmental Policy Act (NEPA) of 1969, 42 United States Code Annotated (U.S.C.A.) §§ 4321 to 4370d (West 1994 & Supp. 1997) defines policy and goals for evaluating the environmental consequences resulting from federal actions, including those proposed by the Department of the Navy. The Department of the Navy follows procedures to implement NEPA that are contained in 32 C.F.R. Part 775 (1997)and OPNAVINST 5090.1B.

1.5.2 Land Use

Federal

- Coastal Zone Management Act of 1972, 16 U.S.C.A. §§ 1451 to 1465 (West 1985 & Supp. 1997)
- Exec. Order No. 12,372 (Intergovernmental Review of Federal Programs), 47 Fed. Reg. 30,959 (1982)
- U.S. Department of Defense, Hawaii Military Land Use Plan (1995)

State

- California Coastal Act of 1976, Cal. Pub. Res. Code §§ 30000 to 30900 (Deering 1996 & Supp. 1998)
- Shoreline Management Act of 1971, Wash. Rev. Code Ann. § 90.58. 010 to 90.59.920 (West 1992 & Supp. 1998), and its implementing regulations in Wash. Admin. Code ch. 173-16 (1997 & Supp. 1998)
- Coastal Zone Management Act, Haw. Rev. Stat. §§ 205A-1 to 205A-64 (1993 & Supp. 1996)

Local

- Master Plan, Naval Air Station North Island (NASNI), Coronado, California (1991)
- City of Coronado General Plan, Land Use Element (1987)

- Master Plan, Puget Sound Naval Shipyard (PSNS), Bremerton Naval Complex, Bremerton, Washington (1988) and Addendum (1994)
- City of Bremerton Comprehensive Plan Land Use Element (1986)
- Master Plan, Naval Station (NAVSTA), Puget Sound, Everett, Washington (1986)
- City of Everett Shoreline Management Plan
- Master Plan, Pearl Harbor Naval Complex, Pearl Harbor, Hawaii (1992)
- Natural Resource Management Plan, Pearl Harbor Naval Complex, Pearl Harbor, Hawaii (1989)

1.5.3 Water Quality

Federal

- Rivers and Harbors Appropriation Act of 1899, 33 U.S.C.A. §§ 401 to 454 (West 1987 & Supp. 1996)
- Clean Water Act (CWA), 33 U.S.C.A. §§ 1251 to 1387 (1986 & Supp. 1997)
- Safe Drinking Water Act (SDWA) of 1974, 42 U.S.C.A. §§ 300f to 300j-26 (West 1991 & Supp. 1997)
- Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972 (the Ocean Dumping Act), 33 U.S.C.A. §§ 1401 to 1445 (West 1996 & Supp. 1997)
- Oil Pollution Act of 1990 (OPA 90), 33 U.S.C.A. §§ 2701 to 2761 (West Supp. 1997)

State

- Porter-Cologne Water Quality Control Act, Cal. Water Code §§ 13000 to 13953.4 (Deering 1977 & Supp. 1998)and its implementing regulations in Cal. Code Regs. title 23 (1997)
- California Environmental Quality Act, Cal. Pub. Res. Code §§ 21000 to 21177 (Deering 1996 & Supp. 1998). The Department of the Navy interprets the California Environmental Quality Act (CEQA) as being inapplicable to federal projects. Nevertheless, pursuant to an agreement with the Regional Water Quality Control Board, San Diego Region (RWQCB), this EIS and the accompanying public participation process are intended to cover the requirements of Cal. Code Reg. title 14, §§15087(a), 15221, and 15225 (1997). Accordingly, the RWQCB may decide to use this EIS in place of an EIR without recirculation of the federal document (EIS) for public review. CEQA requires that NEPA documents be supplemented if necessary in order to be compliant with CEQA document requirements.
- Coastal Waters Protection Act of 1971, Wash. Rev. Code Ann. §§ 90.48.010 to 90.48.906 (West 1992 & Supp. 1998)
- Puget Sound Dredge Disposal Analysis (Not Codified).
- Water Pollution, Haw. Rev. Stat. §§ 342D-1 to 342D-70 (1993 & Supp. 1996) and its implementing regulations in Haw. Admin. Rules title 11, chapters 54, 55 (1992)

1.5.4 Air Quality

Federal

- Clean Air Act (CAA), 42 U.S.C.A. §§ 7401 to 7671q (West 1995 & Supp. 1997)
- Federal General Conformity Rule, Clean Air Act § 176(c), 42 U.S.C.A. § 7506(c) (West 1995 & Supp. 1997) and its implementing regulations in 40 C.F.R. Part 93 (1997)

State

- Air Resources, Cal Health & Safety Code §§ 39000 to 44474 (Deering 1986 & Supp. 1998)
- Washington Clean Air Act, Wash. Rev. Code Ann. §§ 70.94.011 to 70.94.990 (West 1992 & Supp. 1998) and its implementing regulations in Wash. Admin. Code ch. 173-400 (1997 & Supp. 1998)
- Hawaii Air Pollution Control Act, Haw. Rev. Stat. §§ 342B-1 to 342B-63 (1993 & Supp. 1996) and its implementing regulations in Haw. Admin. Rules title 11, chs. 59, 60

Local

- San Diego County Air Pollution Control District Rules and Regulations (1997)
- Puget Sound Air Pollution Control Agency Rules and Regulations (1997)
- Hawaii Air Pollution Control District Rules and Regulations (1997)

1.5.5 Biological Resources

Federal

- Endangered Species Act of 1973, 16 U.S.C.A. §§ 1531 to 1534 (West 1985 & Supp. 1997)
- Exec. Order 11,990 (Protection of Wetlands), 42 Fed. Reg. 26,961 (1977)
- Fish and Wildlife Coordination Act, 16 U.S.C.A. §§ 661 to 668ee (West 1985 & Supp. 1997)
- Conservation Programs on Government Lands (Sikes Act) , 16 U.S.C. §§ 670a to 670*o* (West 1985 & Supp. 1997)
- Marine Mammal Protection Act of 1972, 16 U.S.C.A. §§ 1361 to 1421h (West 1985 & Supp. 1997)
- Fish and Wildlife Conservation Act of 1980 (Nongame Act), 16 U.S.C. §§ 2901 to 2912 (West 1985 & Supp. 1997)
- Exec. Order 13,089 (Coral Reef Protection), 63 Fed. Reg. No. 115 (1998)
- Exec. Order 13,112 (Invasive Species), 64 Fed. Reg. No. 25 (1999).

State

- California Endangered Species Act, Cal. Fish & Game Code §§ 2050 to 2116 (Deering 1989 & Supp. 1998)

- Fisheries Code of the State of Washington, Wash. Rev. Code Ann. §§ 75.08.010 to 75.08.530 (West 1994 & Supp. 1998) and its implementing regulations in Hydraulic Code Rules, Wash. Admin. Code ch. 220-110 (1997 & Supp. 1998)

Conservation of Aquatic Life, Wildlife, and Land Plants, Haw. Rev. Stat. §§ 195D-1 to 195D-10 (1993 & Supp. 1996)

1.5.6 Cultural Resources

Federal

- National Historic Preservation Act, 16 U.S.C.A. §§ 470 to 470x-6 (West 1985 & Supp. 1997)
- Archaeological Resources Protection Act (ARPA) of 1979, 16 U.S.C.A. §§ 470aa to 470mm (West 1985 & Supp. 1997)
- Archaeological Resources Protection Act (ARPA) of 1979, Final Uniform Regulations, 32 C.F.R. Part 229 (1997)
- Native American Graves Protection and Repatriation Act (NAGPRA), 25 U.S.C.A. §§ 3001 to 3013 (West Supp. 1997)

State

- Historic Preservation, Haw. Rev. Stat. ch. 6E (1993 & Supp. 1996)

1.5.7 Public Health and Safety

Federal

- Exec. Order 12,088 (Federal Compliance with Pollution Control Standards), 43 Fed. Reg. 47,707 (1978) Exec. Order 12,856 (Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements), 58 Fed. Reg. 41,981 (1993).
- Exec. Order 12,898 (Environmental Justice), 59 Fed. Reg. 7,629 (1994)
- Exec. Order 13,045 (Environmental Justice for Children, Protection from Environmental Health Risks and Safety Risks), 62 Fed. Reg. 19883 (1997)
- Resource Conservation and Recovery Act (RCRA) of 1976, 42 U.S.C.A. §§ 6901 to 6992k (West 1995 & Supp. 1997)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 42 U.S.C.A. §§ 9601 to 9675 (West 1995 & Supp. 1997)
- Defense Environmental Restoration Program (DERP),10 U.S.C.A. §§ 2701 to 2708 (West Supp. 1997)
- Toxic Substances Control Act (TSCA), 15 U.S.C.A. §§ 2601 to 2692 (West 1998)
- Chief of Naval Operations, Environmental and Natural Resources Program Manual, Navy Occupational Safety and Health (NAVOSH) Program Instructions (OPNAVINST) 3120.32C, 5100.19c, 5100.25A & Appendix A7-C

- Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986, 42 U.S.C.A. §§11001 to 11050 (West 1995 & Supp. 1997)
- Federal Insecticide, Fungicide, and Rodenticide Act, Federal Insecticide, Fungicide, and Rodenticide Act, as amended, 7 USC §§ 135 et seq and 7 USC §§ 136 et seq.

State

- Uniform Fire Code (1997)
- Underground Storage of Hazardous Substances, Cal. Health & Safety Code §§ 25280 to 25299.7 (Deering 1988 & Supp. 1998)
- Underground Storage Tanks, Wash. Rev. Code Ann. §§ 90.76.005 to 90.76.903 (West 1992 & Supp. 1998)
- Underground Storage Tanks, Haw. Rev. Stat. §§ 342L-1 to 342L-53 (1993 & Supp. 1996)
- Hazardous Waste Control, Cal. Health & Safety Code §§ 25100 to 25249, 25250 to 25250.25 (Deering 1988 & Supp. 1998)
- Hazardous Waste Management Act, Wash. Rev. Code Ann. §§ 70.105.005 to 70.105.900 (West 1992 & Supp. 1998)
- Hazardous Waste, Haw. Rev. Stat. 342J-1 to 342J-56 (1993 & Supp. 1996)
- Carpenter-Presley-Tanner Hazardous Substance Account Act, Cal. Health & Safety Code §§ 25300 to 25395.15 (Deering 1988 & Supp. 1998)
- Model Toxics Control Act, Wash. Rev. Code Ann. §§ 70.105D.010 to 70.105D.921 (West 1992 & Supp. 1998)
- Environmental Response Law, Haw. Rev. Stat. §§ 128D-1 to 128D-23 (1993 & Supp. 1996)

1.5.8 Noise

Federal

- Noise Control Act of 1972 and Quiet Communities Act of 1978, 42 U.S.C.A. §§ 4901 to 4918 (West 1995 & Supp. 1997)
- U.S. Department of Housing and Urban Development, 24 C.F.R. Part 24 (1997) (interior residential noise standards)

State

- California Noise Control Act of 1973, Cal. Health & Safety Code §§ 46000 to 46080 (Deering 1997 & Supp. 1998)
- Cal. Gov't Code § 65302(f) (noise element of general plans) (Deering 1987 & Supp. 1998)
- Noise Control Act of 1974, Wash. Rev. Code Ann. §§ 70.107.010 to 70.107.910 (West 1992 & Supp. 1998)

- Noise Pollution, Haw. Rev. Stat. §§ 342F-1 to 342F-33 (1993 & Supp. 1996) and its implementing regulations in Haw. Admin. Rules ch. 46 (1996)

Local

- Noise Elements of County and City General Plans (e.g., City of Coronado, City of Bremerton, City of Everett, City and County of Honolulu)

1.5.9 Utilities

Federal

- Exec. Order 12902 (Energy Efficiency and Water Conservation at Federal Facilities), 59 Fed. Reg. No. 47. (March 8, 1994).

1.6 SCOPING PROCESS/AREAS OF POTENTIAL IMPACTS

Public comment on the proposed action was solicited pursuant to federal requirements. A federal Notice of Intent (NOI) was published in the *Federal Register* on 3 December 1996, and public comments received until 28 February 1997.

Public scoping meetings were held at all four CVN homeporting alternative locations:

- PSNS Bremerton, at Bremerton, Washington on 3 February 1997
- NAVSTA Everett, at Everett, Washington on 4 February 1997
- PHNSY Hawaii, at Pearl City, Hawaii on 6 February 1997
- NASNI Coronado, at Coronado, California on 10 February 1997

Public concerns identified in the response to the NOI and in scoping meetings are summarized in Volume 2, Appendix B, EIS Scoping Comment Issues. Concerns were related to a variety of environmental issue areas that are addressed in this EIS. The Navy has determined, however, that some of the issues raised during scoping are not relevant to this EIS analysis under NEPA. These concerns are listed below and are not addressed further in the EIS.

San Diego

- *Consideration of Naval Station Long Beach as a CVN homeporting location* is unreasonable because it has been closed pursuant to previous BRAC legislation.
- *Halting construction of CVN-76, USS RONALD REAGAN*, one of the two future CVNs assigned to the Pacific Fleet, is outside the scope of this proposed action. Construction of a specific aircraft carrier is outside the scope of this action.
- *Environmental Justice Impacts on Tijuana, Mexico.* Executive Order 12898, Environmental Justice, only applies to actions within the United States and its territories and possessions. It does not apply to foreign countries such as Mexico.

Bremerton

- *Federal Aviation Administration funding for expansion of the Bremerton National Airport* is not related to nor could it be potentially affected by the proposed action, so that Navy support is not considered relevant.

- *Concentration of CVNs at PSNS Bremerton, inducing increased risks of enemy attacks,* is not considered an environmental issue subject to NEPA.

Everett

- *Impacts on wetland habitat resulting from increased demand for housing and services* is not within the scope of this action. The provision of housing and public services is the responsibility of private and municipal entities and is subject to regulatory control. Wetland impacts from non-water-dependent actions would not be permitted by the Army Corps of Engineers and would likely be illegal. The Navy does not condone Clean Water Act violations. Housing issues are discussed in the EIS in terms of existing availability. The proposed action would result in developing housing in cooperation with local developers, but the location of the new housing would be outside naval facilities.

Pearl Harbor

- *Increase in Pearl Harbor's perceived value as a strategic military target* is not considered an environmental issue subject to NEPA.
- *Return of Hawaiian lands control from the U.S. government to indigenous peoples* is outside the scope of the proposed action.

1.7 PUBLIC NOTICE ACTIVITIES

The Draft EIS was circulated for a 75-day period. Public hearings were held approximately 4 to 5 weeks after the *Federal Register* publication of the Notice of Availability (NOA) for this EIS. Public hearings were held in Bremerton, Washington, Everett, Washington, Honolulu, Hawaii, Coronado, California, and San Diego, California. The exact hearing dates, times, and locations appeared as a notice in local newspapers at least two weeks before the public hearings. The notice also included the addresses of local libraries where the Draft EIS could be reviewed. The notice was mailed to approximately 300 individuals who attended the scoping meetings for the Draft EIS, to all individuals who requested to be included on the EIS mailing list, and to agencies, offices, and individuals who requested copies of the Draft EIS. Information on the dates and times of public hearings were available from the Navy by toll-free phone number, fax, or e-mail.

1.8 PUBLIC INVOLVEMENT AND INTERAGENCY COORDINATION

San Diego

Meeting with resource and regulatory agencies

- Southwest Division, Naval Facilities Engineering Command, San Diego, California
    - U.S. Environmental Protection Agency, Region IX and Region X
    - U.S. Army Corps of Engineers
    - National Marine Fisheries Service
    - U.S. Fish and Wildlife Service
    - California Regional Water Quality Control Board
    - California Department of Fish and Game

Consultation with resource and regulatory agencies

- Southwest Division, Naval Facilities Engineering Command, San Diego, California
    - California Coastal Commission
    - California Department of Toxic Substances Control

Pacific Northwest

The following meetings addressing interagency coordination took place in the Pacific Northwest:

Meeting in Bremerton, Washington
- City of Bremerton Planning Department

Meeting in Kitsap County
- Kitsap County Planning Department

Meeting in Olympia, Washington
- U.S. Fish and Wildlife Service
- U.S. National Marine Fisheries Service

Meeting in Olympia, Washington
- Washington Department of Ecology (Ecology)

Meeting in Bellevue, Washington
- Washington Department of Ecology, Northwest Regional Office
  - Hazardous Waste and Toxics Reduction Program
  - Snohomish Basin Local Action Team Leader
  - Water Quality and Industrial Wastewater Permits
  - Toxics Reduction Production; Senior Planner for the Regional Office
  - Sediment Management Program; Toxics Cleanup Program; Implementation of the Sediment Management Standards
  - Toxics Cleanup Program

Meeting with U.S. Environmental Protection Agency

Meeting in Bremerton, Washington
- Kitsap County Department of Community Development

Meeting in Seattle, Washington
- Puget Sound Dredged Disposal Analysis (PSDDA) Agencies Meeting
  - U.S. Army Corps of Engineers, Seattle District, Dredged Material Management Office (DMMO)
  - Washington Dept. of Ecology
  - U.S. EPA Region X
  - Washington Dept. of Natural Resources

Meeting with Native American tribes
- Suquamish Tribe
- Tulalip Tribe

Hawaii

Consultation with resource and regulatory agencies
- Department of Health, Clean Water Branch

Department of Business, Economics, Development and Tourism
Coastal Zone Management Program

Meeting with Hawaii State Historic Preservation Office

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

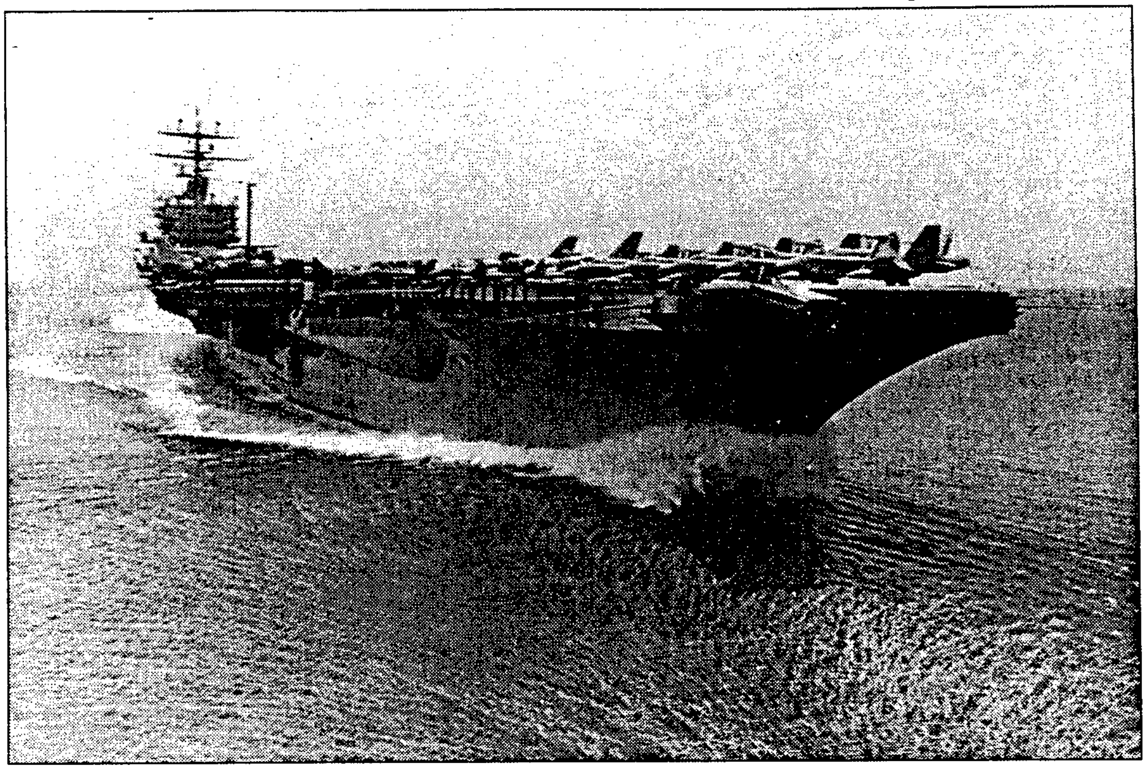
This chapter describes the proposed action and alternatives as well as the process used by the Navy to identify reasonable locations for the creation of the CVN home port capacity required by the U.S. Pacific Fleet. Also considered are the reasonable alternatives for relocating up to four Fast Combat Support Ships (AOEs) that could be displaced from Puget Sound Naval Shipyard (PSNS) Bremerton as a result of this action. A CVN and an AOE are pictured in Figure 2-1.

The Commander Naval Air Force, U.S. Pacific Fleet (CNAP), in its *Home Port Analysis for Developing Home Port Facilities for Three NIMITZ-Class Aircraft Carriers in Support of the U.S. Pacific Fleet* (Department of the Navy [DON] 1997a) has completed an extensive analysis to identify a reasonable range of potential CVN home port locations within the U.S. Pacific Fleet's Area of Responsibility, along the United States West Coast and Hawaii. This EIS incorporates that analysis as a reference. A summary is provided in Volume 2, Appendix G. Possible concentrations of naval presence within the Pacific Fleet that would minimize the need for extensive improvements and expense in the creation of CVN home port capacity were identified in San Diego, the Pacific Northwest, and Hawaii. Within these concentrations, specific CVN home port locations were then selected as a result of their ability to satisfy a number of operational objectives or requirements. The maximum CVN home port capacity that could reasonably be created at any one location was then determined. The selection of a reasonable range of alternatives in this EIS builds upon the analysis presented in the CNAP's *Home Port Analysis* (DON 1997a).

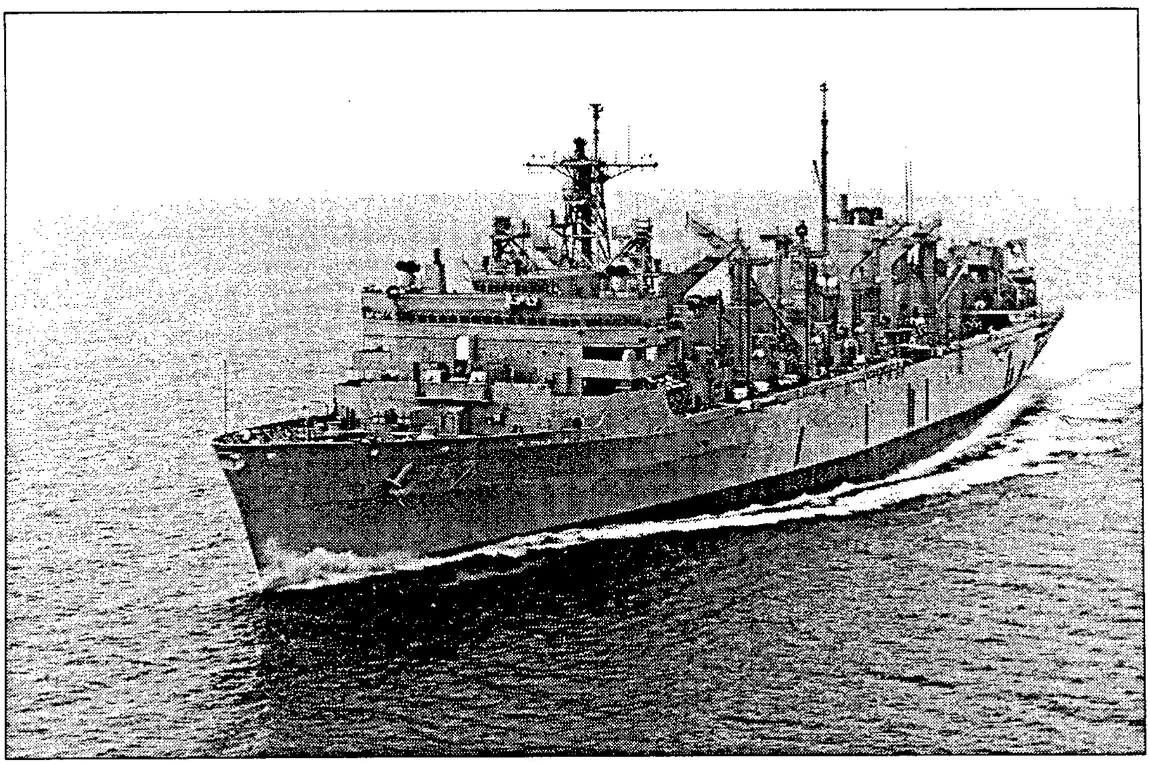
This EIS alternative analysis compares each location's ability to provide necessary support facilities for varying numbers of CVNs, resulting in alternative facility development scenarios for combinations of CVNs and AOEs for the following locations: Naval Air Station North Island (NASNI), Coronado, California; PSNS Bremerton, Washington; NAVSTA Everett, Washington; and Pearl Harbor Naval Shipyard (PHNSY), Pearl Harbor, Hawaii. Other locations that did not satisfy the CVN Home Port Objectives and Requirements discussed below are also addressed. This EIS alternative analysis compares each location's ability to home port varying numbers of CVNs, resulting in combinations of CVNs and AOEs for each home port location. The analysis is presented in Volume 2, Appendix G.

2.2 PREFERRED ALTERNATIVE

The Navy's preferred alternative is Alternative Two. Alternative Two would upgrade the current facilities and infrastructure at NASNI (which has the homeport capacity to support one CVN and two CVs) with the additional capacity required to support a total of three CVNs and would maintain the existing CVN homeport capacity at NAVSTA Everett. The Navy's preference for this home port combination is based on NASNI's accessibility to the sea and training ranges; PHNSY's inaccessibility to training ranges and the lack of facilities to support a carrier air wing; and the operational and quality of life advantages of the existing CVN home port at NAVSTA Everett and the assumption that depot maintenance for that CVN can be successfully completed without a significant adverse impact on crew quality of life or maintenance schedules and costs.



USS CARL VINSON (CVN-70)



USS RAINIER (AOE 7)

Figure 2-1. CVN-68 Class Nuclear Aircraft Carrier and AOE-6 Class Fast Combat Support Ship

This assumption is based upon the expectation that the Department of the Navy or Washington State/local governments will be able to develop programs to:

1) **Minimize quality of life impacts including commuting times, Navy Personnel Tempo of Operations (PERSTEMPO), and quality and availability of housing for the Everett ship's crew and their families; and**

2) **Avoid unacceptable impacts on shipyard and ship's force maintenance work and costs associated with that work, during the Everett carrier's PIA and pre and post-PIA maintenance.**

Throughout the EIS process, the Navy will continue to update information relating to its selection of a preferred alternative. Because NAVSTA Everett only recently assumed its role as a CVN home port with the arrival of the USS ABRAHAM LINCOLN (LINCOLN) in January 1997, validation of the assumption upon which the preferred alternative is based may not occur until completion of the 1999 PIA for the LINCOLN, now scheduled to occur April to October 1999. New information developed during this first PIA for a CVN homeported at NAVSTA Everett will be carefully reviewed by the Navy, especially information necessary to ensure that impacts on quality of life and maintenance work and costs have in fact been successfully mitigated. The regulations implementing NEPA require the Navy to prepare a supplemental EA or EIS should significant new information relevant to environmental concerns bearing on the impacts of the proposed action become available.

Details of CVN homeporting facility and infrastructure improvements for the preferred alternative are discussed in section 2.4.2, and are in Table 2-2 (see also Figures 2-7 through 2-10).

2.3 DEVELOPMENT OF ALTERNATIVES

This EIS analyzes the potential environmental effects of the proposed action at various locations with varying numbers of CVNs and AOEs, including any associated facilities and infrastructure development and dredging. Environmental resource areas addressed in this EIS include geology, topography, and soils; dredging, hydrology, and water quality; pollution prevention; socioeconomics, environmental justice, schools, and housing; transportation/circulation/parking; public facilities and recreation; safety and environmental health; aesthetics; and utilities. Issue analysis includes an evaluation of the direct, indirect, short-term, and cumulative impacts associated with the proposed actions.

The Navy determined the CVN Home Port Objectives and Requirements that must be met for a location to be reasonably considered as a home port for a CVN. Some level of facility improvements are needed to provide an adequate CVN home port at all locations. The level of facility improvements would be specific to the location and number of CVNs homeported at that location. Candidate locations were selected for consideration in this EIS if they could meet the objectives and requirements after the application of the following three criteria:

- location within the U.S. Pacific Fleet's Area of Responsibility;
- capable of avoiding the need for extensive modifications to or construction of shore infrastructure and facilities; and

- capable of providing CVN maintenance in the ship's home port area with the goal of minimizing the impact on crew quality of life (QOL; see section 2.3.1.4 for additional discussion).

Using the broad objectives outlined above, the Navy identified (DON 1997a) three concentrations of naval presence within the Pacific Fleet for CVN homeporting consideration: San Diego, the Pacific Northwest, and Hawaii.

Specific locations for homeporting were determined by examining existing ports within the three concentrations described above, to determine how well they were capable of satisfying the following CVN Home Port Objectives and Requirements (see section 2.3.1 and Appendix G for additional discussion):

- Operations and Training;
- Facilities;
- Maintenance; and
- Quality of Life for Navy Personnel.

2.3.1 CVN Home Port Objectives and Requirements

The *Home Port Analysis for Developing Home Port Facilities for Three NIMITZ-Class Aircraft Carriers in Support of the U.S. Pacific Fleet* (DON 1997a) encompassed a planning process to determine reasonable and practicable locations for the CVNs. The important aspect of that process was the identification of CVN operations and training objectives; facility and infrastructure requirements; maintenance objectives; and sailor QOL objectives. These CVN Home Port Objectives and Requirements are defined below. These requirements and each home port location's existing capacity to meet the requirements are discussed in detail in Volume 2, Appendix G, in which the various locations and quantities of homeported CVNs are compared with the Home Port Objectives and Requirements.

2.3.1.1 Operations and Training

These objectives address the need for a CVN homeport's ready access to the sea. Several objectives involve the geographic relationship of the CVN home port location to air wing training ranges in the Southern California area.

2.3.1.2 Home Port Facilities

Home port facility objectives and requirements defined by the Navy (Commander, NAVSEA letter Serial 03D3/242 dated 3 Jan 95; see Volume 2, Appendix H, DON 1995c, DON 1997c and DON 1997d) address a number of design constraints: turning basin and berth water depths (-50 feet for home port/port of call berths and at least -47 feet for shipyard maintenance berthing areas); CVN pier size (at least 125 feet wide for two-sided piers, at least 80 feet wide for one-sided wharves or piers, and wharf length of at least 1,300 feet); berth utilities (electricity, shore power, pure steam, potable water pressure and demand, pure water, compressed air, sanitary sewer, and oily waste collection; transient warehouse size; and parking.

2.3.1.3 *Maintenance*

A maintenance plan for NIMITZ-class aircraft carriers, the Incremental Maintenance Plan, has been recently implemented. The plan has been developed specifically to support CVN operational requirements. The specialized facilities needed for CVN maintenance have an important influence on the selection of home port locations.

Over an aircraft carrier's 2-year operating cycle, 6 months are spent on an overseas deployment and nearly 6 months are spent in a work-intensive depot level maintenance period known as a Planned Incremental Availability (PIA), during which major repairs are accomplished. Twelve months are spent in CVN operational training that includes several routine maintenance periods. At every third cycle or approximately 6 years, the nearly 6-month maintenance availability is replaced by a 10- to 11-month depot-level Docking Planned Incremental Availability (DPIA) at a nuclear-capable shipyard to complete hull work and other labor-intensive maintenance. For example, if there were three homeported CVNs at NASNI, then PIA activities would occur for approximately 36 months out of every 6-year period. This averages to one 6-month PIA per year.

To support the 2-year operational cycle and include time for CVN personnel to be with their families, PIAs will be accomplished in the ships' permanent home port area. If a PIA were to occur in a different home port location, funding for moving crew families would not be provided by the Navy (e.g., when a crew member is out of his/her home port for less than 6 months). Further, the PIA availability would be considered to apply against PERSTEMPO sailor QOL objectives (see Volume II, Appendix G, section 1.4) for family separation because the ship would be out of its home port for more than 2 months. An alternative to relocating CVN crew and families during each PIA is to temporarily transfer a work force from a nuclear capable shipyard and/or private contractors to the respective home port location that has available maintenance capabilities for the PIA duration.

A Depot Maintenance Facility (DMF), including a Controlled Industrial Facility (CIF), a Ship Maintenance Facility (SMF), and a Maintenance Support Facility (MSF), is required to perform depot-level maintenance of CVN propulsion plant systems and components in or near a home port not adjacent to a nuclear-capable shipyard. Other maintenance facility requirements include a pier/wharf capable of supporting a 140-ton crane, a maintenance dry dock for a DPIA, laydown (paved) area, and non-propulsion plant maintenance facilities.

The extent and proximity to which these DMF components exist or are capable of being built is a major criterion for siting a CVN home port. Having these facilities at the home port also helps keep the crew members near their families for the maximum time possible. In the U.S. Pacific Fleet Area of Responsibility, only PSNS has the capabilities to perform all aspects of CVN depot-level repair work (drydocking and pierside maintenance such as a DPIA). NASNI is currently constructing facilities to support PIA maintenance but not a DPIA, since no CVN drydocking capability is available or planned. NAVSTA Everett has no facilities capable of depot-level CVN propulsion plant work. PHNSY has drydocking and depot-level capabilities, but lacks some specialized facilities and pieces of equipment to perform CVN PIA and DPIA maintenance, but adequate size exists to accommodate a CIF. CVN maintenance facility objectives and requirements are detailed in Volume 2, Appendix I.

2.3.1.4 *Quality of Life*

Adequate QOL for the ship's crew members and their families is a primary goal of the Navy. QOL is a common term in the Navy referring to the sum of all the factors, quantitative and otherwise, that contribute to Navy members' satisfaction with their career situation and include factors such as family separation (see discussion of PERSTEMPO in Volume 2, Appendix G), housing, recreational opportunities, and parking.

2.3.2 CVN Home Port Locations Selected for Analysis

Section 2.3.1 provides an overview of the objectives and requirements associated with the operations and homeporting of a CVN. Using these objectives and requirements as a yardstick, the facilities and infrastructure needed to satisfy them can be determined. The following section presents this range of CVN homeporting facilities and infrastructure (and where necessary, facilities and infrastructure for relocated AOEs) at each home port location.

From this examination, four locations were identified as candidates: NASNI, PSNS, NAVSTA Everett, and PHNSY. These locations are defined in section 2.3.2, below. All other locations were rejected from consideration in this EIS due to their inability to satisfy the CVN Home Port Objectives and Requirements stated above. Those alternative home port locations that were considered but eliminated are described in section 2.6.1.

The Navy (DON 1997a) used the CVN Home Port Objectives and Requirements to determine what facility construction would be necessary at each of the four CVN homeporting locations to support a CVN. The analysis also included evaluating the feasibility of homeporting more than one CVN at each location with respect to (1) what additional construction projects would be required and (2) what other related (but not CVN-specific) projects might be required based on the number of CVNs homeported. The range of CVN facility improvements feasibly constructed at each home port location is discussed in section 2.3.3.

The Navy then determined a reasonable range of combinations of CVNs and AOEs for each location (DON 1997a). Section 2.3.3 describes these combinations in detail. Combinations of CVNs and AOEs that were considered but eliminated are found in section 2.6. Finally, combinations of CVNs at locations were brought together into several alternatives, each capable of providing home ports for three additional CVNs. Each alternative requires a varying level of facilities development, but satisfies CVN Home Port Objectives and Requirements. In addition to the reasonable range of alternatives, a No Action Alternative is included as required by the National Environmental Policy Act (NEPA). The six home port alternatives used in this EIS are discussed in section 2.4 after discussion of the development process.

2.3.2.1 *NASNI, Coronado, California*

NASNI is located in Coronado, California, near San Diego. It occupies approximately 2,800 acres on the tip of the Silver Strand Peninsula at the entrance to San Diego Bay (see Figure 2-2). It is bordered by San Diego Bay on the north and west, the Pacific Ocean on the south, and by the City of Coronado on the east. NASNI has been in operation since 1918 (DON 1991) and also was recently established as a CVN home port through the Defense Base Closure and Realignment Act and a subsequent NEPA decision (DON 1995a). NASNI is the only reasonable location in the San Diego area for homeporting CVNs because of space availability and existing support facilities (DON 1995b).

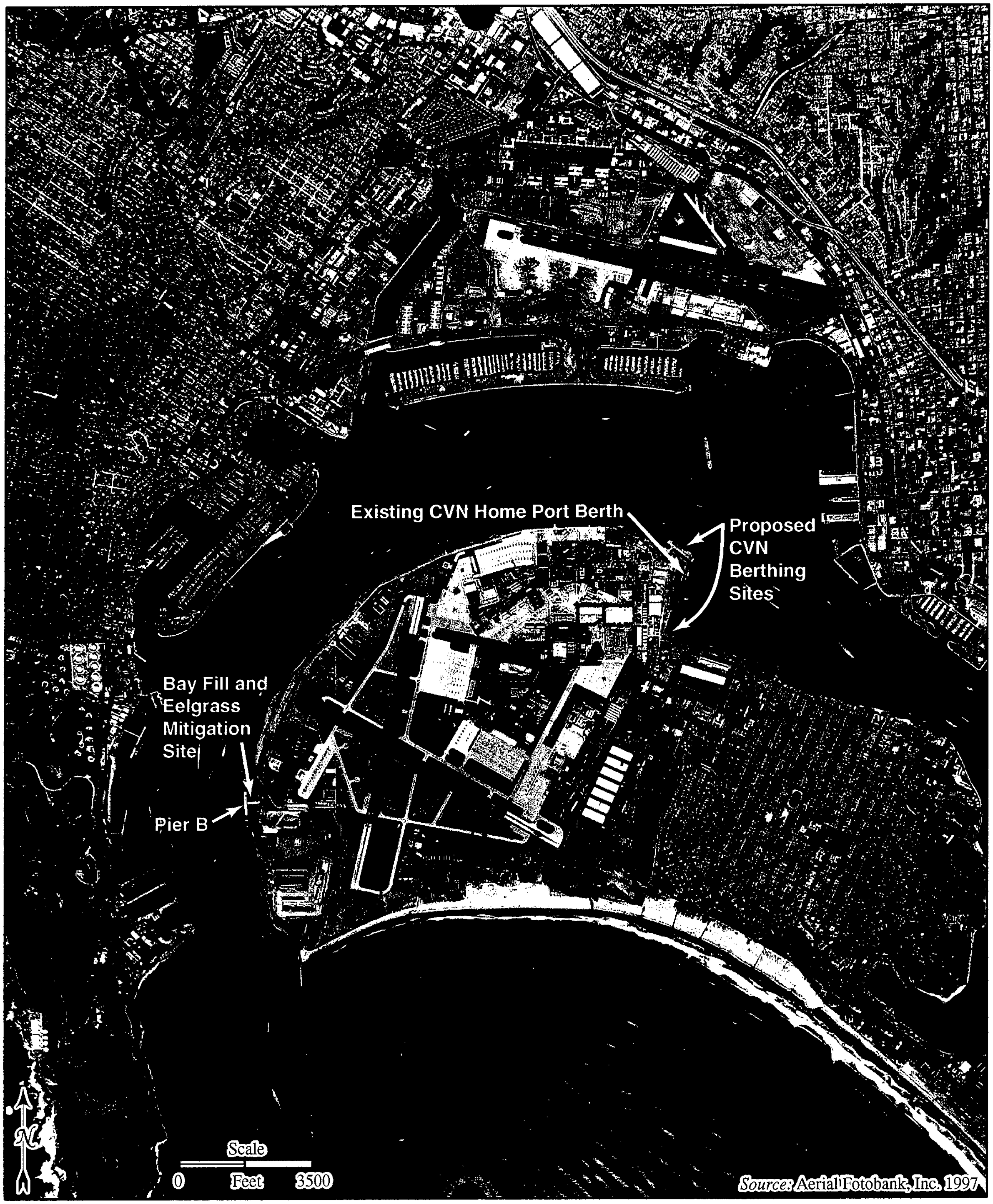


Figure 2-2. Aerial View of NASNI

Home port facilities and infrastructure for two conventionally powered carriers (CV) and one nuclear powered carrier (CVN) currently exist at NASNI. NASNI has provided the requisite facilities and infrastructure to home port three aircraft carriers since World War II. Over the ensuing years, those facilities and infrastructure have been modernized to keep pace with the increased requirements generated by evolving aircraft carrier ship design and capabilities. NASNI has been the homeport for three aircraft carriers for several decades leading up to the 1990s. In 1993, the decommissioning of USS RANGER resulted in the homeporting total dropping to two carriers while awaiting RANGER's replacement. An analysis of the years 1975 through 1998 reveals that the removal of RANGER did not appreciably change the historic annual average number of carrier-days-in port (see section 3.0 for a detailed discussion). This was a result of the traditional operational employment schedule of Pacific Fleet aircraft carriers. Information on average number of days per year homeported carriers at NASNI were simultaneously in port illustrates that a schedule of a carrier homeported at NASNI is dynamic and results in considerable time at sea even when it is between Western Pacific deployments. Under alternatives that would result in construction of facilities and infrastructure to create capacity for one or two additional CVNs, each CV is replaced when a CVN is added to the Pacific Fleet active inventory. The first CV left in 1998, the last will leave in 2003. The first additional CVN is currently scheduled to arrive in the Pacific Fleet in 2002, and the second in 2005.

NASNI contains two CVN-capable berths: one for the homeported BRAC CVN, and the other for a transient CVN. The transient berth at NASNI provides direct land access from the ship berth for air wing logistic support, including aircraft onloads and offloads for all West Coast carriers. The majority of the ships' underway training is in the Southern California (SOCAL) operating areas and the uniqueness of having a naval air station co-located with a carrier berth results in CVNs currently homeported in the Pacific Northwest using the transient berth for the requisite air wing on- and off-loads. It is essential that transient CVNs remain able to moor temporarily at NASNI for this evolution (DON 1995a).

Pier J/K does not have adequate width or length to serve as a CVN home port berth. Water depths adjacent to the pier are approximately 42 feet below mean lower low water (MLLW), less than the 50 feet MLLW required for CVN homeporting (see section 2.3.1.2 for discussion of CVN homeporting facility requirements).

The Navy has nearly completed constructing nuclear propulsion plant maintenance facilities at NASNI to support the existing CVN home port. CVN dry-dock facilities do not exist there and none are planned (see section 2.3.1.3, and Volume 2, Appendix G, for additional details of CVN maintenance requirements).

With the completion of the Depot Maintenance Facility (DMF), NASNI facilities are able to provide all necessary CVN pierside maintenance support. These facilities are capable of accommodating the staggered maintenance schedules of up to three homeported CVNs. For each homeported CVN, approximately 450 workers would need to be transferred to NASNI for nearly six months every two years to perform ship propulsion plant maintenance.

NASNI currently supports approximately 130 helicopters and 80 fixed-wing aircraft. Normal deployment schedules reduce the number of aircraft present at any one time by an additional 20 to 25 aircraft. An average of 37 transient (visiting) aircraft use the naval station daily. CVN homeporting would not increase these aviation units based at NASNI. These units are based by type of aircraft and are independent of the aircraft carriers. The aviation units not only deploy on aircraft carriers homeported at NASNI, but also on aircraft carriers homeported at other locations that visit NASNI while training. Therefore, the proposed action would not cause an increase in aircraft or air traffic at NASNI.

The carrier battle group and its associated CVN homeported at NASNI must train together in southern California, where practice target ranges are located. Due to NASNI's location within southern California, a CVN homeported there does not require any transit time to accomplish this air squadron training.

NASNI has a population of 19,258, and has been decreasing from a high of 21,759 in 1996 (see Volume 3, Section 2, NASNI Population). This figure is estimated to continue to decline to 18,982 in 2005 due to diminishing Navy manpower funding, as exhibited in the President's FY 2000 Budget submission for Navy manpower appropriations.

2.3.2.2 *PSNS Bremerton, Washington*

PSNS is located in Bremerton, Washington, on Sinclair Inlet, a western arm of the Puget Sound (Figure 2-3). Since the issue of the Draft EIS, the Naval Facility at Bremerton has been split into two separate commands: Puget Sound Naval Shipyard and Naval Station Bremerton. For the purposes of this EIS, this EIS has not been revised to correct this change. Instead, when the EIS refers to PSNS, this could mean either the new Naval Station Bremerton or the reduced area of Puget Sound Naval Shipyard. No other revisions are required to the EIS analysis because of this change.

PSNS is part of the Bremerton Naval Complex, which includes the Fleet and Industrial Supply Center, Puget Sound (FISC Puget Sound), the Naval Inactive Ship Maintenance Facility (NISMF Bremerton) and a variety of other tenants. PSNS, which has been an active Naval Shipyard since the 1890s, provides the only CVN propulsion maintenance and dry-dock center on the West Coast. It was established in 1995 as a permanent CVN home port pursuant to the procedures of the Defense Base Closure and Realignment Act and a subsequent NEPA decision (DON 1995b). PSNS serves as home port to one CVN, and four AOEs. In addition to the homeported ships, the Shipyard's maintenance forecast for industrial work is one CVN, one combatant or auxiliary surface ship, and six submarine overhauls, inactivations and/or disposals per year.

A temporary CVN home port berth at Pier B was created at PSNS in 1986 as an interim measure until a permanent CVN home port berth could be constructed at NAVSTA Everett. Because this temporary homeporting was anticipated to be short term, only those berthing facilities considered mission-essential were constructed to support the CVN. As a result of the BRAC 1993 decision to close NAS Alameda and subsequent NEPA analysis, a decision was made in August 1995 to select PSNS as a permanent home port for a CVN. Upon issuing the decision to designate PSNS as a permanent home port for one CVN, construction of shore-side support facilities consisting of a parking garage and playing fields was begun to correct deficiencies in shore-side infrastructure at PSNS.

PSNS currently has three CVN capable berths (see Figure 2-9): Pier B, Pier D (west side), and Pier 3 (east side). Pier B is the primary CVN home port pier and a maintenance pier during drydocking availabilities (maintenance periods). Pier D is a backup CVN home port pier, and currently functions as a home port pier for AOEs. Pier 3 is the primary CVN maintenance pier, and is located within the PSNS security area called the Controlled Industrial Area (CIA).

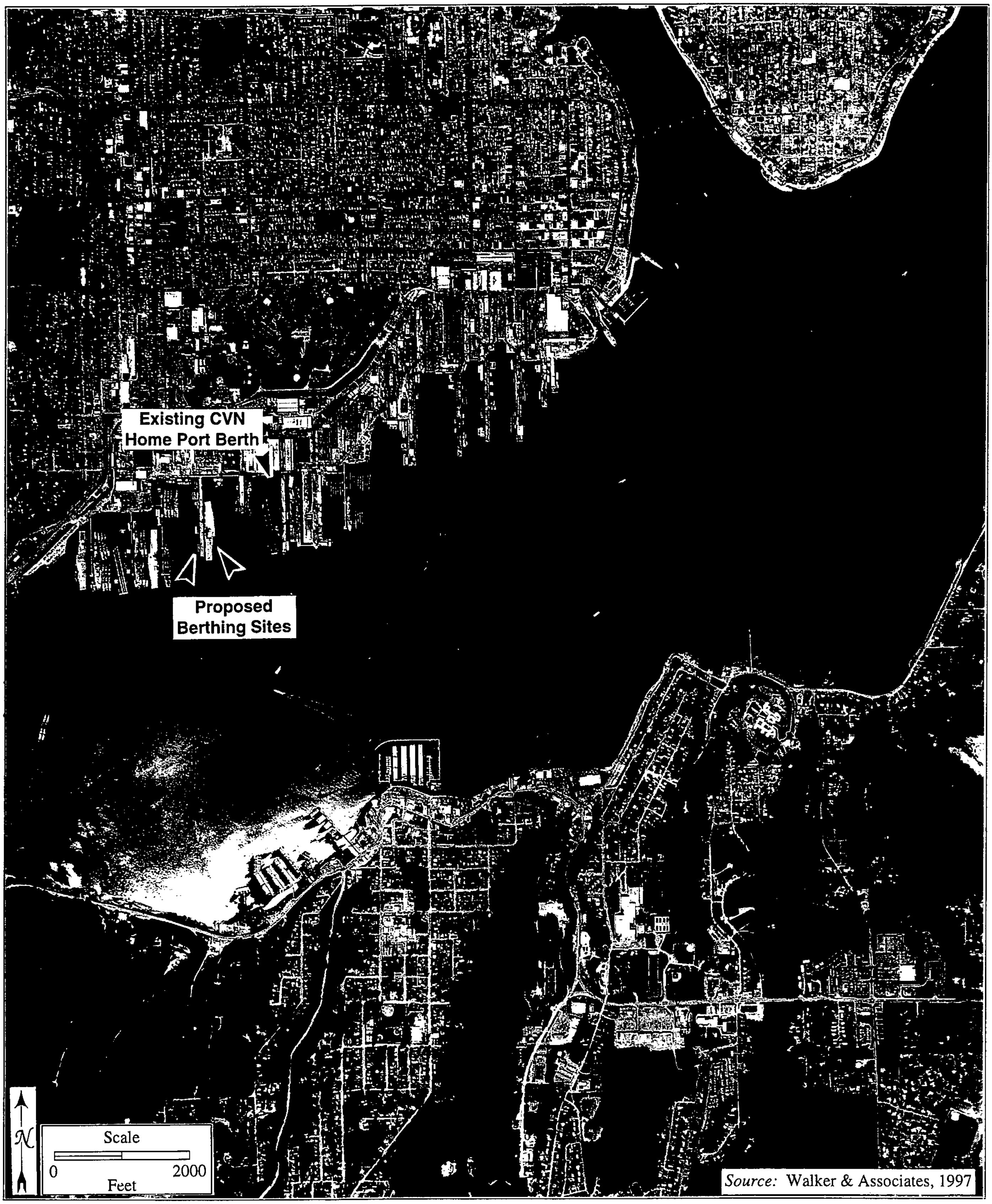


Figure 2-3. Aerial View of PSNS Bremerton

The available area for CVN homeporting encompasses the area between Pier B and Pier D in the Shipyard. Piers west of Pier D are used for inactive ship mooring, and are considered to be essential to the PSNS mission. Piers east of Pier B are within the CIA, and are undesirable for homeporting purposes because of conflicts with the maintenance mission of the PSNS and sailor quality of life. Pier C, between Pier B and Pier D, was the home port location for two CGNs when this EIS was originally developed. Since then one CGN has been decommissioned and the other vessel has been removed from active inventory. The pier is inadequate in length and design to adequately serve as a CVN pier.

This EIS analyzes AOEs (see Figure 2-1) currently homeported at PSNS. The addition of any CVNs at PSNS would require relocation of AOEs because all available berths are now being used. With the additional homeporting of any CVN at PSNS, a minimum of two AOEs would be displaced from PSNS. Two CVNs and two AOEs homeported at PSNS is not entirely satisfactory due to the stress the large numbers of crew members would place on the QOL aspects of the shipyard (see Volume 2, Appendix G, section 2.2.4 for additional discussion). Therefore, the ideal situation with two CVNs homeported at PSNS would be to relocate all four AOEs. NAVSTA Everett is a candidate location for gaining the displaced AOEs. Sufficient room exists at NAVSTA Everett to berth all four AOEs *if* the CVN currently there is relocated, or up to two AOEs if the CVN remains at NAVSTA Everett.

Additional dredging would be required at PSNS CVN berths under all alternatives except the No Action Alternative (see section 2.3.3.2 for additional discussion). All CVN berths at PSNS are currently dredged to meet Naval Sea Systems Command (NAVSEA) requirements under the CVN sea chests, but are not dredged under the entire length of the ship (see NAVFAC dredge criteria in DON 1997d). Based on recent clarification of policy requiring full depth beneath the entire ship, dredging those berths for the complete CVN length is needed. Dredging both sides of Pier D is desired by PSNS for increased flexibility to accommodate current berthing needs. Dredging both sides of Pier D would be required if a second CVN were to be homeported at PSNS.

Both Pier B and Pier D at PSNS are only marginally acceptable as a CVN home port berth due to existing structural design and overall dimensions (DON 1997c). Replacing Pier D would provide greater benefits than expanding and upgrading Pier B based on several important factors. First, Pier D can provide two ship berths as opposed to one berth at Pier B. A CVN berth is not possible on the east side of Pier B due to its proximity to the Drydock #6, currently used for CVN maintenance. Second, with five CVNs in the U.S. Pacific Fleet by the year 2005, PSNS will possibly need to provide major CVN dry-dock maintenance five out of six years (see section 2.3.1.3 for a discussion of CVN maintenance requirements). Pier B would be used most efficiently in conjunction with Drydock #6 as a CVN maintenance complex, rather than as a CVN homeporting berth. Lastly, Pier D is closer to CVN and AOE crew support infrastructure, including the parking garage and bachelor's enlisted quarters (BEQ). Therefore, the Navy is designating Pier D to be the future primary CVN home port berth, while Pier B would become a dedicated CVN maintenance pier. Pier D replacement (in its existing location) is required to correct structural and dimensional deficiencies under all CVN homeporting alternatives except the No Action Alternative (see section 2.3.3.2 for additional discussion). The new Pier D could support one or two CVNs depending upon the alternative chosen.

Ships transiting to or from PSNS to the sea must pass through Rich Passage, a narrow waterway (shown on Figure 1-2) with swift currents during tidal changes. Due to the swift current and limited maneuverability in the narrow passage, CVNs transiting Rich Passage do so only during conditions of slack or nearly slack water (when currents are 1 knot or less). CVN transit is also limited by the depth of the channel. Several points in Rich Passage have a maximum depth of 40 feet MLLW. CVNs transiting the passage do so during high tide to ensure a minimum depth of 50 feet. While physical conditions in Rich Passage restrict CVN transit, a CVN homeported at PSNS would still be able to get underway and respond to emergency situations within 96 hours.

The CVN homeported at PSNS must train together with its battle group in southern California where practice target ranges are located. Due to PSNS's location in the Pacific Northwest, a CVN homeported there requires three days transit to the SOCAL training areas. Typically, the air wing will embark with the carrier four times during a 2-year cycle of training and deployment. Therefore, a PSNS-based CVN would have to steam back and forth between the Pacific Northwest and SOCAL for a total of eight 3-day trips, or 24 transit days over a 2-year period.

All shop facilities needed to support carrier maintenance or repair needs are available at PSNS. Supply requirements would be accommodated with the use of existing warehouse space at PSNS, excess space at the former bottling plant within the expansion area, or leased space elsewhere in Bremerton.

PSNS currently has a civilian workforce of approximately 9,000 persons. Average annual civilian employment has ranged between 8,000 and 12,000 since 1956. The uniformed ship's force population at PSNS has averaged 6,830 since 1980, with a maximum of 12,172 in the fall of 1992 and a minimum of 2,622 in the spring of 1986. The fluctuation in the military population is directly linked to ship maintenance and homeported ship movements. The Navy documented decisions to increase homeporting capacity at PSNS with the *Programmatic Environmental Impact Statement for Fast Combat Support Ship (AOE-6) Homeporting on the West Coast* in 1993 (DON 1992). The AOE-6 PEIS evaluated a land purchase, pier improvements and QOL improvements. A CVN Homeporting Environmental Assessment (DON 1995b) assessed QOL improvements, specifically new playing fields and a parking garage.

2.3.2.3 *NAVSTA Everett*

In 1984, the Navy selected a location along the central waterfront within the City of Everett, Washington, to build a new carrier battle group (CVBG) home port (Figure 2-4). Construction at NAVSTA Everett began in 1987, and Initial Operating Capability (IOC) was completed in mid-1994. NAVSTA Everett is the Navy's newest CVN home port and was designed to home port one CVN, but not to provide ship maintenance and drydocking. NAVSTA Everett currently homeports seven ships: one CVN, two guided-missile destroyers (DDG), two destroyers (DD), and two guided-missile frigates (FFG).

The NAVSTA Everett waterfront location is a very compact, functionally-oriented base. Most available land is dedicated to facilities involved in the support of homeported ships, including supply functions, storage area, maintenance functions and administrative facilities. Basic utilities, roadways and the parking area consume much of the remaining land. Community support facilities include barracks, a galley, child care center, an exchange, a recreation center and recreation fields. Construction of NAVSTA Everett is nearly completed. Additional facilities are planned to complete NAVSTA Everett's support requirements.

Figure 2-4. Aerial View of NAVSTA Everett

approximately 42 feet MLLW, less than the 50 feet MLLW required for CVN homeporting (see section 2.3.1.2 for a discussion of CVN homeporting facility requirements).

Only one CVN home port berth exists at NAVSTA Everett, on the east side of Pier A. The west side of the pier is used to accommodate the smaller DDG, DD, and FFG vessels. Water depth is The existing berthing site at NAVSTA Everett (Pier A) was designed and built to support the needs of a CVN in regards to utilities, vehicle access for ship supplies/materials, and loading and unloading of supplies/material on and off the ship. However, there are no depot level maintenance facilities available at NAVSTA Everett. Maintenance facilities are available at PSNS, which is in close proximity to NAVSTA Everett.

The CVN homeported at NAVSTA Everett must train in SOCAL where practice target ranges are located. Due to NAVSTA Everett's location in the Pacific Northwest, a CVN homeported there requires 3 days transit to the SOCAL training areas. As discussed above for PSNS, a NAVSTA Everett-based CVN would have to steam back and forth between the Pacific Northwest and SOCAL for a total of eight 3-day trips, or 24 transit days over a 2-year period.

The current workforce at NAVSTA Everett is 834 civilian and 5,698 military personnel. The majority of these personnel are located at the waterfront location, with the remainder located at the Family Support Complex (FSC). Of the military population, 4,813 are shipboard-based personnel.

2.3.2.4 *PHNSY, Pearl Harbor, Hawaii*

Home port locations in Hawaii are all within the Pearl Harbor Naval Complex (Figure 2-5). Pearl Harbor has not homeported carriers since World War II. Individual wharves and piers managed by the NAVSTA Pearl Harbor and PHNSY are potential homeporting locations. To home port a CVN, candidate berths (see Figure 2-6) would require dredging, utility upgrading, and modifications.

Berths B2 and B3 are adjacent berths located in the PHNSY within the CIA, with a water depth of approximately 44 feet MLLW. Berths B2 and B3 (B2/3) are used primarily by the shipyard for vessels under repair. On occasion, B2/3 are also used for overflow berthing from NAVSTA Pearl Harbor, but because of distance from the center of NAVSTA Pearl Harbor, it is an undesirable transient berth and not heavily used for that purpose. B2/3 can be used without impairing the use for maintenance at Drydock #1, and can with modifications, including dredging, accommodate a CVN.

Berths B2/3 are where CVN PIA maintenance would be conducted (see section 2.3.1.3 for discussion of CVN maintenance facility requirements). Additional maintenance facilities, including a Controlled Industrial Facility (CIF) used for inspection, modification, and repair of the CVN nuclear propulsion plant (see expanded discussion in Volume 2, Appendix I), and upgrades to pump/valve testing equipment and pure water production are needed to support CVN PIAs and Drydocking Planned Incremental Availability (DPIA). With the additional maintenance facilities, and augmentation of the work force from other qualified shipyards, PHNSY would be able to support the maintenance needs of a CVN and still execute its primary mission of providing maintenance on U.S. Pacific Fleet surface ships and nuclear-powered submarines.

Seven warehouses are available for use in PHNSY. Four smaller warehouses are projected for demolition in the near term, providing several areas for potential use, roughly 0.5 acre each. B2/3 has existing potable water, compressed air and wastewater hookups. Steam and electricity are provided by portable units (steam plants and mobile utility support equipment [MUSE] substations) capable of meeting CVN requirements. Proposed electrical upgrades planned in consultation with Hawaii Electric Company (HECO) within the next 5 years would provide 4,160 volts of power to the berths.

The CVN homeported at PHNSY must train where practice target ranges are located. Due to PHNSY's location in Hawaii, each transit between the location and SOCAL requires approximately 6 days each way. Typically, the air wing will embark with the carrier four times during a 2-year cycle of training and deployment. Therefore, a Hawaiian-based carrier would have to steam back and forth between Hawaii and SOCAL for a total of eight 6-day trips, or 48 transit days over a 2-year period. An additional 24 days is needed to pick up and drop off the air wing before and after overseas deployment. The lack of CVN air wing airfields and tactical air training ranges requiring transit to SOCAL are discussed below.

There are no airfields in Hawaii capable of permanently basing a CVN air wing. With the BRAC-directed conversion of NAS Barbers Point to civilian use, and the associated realignment of P-3 squadrons to Marine Corps Base Hawaii (MCBH) Kaneohe Bay, no space exists for the 70-80 carrier air wing aircraft. The Pacific Missile Range airfield at Barking Sands, Kauai, is also too small, with insufficient space for expansion. The only remaining airfield in Hawaii with required Class B runways is Hickam Air Force Base. The base shares operating surfaces and airspace with Honolulu International Airport, and could accommodate only a portion of the air wing as transients en route to or from a CVN at sea nearby.

In addition to no permanent CVN air wing airfields in the Hawaii area, a lack of tactical air training ranges exists. The capacity for training in Hawaiian waters is limited to the Pacific Missile Range Facility on Kauai, primarily a surface and subsurface range, and one bombing range at Pohakuloa Training Area on the island of Hawaii. Air-to-surface (attack) and air-to-air training capability is limited and insufficient to meet all CVN battle group workup training objectives. While some rudimentary training is possible, absence of the sophisticated tracking and tactically challenging ranges that are accessible from Southern California makes it unsatisfactory to train either the ship-air wing team or the carrier battle group in Hawaii.

The discussion above illustrates that basing a carrier air wing in Hawaii is not operationally efficient or desirable. Considering also the investment required for air base initial set-up and equipment, transfer of required personnel, and operational personnel support, the Navy plans to continue basing Pacific Fleet carrier air wings in the continental United States (CONUS) (DON 1997b). This alternative requires a CVN based in the Hawaii area to transit to SOCAL where it would embark the air wing, join up with other battle group ships, and conduct required training.

The Navy population on Oahu is approximately 18,000 uniformed personnel and is not projected to change substantially over the next 10 years.

The previous section has demonstrated that NASNI, PSNS, NAVSTA Everett, and PHNSY are the only reasonable locations within the Pacific Fleet Area of Responsibility capable of satisfying operational objectives for CVN homeporting. The following section describes in more detail the

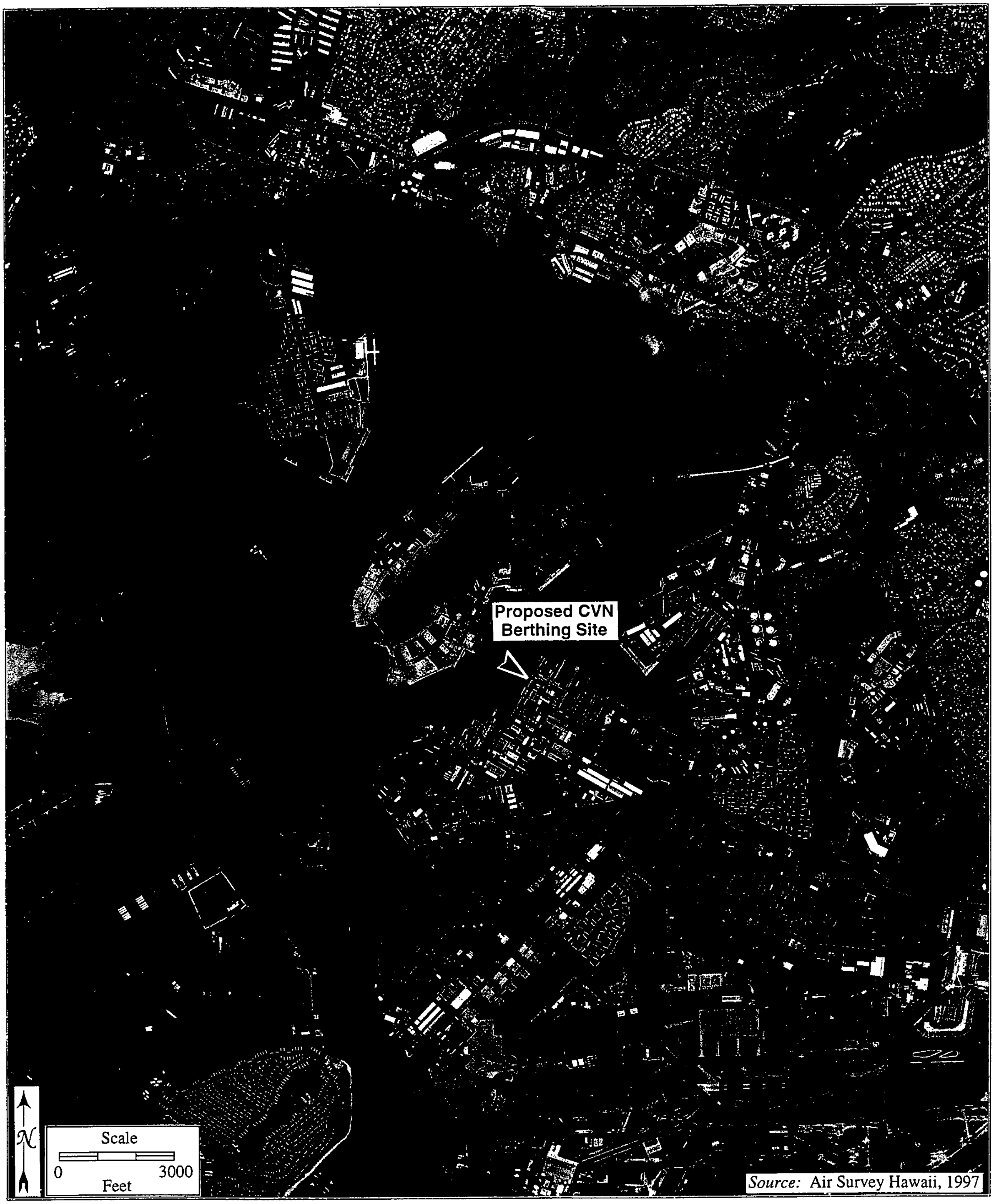


Figure 2-5. Aerial View of Pearl Harbor Naval Complex

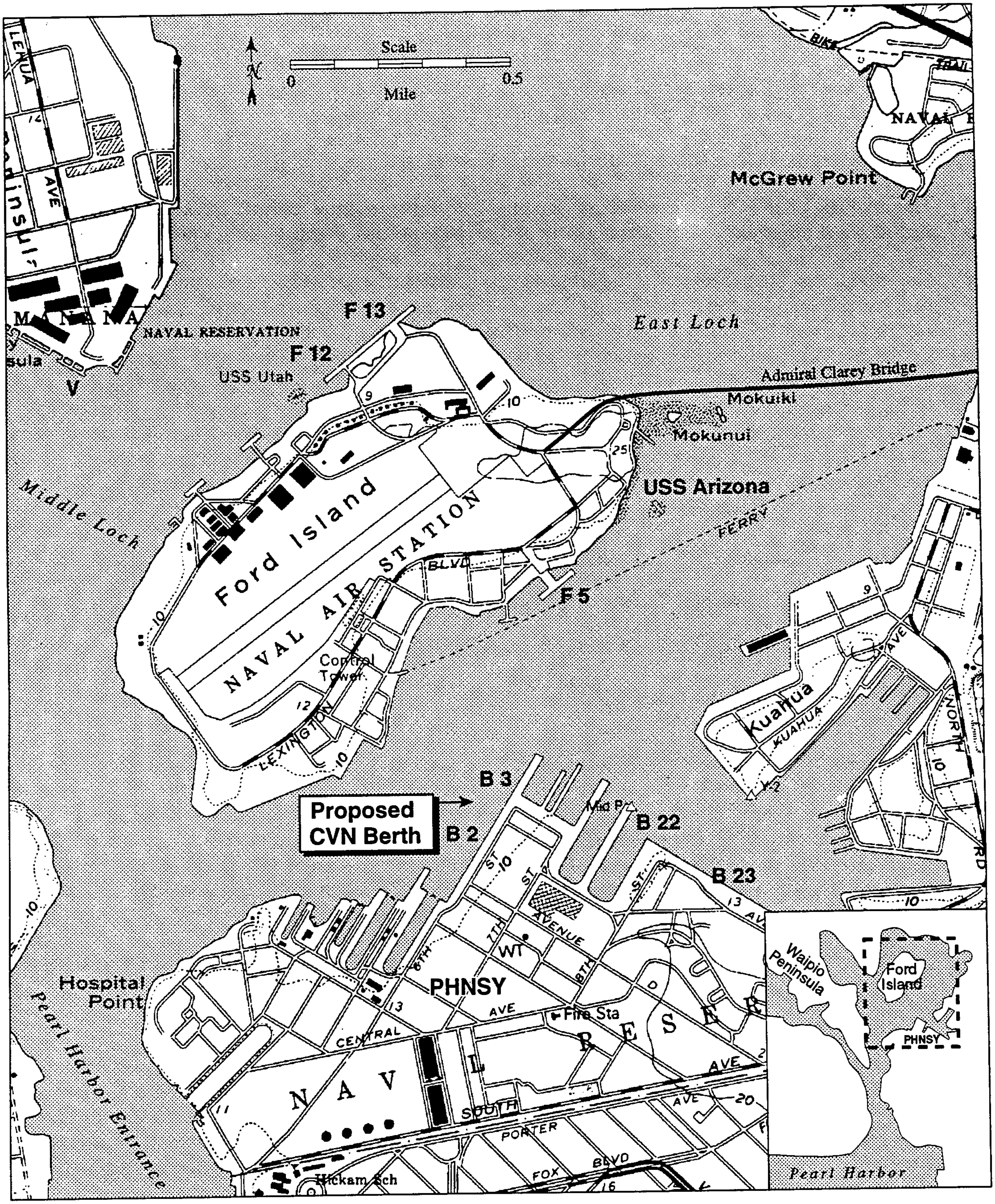


Figure 2-6. Pearl Harbor Naval Complex Alternative CVN Home Port Sites

CVN Home Port Objectives and Requirements, and uses these variables to define the reasonable number of CVNs that could be reasonably placed at any one location.

2.3.3 Home Port Location Facilities and Infrastructure

The analysis of the CVN homeporting facilities and infrastructure at each location that follows includes a summary of the specific construction projects needed to satisfy the CVN Home Port

Objectives and Requirements. Included in the construction projects listed for PSNS are two projects required for the currently homeported CVN that are necessary to bring the location into conformity with Naval Sea Systems Command and Naval Facilities Engineering Command guidelines. Included in the construction projects listing for NAVSTA Everett are those needed to home port the AOEs that would be moved from PSNS if PSNS were chosen to provide capacity to home port more than the one CVN now there. (A more detailed discussion on AOE relocation is presented in the PSNS description in section 2.3.2.2). The homeporting facilities needed to support CVNs and relocated AOEs for each location are discussed beginning with the action requiring the least amount of improvements, through those with the most improvements. Additional detail is also provided in Volume 2, Appendix I.

2.3.3.1 NASNI

Proposed NASNI home port facility improvements are illustrated on Figure 2-7.

Facilities for No Additional CVN: Capacity for Total of One CVN

No new construction or dredging would be required. The transient berth would remain as presently established.

Facilities for One Additional CVN: Capacity for Total of Two CVNs

The existing J/K pier, representing 63,000 square feet of surface area, would be demolished and reconstructed as a wharf to provide required CVN dimensions of 90 feet wide and 1,300 feet long. Demolition and reconstruction is required to maintain the existing transient CVN pier berth to support air wing training and battle group training for CVNs in the U.S. Pacific Fleet Area of Responsibility.

To achieve the required water depth, dredging from 42 feet to 50 feet MLLW would occur with an approximate 3-foot overdepth dredging allowance. The dredged material from the berthing area, estimated at 534,000 cy, would be excavated in two phases to avoid overlap with the least tern nesting season (April 1 - September 15), as feasible. Coordination with USFWS (15 April 99) determined that it would be important to complete the mitigation site as expeditiously as possible, even if construction extends into the nesting season. This would provide replacement habitat for use by terns and other marine organisms as soon as feasible. The preferred disposal strategy would be to transport material by bottom dump barge and dispose it at an in-bay location south of Naval Amphibious Base (NAB), approximately 3.75 miles south of the CVN home port site, to create the NAB Habitat Enhancement Area (see Figure 2-8).

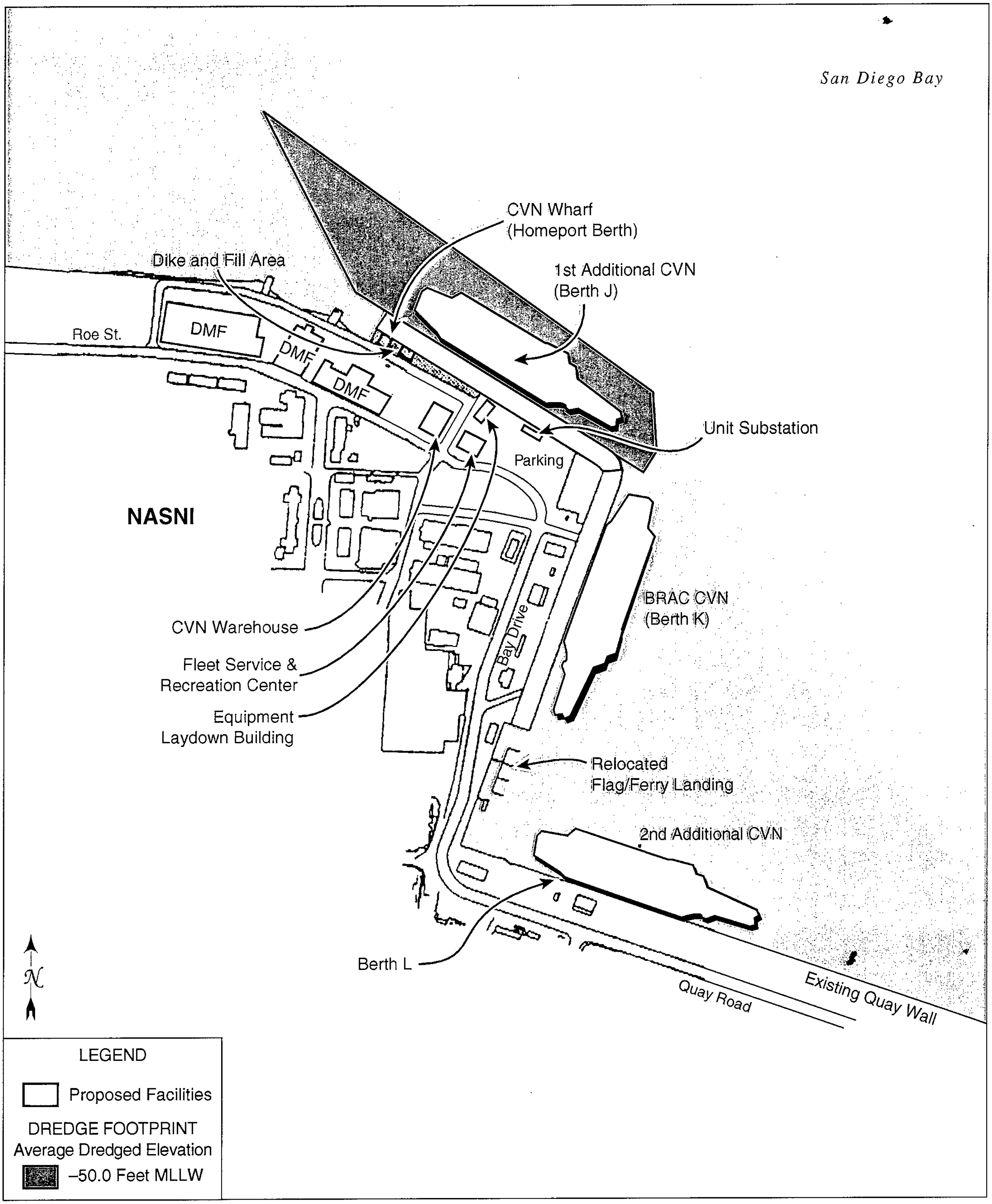


Figure 2-7. NASNI Improvements

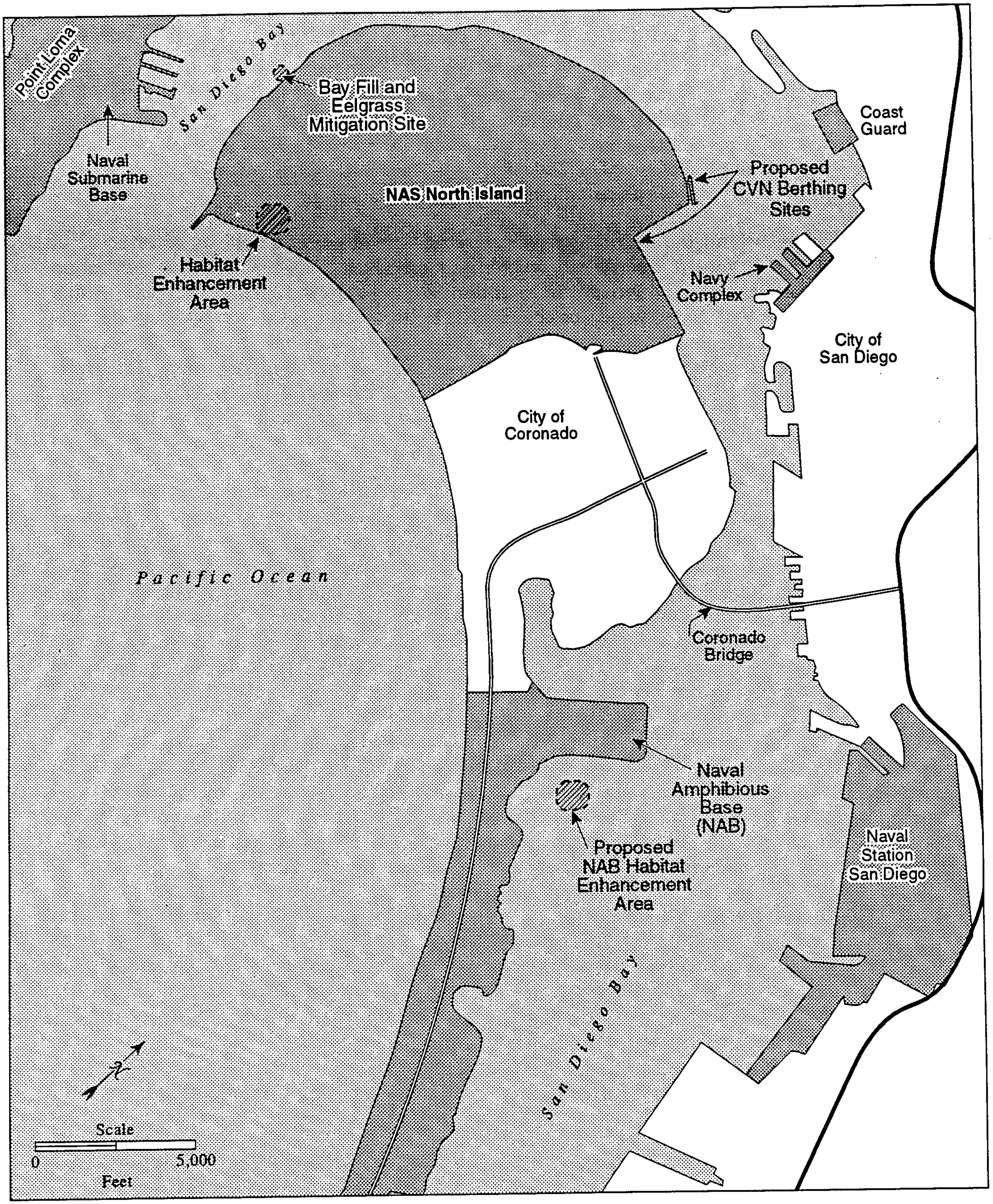


Figure 2-8. NASNI Proposed NAB Habitat Enhancement Area

If insufficient time were available to complete dredging and disposal of the 220,000 cy at the NAB Enhancement Area before the beginning of the least tern nesting season, the excavated material would be temporarily placed adjacent to the underwater dike footing area, but outside the bay shipping channel, until the beginning of the next phase of dredging (see below). Final disposal would be in accordance with permit conditions.

The dike structure behind the wharf, approximately 1.5 acres in size, would be constructed of approximately 150,000 tons of quarry run and armor stone during the first phase of excavation activity. This material would be brought in by bottom dump barge, and then put in place with a clamshell dredge. A foundation would be constructed by excavating below the dike and filling it with the quarry rock material, which would provide a structural attachment to the existing bearing material on the bay bottom. The rock containment dike placement would account for design and operational conditions, including fill loads and seismic activity. The fill material would ultimately be covered with a concrete cap to provide a transitional paved area to the other CVN berth facilities.

Filling in the 1.5-acre dike area and dredging for the CVN berthing area described above would require construction of a mitigation site to address the loss of water habitat (U.S. waters replacement). The mitigation site would be constructed adjacent to Pier B on NASNI, approximately 2 miles southwest of the CVN home port location, and contiguous with the BRAC CVN mitigation site (see Figure 2-2). The 1.5 acre loss would be mitigated at the site by creating new habitat based on one of two options: intertidal or intertidal/subtidal. These options were coordinated with US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and Corps of Engineers (COE) (15 April 1999). The final design would be determined by the agencies during permitting. The intertidal option would extend from +4 to +1 feet MLLW, and the intertidal/subtidal option would extend from +2 to -4 feet MLLW. In addition to the replacement of the 1.5 acres that would be lost from fill at the wharf site, the mitigation site design would also include mitigation acreage (the maximum would be 0.9 acres associated with the intertidal/subtidal option) from construction of the mitigation site. Any impacts to eelgrass would be mitigated by applying the loss against the credit (9 acres) currently existing in the Navy's North and North-Central Eelgrass Mitigation Bank. Eelgrass would be mitigated in accordance with the Southern California Eelgrass Mitigation Program policy.

Excavation for the mitigation site would occur during the first phase of dredging and use exclusively land-based equipment including a dragline, a backhoe, and off-road vehicles. Approximately 48,000 cubic yards (cy) of sediment would be excavated in constructing the mitigation site, and would be in accordance with permit specifications and agency requirements. Approximately 29,000 cy of excavated material from the mitigation site may be used to fill in approximately 1.5 acres behind the existing Pier J/K area. This sediment would be trucked to the Pier J/K area on NASNI roads. The remaining excavated material from the mitigation site (approximately 19,000 cy) would be stockpiled at NASNI for future habitat enhancement or construction purposes.

The second phase of dredging in the wharf area would begin after the least tern nesting season. The remaining sediment would be dredged at Pier J/K using a hydraulic cutterhead dredge. A site-specific explosive safety management plan will be required by the dredging contract developed in accordance with DOD Directive 6055.9, "DOD Ammunition and Explosive Safety Standards," to minimize the risks if ordnance is discovered. A 12-inch debris grate will be required (as in the previous home port project) to increase the ability to exclude large debris, including possible ordnance, and specialized unexploded ordnance (UXO) inspection will also be required as part of the Contractor Quality Control (CQC) Program during dredge operations. A Navy ordnance handling specialist would monitor all hydraulic dredging activity. This sediment, along with any sediment that had been stockpiled during the first phase of dredging, would be pumped to the NAB Enhancement Area by hydraulic dredge. The material would be transferred through a pipeline placed on the bay floor from Pier J/K to NAB. At that point, the pipeline would briefly continue onshore, where a booster pump would be connected. The pipeline would then continue offshore to the NAB Habitat Enhancement Area disposal site. If the NAB disposal area were not available, the sediment would be barged to the LA-5 designated ocean disposal site.

The concrete wharf would be supported by concrete and steel piles, reinforced concrete pile cap beams, and the deck slab. The wharf would provide steam, condensate return, low-pressure compressed air, potable water, pure water, salt water, sanitary sewer, oily waste, jet (JP-5) fuel and marine diesel fuel. Electrical utilities would include a new 4,160-V substation. Steam piping on the wharf would run along the wharf edge. Condensate return piping would run on pipe hangers along the underside of the wharf.

Additional improvements would include relocating the existing ferry/flag landing that accommodates NASNI personnel transportation across San Diego Bay. The landing would conceptually be relocated from 150 feet west of Pier J/K to within the footprint of an existing small boat pier facility directly south of Berth K (see Figure 2-7). A CVN warehouse, a fleet support building, equipment laydown building, and lighting are included. Improvements to the security fence would also be needed.

Facilities for Two Additional CVNs: Capacity for Three Total CVNs

Minimal construction would be required to accommodate a second additional CVN. No additional dredging would be required. The second additional CVN would be berthed along the quay wall (Berth L/M) in the location that is currently used as a transient CVN berth. Some additional utility and fencing upgrades would be required. The probability of all three homeported CVNs and a transient CVN simultaneously in port at NASNI would be extremely low, given the CVN operational schedule and maintenance requirements (including 10-11 month DPIAs at PSNS). Therefore, any one of the three berths (Berth K, Berth J, or Berth L) vacant at that time could support the transient CVN needs.

2.3.3.2 *PSNS*

Proposed PSNS home port site improvements are illustrated on Figure 2-9.

Facilities for No Additional CVN: No Change – Capacity for Total of One CVN

Although no change in the existing number of CVNs and AOEs would occur, the two construction projects necessary to bring PSNS into conformity with Naval Sea Systems Command and Naval Facilities Engineering Command guidelines would be implemented. Dredging and disposal of approximately 425,000 cubic yards of sediment are proposed. Dredging both sides of Pier D is desired by PSNS for increased flexibility to accommodate current berthing needs. Dredging both sides of Pier D would also be required if a second CVN were to be homeported at PSNS. The Pier D East berth would be dredged from the existing average depth of 45 feet to 49 feet MLLW, and the Pier D West berth would be dredged from the existing average depth of 43 feet to 49 feet MLLW. Two other berths would also be dredged: Pier B would be dredged from the existing average depth of 40 feet to 46.1 feet MLLW, and Pier 3 from the existing average depth of 44 feet to 46.1 feet MLLW. The sediments would be removed by either a hydraulic dredge, a clamshell dredge, or a combination of the two. Dredged material determined to be suitable for disposal (estimated at 308,000 cubic yards) at a designated Puget Sound Dredge Disposal Analysis (PSDDA) disposal site would be disposed of at the Elliott Bay PSDDA site near Seattle. Unsuitable dredged materials (estimated at 117,000 cubic yards) would be disposed of at an appropriately permitted upland landfill or in one or more of three potential Confined Disposal Facilities/Confined Aquatic Disposal (CDF/CAD) sites at PSNS (see Figure 2-10 for potential CDF/CAD locations).

These CDFs would create new land area (fastland) that would be contiguous with existing Shipyard ground surfaces. Figure 2-10 shows two sites being considered for CDF construction at PSNS. In addition, the Navy is considering disposal of unsuitable dredged material in a CAD facility that would be constructed in a marine area near the southwest boundary of PSNS (Figure 2-10). This CAD facility would differ from the CDFs by being submerged (aquatic) at its surface and thus would not create any new land. All of the unsuitable dredged material generated by this project could be accommodated in some combination of these sites. Any excess unsuitable dredged materials can be accommodated by rail or truck transport to a permitted upland landfill. In the event that the CDF/CAD proposals are not implemented, sufficient capacity exists at regional upland landfills for the entire volume of unsuitable dredged materials. Sediments would be placed in the CDFs most likely by clamshell dredge, because this dredge retains dredged sediment at nearly the same water content and volume as when the sediment was excavated. Additionally, excessive expansion in volume of dredged sediments during hydraulic dredging that substantially reduces the capacity of a CDF is avoided.

The CDFs at sites 1 and 2 would be built with sheet pile walls. The layer of unsuitable dredged material would be covered with a layer of appropriate thickness of dredged material that is suitable for unconfined aquatic disposal, or other material suitable for this purpose. The top elevation of the CDF would be the same as that of the adjacent land. The approximate area of the CDFs would be 2.3 acres at Site 1 and 1.5 acres at Site 2.

The walls of the CAD facility would be of earthen material, possibly armored with riprap or similar material. Unsuitable dredged material would be covered with a layer of suitable dredged material thick enough to effectively isolate the underlying unsuitable dredged material from the aquatic environment. This clean cap material could be placed by hydraulic dredge and pumping. The elevation of the surface of the site would range from 0 foot MLLW to 10 feet MLLW, in order to maintain an anaerobic environment for this material. The footprint of this CAD facility would be approximately 10 acres, while its top surface would be about 6 acres. The habitat value of the site would be enhanced by replacing the existing deep-water habitat with more productive shallow-water habitat, and by the hard bottom habitat provided by the riprap. The enhanced value of the CAD site would also compensate for the deep-water habitat lost at the two CDF sites.

Final dredging design, including determination of the volumes of dredged material that are suitable for open-water disposal, will be based on the results of an ongoing comprehensive sediment characterization at PSNS (see section 4.4.1). Of course, disposal of all dredged material would be accomplished in accordance with all applicable regulations and guidelines, and with the

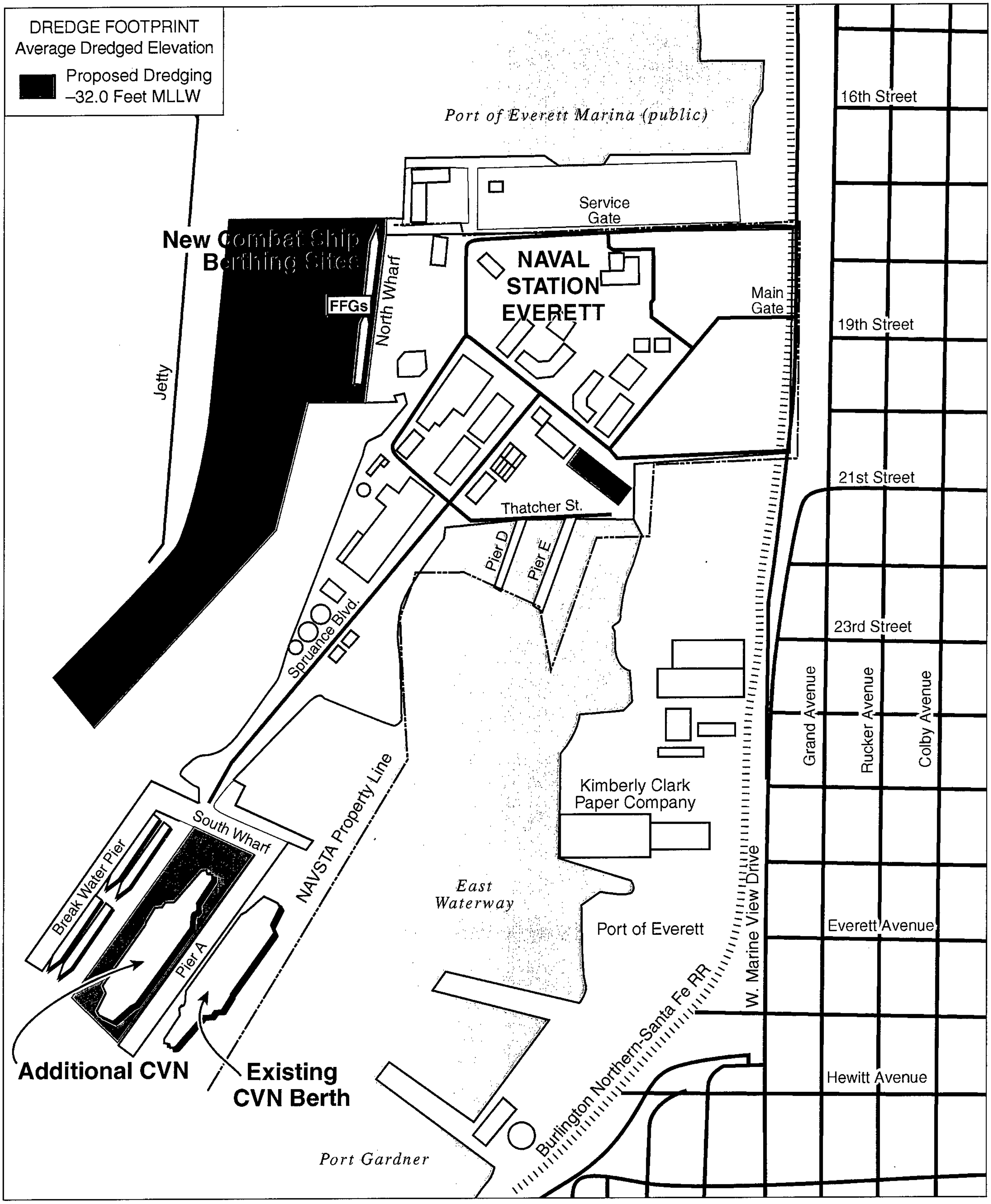


Figure 2-9. NAVSTA Everett Improvements

procedures described in this section and section 4.3.2. Should the ongoing sediment characterization result in a change in the volumes of dredged material that would be suitable and unsuitable for open-water disposal, all material, suitable and unsuitable, would still be disposed of in accordance with all applicable regulations and guidelines, and with the procedures described in sections 2.3.3.2 and 4.3.2. As a result, environmental impacts would not differ substantively from those described in this Final EIS.

The existing Pier D would be demolished and rebuilt with a new 1,310-foot long, 150-foot wide structure. The pier would be supported with pile-driven, pre-cast concrete panels with either concrete pavement on aggregate base or a concrete overlay. The deck would be supported on cast-in-place concrete pile caps.

A variety of utilities associated with the pier would be upgraded. One 4,160-V substation would be placed at the head of the pier to support only one total CVN on either side of the pier. Two 480 VAC substations would be located in vaults beneath both sides of the deck. Both sides of the pier would provide connections for steam, condensate return, low-pressure compressed air, potable water, pure water, salt water, sanitary sewer, oily waste, jet (JP-5) fuel and marine diesel fuel. In addition to providing support for the CVN on one side of the pier, the utility connections on the other side of the pier would provide infrastructure for AOEs currently homeported at PSNS.

Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs

As stated above for the facilities and infrastructure associated with No Additional CVN, dredging and disposal of approximately 425,000 cubic yards of sediment would be required. Two CVN berths on either side of Pier D would be dredged. The Pier D East berth would be dredged from 45 feet to 49 feet MLLW, and the Pier D West berth would be dredged from 43 feet to 49 feet MLLW. Two other CVN berths would also be dredged: Pier B would be dredged from 40 feet to 46.1 feet MLLW, and Pier 3 from 44 feet to 46.1 feet MLLW. The sediments would be removed by either a hydraulic dredge, a clamshell dredge, or a combination of the two. Dredged material determined to be suitable for disposal (estimated at 308,000 cubic yards) at a designated PSDDA disposal site would be disposed of at the Elliott Bay PSDDA site near Seattle. Unsuitable dredged materials (estimated at 117,000 cy) would be disposed of at an appropriately permitted upland landfill, in one or more of the three potential CDF/CAD sites at PSNS, as discussed previously (see Figure 2-10 for potential CDF and CAD site locations).

The existing Pier D would be demolished and rebuilt with a new 1,310-foot-long, 150-foot-wide structure. The pier would be supported with pile-driven, pre-cast concrete panels with either concrete pavement on an aggregate base or a concrete overlay. The deck would be supported on cast-in-place concrete pile caps. A variety of utilities associated with the pier would be upgraded. Two 4,160-V substations would be placed at the head of the pier to support a total of two CVNs on each side of the pier. Two 480-VAC substations would be located in vaults underneath both sides of the deck, and additional sewage-holding capacity would be needed for the second CVN. The pier would provide steam, condensate return, low-pressure compressed air, potable water, pure water, salt water, sanitary sewer, oily waste, jet (JP-5) fuel and marine diesel fuel.

Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs

As stated above for the facilities and infrastructure associated with No Additional CVN, dredging and disposal of approximately 425,000 cubic yards of sediment would be required. Two CVN berths on either side of Pier D would be dredged. The Pier D East berth would be dredged from 45 feet to 49 feet MLLW, and the Pier D West berth would be dredged from 43 feet to 49 feet. Two other CVN berths would also be dredged: Pier B would be dredged from 40 feet to 46.1 feet, and Pier 3 from 44 feet to 46.1 feet. The sediments would be removed by either a hydraulic dredge, a clamshell dredge, or a combination of the two. Dredged material determined to be suitable for disposal (estimated at 308,000 cy) at a designated PSDDA disposal site would be disposed of at the Elliott Bay PSDDA site near Seattle. Unsuitable dredged materials (estimated at 117,000 cy) would be disposed of at an appropriately permitted upland landfill or in one or more of the three potential CDF/CAD sites at PSNS, as discussed above (see Figure 2-9 for potential CDF and CAD site locations).

The existing Pier D would be demolished and rebuilt with a new 1,310-foot long, 150-foot wide structure. The pier would be supported with pile-driven, pre-cast concrete panels with either concrete pavement on aggregate base or a concrete overlay. The deck would be supported on cast-in-place concrete pile caps.

A variety of utilities associated with the pier would be upgraded. Two 4,160-V substations would be placed at the head of the pier to support a total of two CVNs, one on each side of the pier. Two 480-VAC substations would be located in vaults underneath both sides of the deck, and additional sewage-holding capacity would be needed for the second CVN. The pier would provide steam, condensate return, low-pressure compressed air, potable water, pure water, salt water, sanitary sewer, oily waste, jet (JP-5) fuel and marine diesel fuel. In addition to providing support for the CVN on one side of the pier, the utility connections on the other side of the pier would provide infrastructure for AOEs currently homeported at PSNS.

2.3.3.3 *NAVSTA Everett*

Proposed NAVSTA Everett home port site improvements are illustrated on Figure 2-10.

Facilities for No Additional CVN: No Change – Capacity for Total of One CVN

No new construction or dredging would be required. As NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN, the PIA maintenance tasks would be performed at PSNS.

Facilities for Removal of Existing CVN: Capacity for No CVNs

No new construction or dredging would be required.

Facilities for Relocation of Existing CVN and Addition of Four AOEs: Capacity for No CVNs

Moving the four AOEs from PSNS to the NAVSTA Everett Pier A would require relocation of two FFGs to the North Wharf (see Figure 2-10). Approximately 50,000 cy of dredging would be required to accommodate the FFGs at the North Wharf. Dredging would lower the water depth at North Wharf from between 26 and 28 feet MLLW to 32 feet MLLW. The sediments would be removed by either a hydraulic dredge, a clamshell dredge, or a combination of the two. Currently available data indicate that the dredged material would be suitable for disposal at the designated Port Gardner PSDDA open-water disposal site, 2.2 miles west of NAVSTA Everett. The materials would be transported by barge to the disposal site. A mooring dolphin, a bundle of approximately 15 piles mechanically driven into the ocean bottom and used for tying up the bow of the AOE

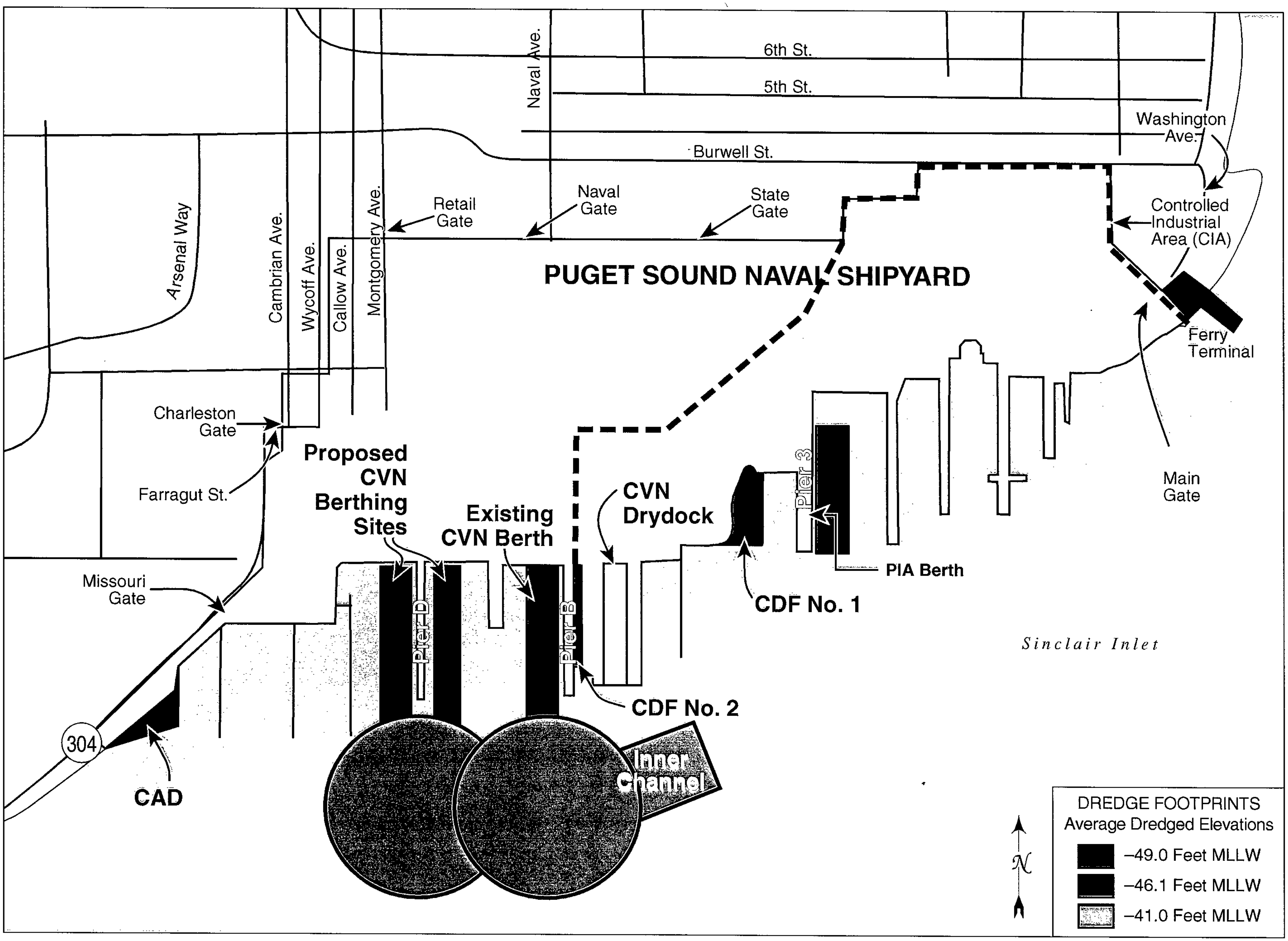


Figure 2-10. PSNS Bremerton Improvements

projecting out from the west side of Pier A, would be installed approximately 200 feet southwest of the pier's end in approximately 80 feet of water. As no utility infrastructure currently exists at the North Wharf, utility connections (including electricity, water, wastewater disposal, oily wastewater, stormwater disposal, and compressed air) would be developed to accommodate FFGs at the North Wharf.

Facilities for No Additional CVN and Addition of Two AOEs: No Change – Capacity for Total of One CVN

Movement of two AOEs from PSNS to the west side of Pier A would require relocation of FFGs to the North Wharf. Approximately 50,000 cy of dredging would be required to accommodate the FFGs at the North Wharf (see Figure 2-11). Dredging would lower the water depth at North Wharf from 25 feet to 28 feet MLLW to 32 feet MLLW. The sediments would be removed by either a hydraulic dredge, a clamshell dredge, or a combination of the two. Currently available data indicate that the dredged material would be suitable for disposal at the designated Port Gardner PSDDA open-water disposal site, 2.2 miles west of NAVSTA Everett. The materials would be transported by barge to the disposal site. A mooring dolphin, a bundle of approximately 15 piles mechanically driven into the ocean bottom and used for tying up the bow of the AOE projecting out from the west side of Pier A, would be installed approximately 200 feet southwest of the pier's end in approximately 80 feet of water. As no utility infrastructure currently exists at the North Wharf, a hazardous waste facility, utility connections (including electricity, water, wastewater disposal, oily wastewater, stormwater disposal, and compressed air) would be developed to accommodate FFGs at the North Wharf. As NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN, the PIA maintenance tasks would be performed at PSNS.

Facilities for One Additional CVN: Capacity for Total of Two CVNs

Approximately 105,000 cubic yards would be dredged on the west side of Pier A to accommodate the additional CVN. To achieve the required water depth, dredging from 45 feet MLLW to 50 feet MLLW would occur with up to a 2-foot overdepth dredging allowance. Excavation would be done by either a hydraulic dredge, a clamshell dredge, or a combination of the two. Use of the west side of Pier A would require relocation of FFGs to the North Wharf. Approximately 50,000 cy of dredging would be required to accommodate the FFGs at the North Wharf. Currently available data indicate that the 155,000 cy of sediments would be suitable for disposal at the designated Port Gardner PSDDA open-water disposal site, 2.2 miles west of the site. The action would require a multi-story parking structure, electrical upgrades, and improvements to the oily water separator system for treating ship bilgewater. As no utility infrastructure currently exists at the North Wharf, utility connections (including electricity, water, wastewater disposal, oily wastewater, stormwater disposal, and compressed air) would be developed to accommodate FFGs at the North Wharf. As NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN, the PIA maintenance tasks would be performed at PSNS.

2.3.3.4 *PHNSY*

Proposed PHNSY home port facility improvements are illustrated on Figures 2-12 and 2-13.

Facilities for No CVN: No Change

No dredging or facility improvements would be required.

Facilities for One CVN: Capacity for Total Of One CVN

Dredging and disposal of 3,000,000 cubic yards of sediment would be needed (see Figure 2-12). To achieve the required water depth, dredging from existing depths (approximately 43 feet to 49 feet MLLW) to 50 feet MLLW would occur with up to a 2-foot overdepth dredging allowance. Excavation would be done by either a hydraulic dredge, a clamshell dredge, or a combination of the two.

Currently available data indicate that most or all of the dredged material would be suitable for disposal at the designated South Ocean Dredge Material Disposal Site, 3.25 nautical miles south of Honolulu. The materials would be transported by barge to the disposal site. Alternative disposal methods are being evaluated for dredge material found to be unsuitable for ocean disposal.

Modifications to the Shipyard would be needed to provide the required CVN maintenance facilities (see Figure 2-13). A CIF of up to 48,000 square feet, similar to facilities existing at PSNS and NASNI, would be constructed with both radiological and non-radiological areas. The radiological controlled area would be up to 34,900 square feet and would be used for industrial work requiring radiological control. It would house both high and low bays. The high bay would be serviced by a high capacity (approximately 60 ton) bridge crane and the low bay would be serviced by a smaller capacity (approximately 25 ton) crane. Personnel entry and exit to the radiological work area would be controlled through a single point located in the adjacent non-radiologically controlled area. The non-radiologically controlled area would be up to 13,100 square feet covering two stories and would house an administrative support area.

Upgrades would be made to Pump/Valve Testing equipment and Pure Water Production to handle the size and volumes associated with CVN component repairs. Additionally, steam, sewer, electrical, and sea water pumping systems would need to be improved. A Fleet Shoreside Facility, a new recreation and support facility for single sailors, including an amusement center, laundromat, vending area, and recreation pavilion, a parking structure, and an equipment laydown area, would be built. A child development center would also be constructed. Electrical upgrades, including provision of a 4160-V substation, would be needed.

2.4 HOME PORT ALTERNATIVES CONSIDERED

The following section shows how individual combinations of CVNs have been combined at each location to create a reasonable range of five home port capacity alternatives as presented in Table 2-1 (Table 2-1 is also presented as a fold-out at the end of this volume). Also identified in Table 2-1 are the reasonable locations for and numbers of AOEs that would be displaced from PSNS as a result of different alternatives. Although other configurations of CVNs at the four home port locations are possible, the five selected present a reasonable range for analysis. A comparison of the six alternatives, including a No-Action alternative, follows. This EIS compares the anticipated environmental effects of implementing each of these alternatives.

A "no action" alternative (Alternative Six) reflects no creation of additional capacity for the two replacement CVNs, an action that is unsatisfactory to both operational readiness and sailor quality of life (see Section 2.4.6 for additional information). The No-Action alternative conforms to NEPA

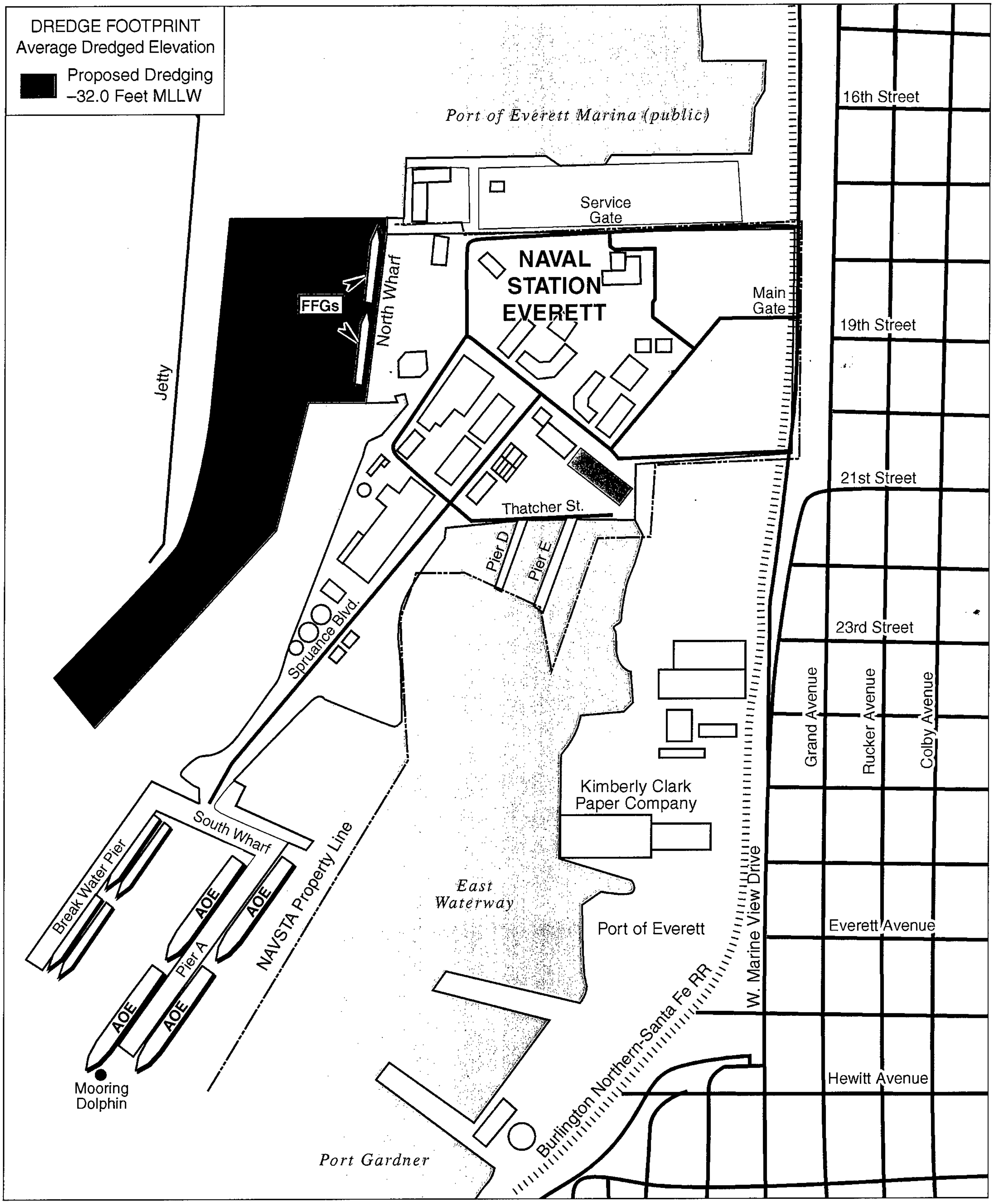


Figure 2-11. NAVSTA Everett Improvements for Addition of Four AOEs

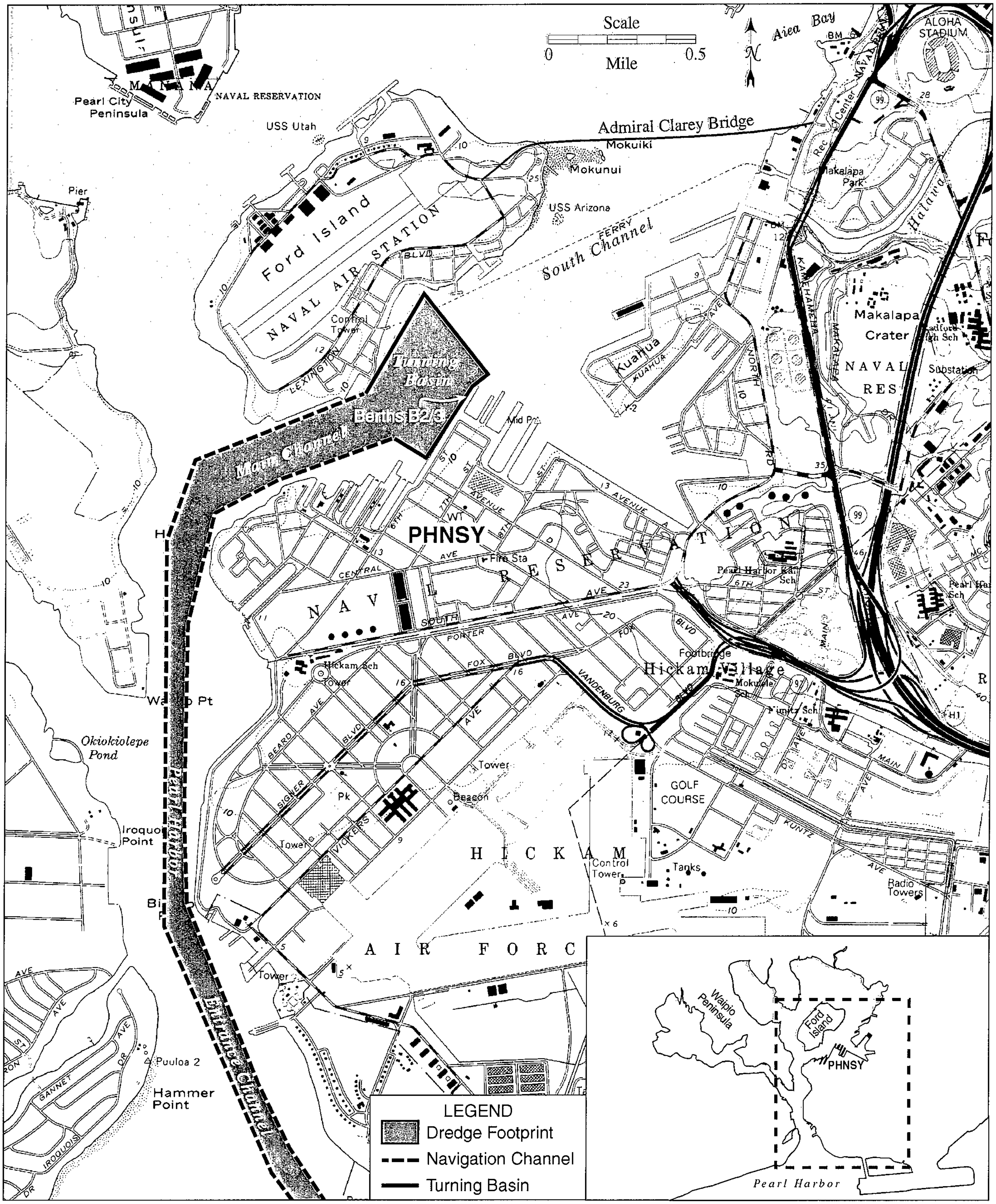


Figure 2-12. PHNSY Dredging Improvements

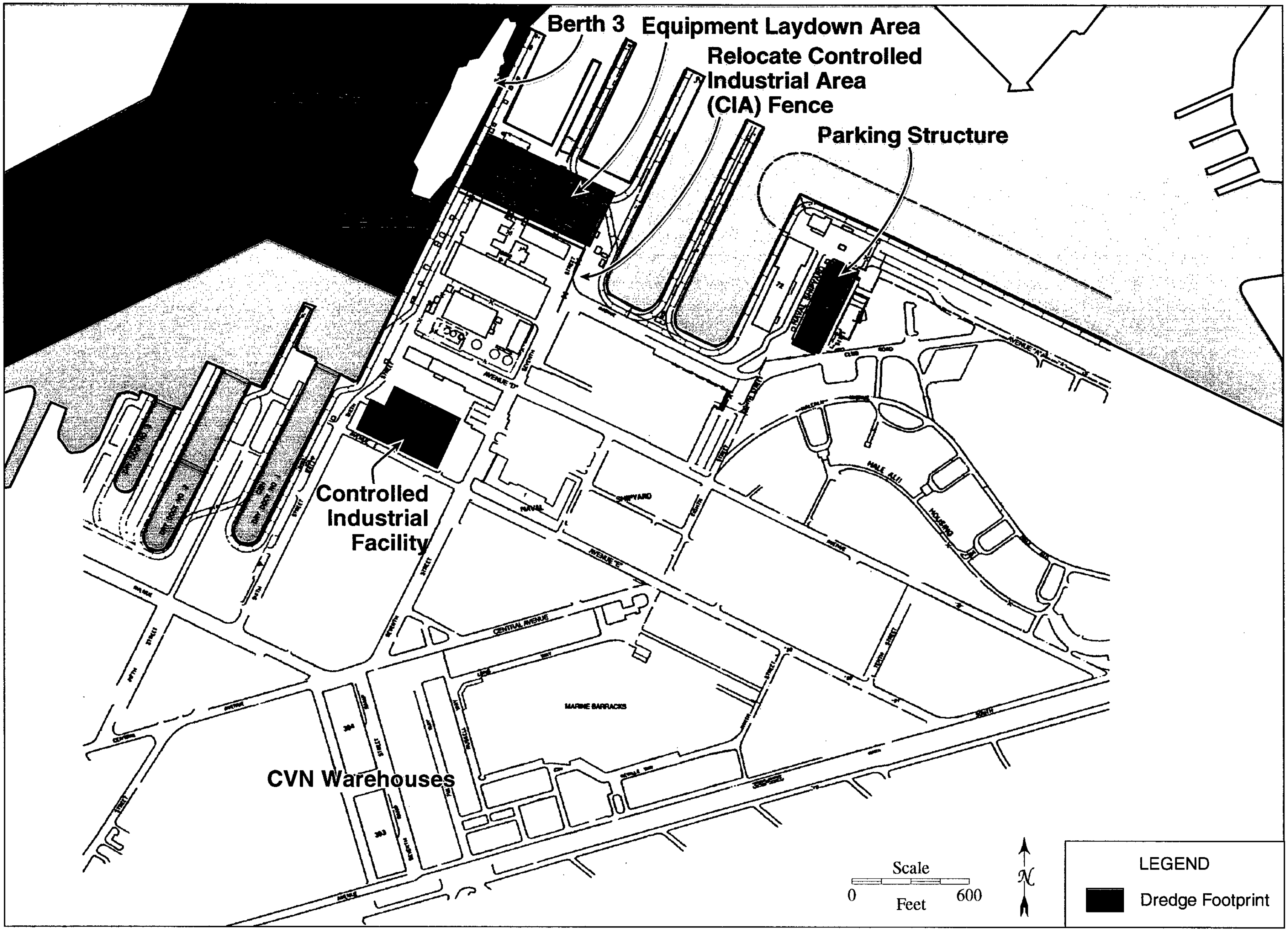


Figure 2-13. PHNSY Improvements

Table 2-1. Home Port Capacity Alternatives for CVNs and AOEs Within the U.S. Pacific Fleet

	ALTERNATIVES (NOS. OF SHIPS)					
Home Port Locations	*One*	*Two*	*Three*	*Four*	*Five*	*Six (No Action Alternative)*
NASNI	3	3	3	2	1	2
PSNS	2	1 (4)	1 (4)	1 (4)	2 (2)	2 (4)
NAVSTA Everett	0 (4)	1	0	2	1 (2)	1
PHNSY	0	0	1	0	1	0

Notes: NASNI and PSNS each have one CVN currently assigned that are not addressed by this EIS analysis.
(2) - Location of Two AOEs.
(4)- Location of Four AOEs.

requirements (40 CFR 1502.14[d]), which prescribe inclusion of a no action alternative even in those cases where no action is more correctly defined as "no change." In this case, Alternative Six is as close to "no change" as can reasonably be achieved. In the cost analysis (See Appendix L, Volume 2) Alternative Six is compared to the situation as it exists today: 2 CV capacity at NASNI, 4 AOEs at PSNS, and 1 CVN capacity at Everett, and then is used as a baseline to which all other alternatives are compared.

The No Action Alternative is required to be analyzed along with others shown in Table 2-1. The No Action Alternative is not acceptable for several reasons. First, a berth at NASNI must be available to act as a transient berth. All U.S. Pacific Fleet CVNs load and off-load their air wings at NASNI. No other West Coast CVN home port has the capability to off-load non-flyable aircraft from the CVN without extreme measures. Additionally, with the preponderance of training performed in the SOCAL operations areas, transient CVNs are in and out of NASNI on a routine basis. Consequently, use of the transient berth as a home port berth with only two CVN berths available would place unacceptable operational constraints on the Fleet Commander. Second, PSNS piers and turning basins, as currently configured, do not meet the requirements for water depth for homeporting CVNs.

Water depth requirements are designed to limit fouling of ship's condensers and associated costly repairs. The piers designated as home port piers (B and D) presently impose severe limitations on the daily functions of a CVN, both operational and maintenance (lack of sufficient strength, laydown area, and width). Third, homeporting of a second CVN at PSNS and retention of the AOEs would cause PSNS to not be able to provide adequate support for CVN crew. PSNS would be over capacity in the areas of parking, housing, pier space, utilities, general services, and general land use.

The facility and infrastructure improvements to provide the capacity to home port CVNs associated with each alternative are summarized below. Table 2-2 represents the specific level of facility development at each home port location for each alternative. Section 2.3.3 and Appendix I provide facility improvement details at each home port location (see also Figures 2-7 through 2-11). The costs associated with each of the six CVN homeporting alternatives are presented in Appendix L, Life Cycles Cost Analysis. Costs associated with each of the six alternatives compared to taking no action are also presented as the best information available at the end of each alternative discussion. These are based on the current cost for CVNs, AOEs and CVs within the EIS scope (Table 2-3), and baseline costs (Table 2-4).

Table 2-2. Construction Projects Needed to Support CVN Homeporting Capacity Alternatives (page 1 of 2)

	Alternative One	
NASNI	Two Additional CVNs Total Three CVNs	Construct CVN berthing wharf and miscellaneous structures Modifications to Berth L
PSNS	One Additional CVN Total Two CVNs	Pierside and turning basin dredging Pier D replacement Utility upgrades to both sides of Pier D
NAVSTA Everett	No CVNs Addition of Four AOEs	Mooring dolphin for AOEs Electrical upgrade for AOEs North Wharf: Dredging, Utilities, Structural repairs
PHNSY	No CVNs	No projects
	Alternative Two	
NASNI	Two Additional CVNs Total Three CVNs	Construct CVN berthing wharf and miscellaneous structures Modifications to Berth L
PSNS	No Additional CVN Total One CVN	Pierside and turning basin dredging Pier D replacement Electrical upgrades to one side of Pier D
NAVSTA Everett	No Additional CVN Total One CVN	No projects
PHNSY	No CVNs	No projects
	Alternative Three	
NASNI	Two Additional CVNs Total Three CVNs	Construct CVN berthing wharf and miscellaneous structures Modifications to Berth L
PSNS	No Additional CVN Total One CVN	Pierside and turning basin dredging Pier D replacement Electrical upgrades to one side of Pier D
NAVSTA Everett	Remove Existing CVN No CVN	No projects
PHNSY	One CVN Total One CVN	Dredging and turning basins Controlled industrial facility (CIF); Pump/valve testing facility Pure water production facility Utility and structural upgrade Parking garage Drydock #4 upgrade Personnel support facilities

Table 2-2. Construction Projects Needed to Support CVN Homeporting Capacity Alternatives (page 2 of 2)

Alternative Four		
NASNI	One Additional CVN Total Two CVNs	Construct CVN berthing wharf and miscellaneous structures
PSNS	No Additional CVN Total One CVN	Pierside and turning basin dredging Pier D replacement Electrical upgrades to one side of Pier D
NAVSTA Everett	One Additional CVN Total Two CVNs	Parking structure Electrical conversion to 4,160-V Expand hazardous waste facility Expand steam plant and add two oil waste tanks Pier A: Dredging North Wharf: Dredging, Utilities, Structural repairs
PHNSY	No CVN	No projects
Alternative Five		
NASNI	No Additional CVNs Total One CVN	No projects
PSNS	One Additional CVN Total Two CVNs Removal of Two AOEs	Pierside and turning basin dredging Pier D replacement Utility upgrades to both sides of Pier D
NAVSTA Everett	No Additional CVNs Total One CVN Addition of Two AOEs	Mooring dolphin and electronic upgrade for AOEs North Wharf: Dredging, Utilities, Structural repairs, Expand Hazardous waste facility expansion
PHNSY	One CVN	Dredging and turning basins CIF Pump/valve testing facility Pure water production facility Utility and structural upgrades Parking garage Drydock #4 upgrade Personnel support facilities
Alternative Six		
NASNI	One Additional CVN Total Two CVNs	No projects
PSNS	One Additional CVN Total Two CVNs	No projects
NAVSTA Everett	No Additional CVNs Total of One CVN	No projects
PHNSY	No CVN	No projects

Table 2-3
Current Cost for CVNs, AOEs, and CVs within EIS Scope
Status Quo[1]

Alternative Locations:	Ships currently homeported (within EIS scope):
NASNI	2 CV
PSNS	4 AOE
Everett	1 CVN
PHNSY	NA

Cost Elements	Description	Estimated Costs
Operational		
PCS	NASNI CV DPIA for 2 CV ($59,212,673/DPIA)	$118,425,346
PCS	Everett CVN DPIA	$59,212,673
SOCAL Training	PNW Steaming $90,000/day, 5 round trips, 6 days, every 2 years.	$23,921,732
Cross-Sound Transportation	$2.08M/PIA or $648,312/yr.	$11,487,954
	Status Quo Operational Subtotal	**$213,047,705**
Housing		
For 2 CV crews at NASNI ($276,632,717/crew)	Includes costs for married and single crew members. For details see Appendix L, Tables 4.3 and 4.3a.	$553,265,434
For 4 AOE crews at PSNS ($49,671,421/crew)	Ratio (600/3217) of CVN costs, includes costs for married and single crew members.	$198,685,684
For 1 CVN crew at Everett	Includes costs for married and single crew members.	$298,565,933
	Status Quo Housing Subtotal	**$1,050,517,049**
	TOTAL COST FOR CVNs, AOEs, AND CVs WITHIN THE SCOPE OF THE EIS STATUS QUO	**$1,263,564,754**

1. Status quo is defined as: 2 CVs at NASNI, 4 AOEs at PSNS, and 1 CVN at Everett. The cost of status quo is the current operations and housing cost of these ships.

Table 2-4

Baseline[1]

Alternative Locations:	No Action (ships within EIS scope):	
NASNI	1 CVN	
PSNS	1 CVN, 4 AOE	
Everett	1 CVN	
PHNSY	NA	
Cost Elements	**Description**	**Estimated Costs**
Operational		
TDY	NASNI DMF PIA $8,492,000/PIA or $2,646,857/yr.	$46,901,783
PCS	NASNI CVN DPIA $10,721,000/move each way	$59,212,673
PCS	Everett CVN DPIA $10,721,000/move each way	$59,212,673
PCS	Move 2 CVNs to new homeports at NASNI and PSNS. $10,721,000/move each way	$21,442,000
SOCAL Training	PNW Steaming $90,000/day, 5 round trips, 6 days, every 2 years for 2 CVNs	$47,843,464
Cross-Sound Transportation	$2.08M/PIA or $648,312/yr.	$11,487,954
	Operational Subtotal	$246,100,547
	Less Status Quo (Operations)[2]	($213,047,705)
	No Action Operational Cost	**$33,052,842**
Housing		
For 1 CVN crew at NASNI	Includes costs for married and single crew members.	$297,044,936
For 1 CVN crew at PSNS	Includes costs for married and single crew members.	$266,334,695
For 4 AOE crews at PSNS ($50,742,789/crew)	Ratio (600/3217) of CVN costs, Includes costs for married and single crew members.	$198,685,684
For 1 CVN crew at Everett	Includes costs for married and single crew members.	$298,565,933
	Housing Subtotal	$1,060,631,246
	Less Status Quo (Housing)[2]	($1,050,517,049)
	No Action Housing Cost	**$10,114,197**
COST FOR BASELINE		**$43,167,039**

1. The baseline for the cost summary is the cost associated with operating, maintaining, and housing the three CVNs and four AOEs as located in Alternative Six.
2. Status quo is defined as: 2 CVs at NASNI, 4 AOEs at PSNS, and 1 CVN at Everett. The cost of status quo is the current operations and housing cost of these ships.

2.4.1 Alternative One

NASNI: Facilities for Two Additional CVNs (Capacity for Total of Three CVNs)
PSNS: Facilities for One Additional CVN with Relocation of Four AOEs (Capacity for Total of Two CVNs)
NAVSTA Everett: Facilities for Removal of Existing CVN and Addition of Four AOEs (Capacity for No CVNs)
PHNSY: Facilities for No CVN (No Change)

NASNI
Facilities for Two Additional CVNs: Capacity for Total of Three CVNs

Dredging from 42 feet to 50 feet MLLW would generate approximately 534,000 cy of sediment. Approximately 29,000 cy from the mitigation site would be used to fill in approximately 1.5 acres behind the existing Pier J/K area. All of the approximately 534,000 cy dredged from the Pier J/K area (berth and approach and the dike area) would be disposed of at an in-bay location south of Naval Amphibious Base (NAB), approximately 3.75 miles south of the CVN home port site, to create the NAB Habitat Enhancement Area (see Figure 2-8). If this site were not available, it would be taken to the LA-5 designated ocean disposal location, located approximately 5 miles southwest of NASNI. The existing J/K pier would be demolished and reconstructed to provide required CVN dimensions of 90 feet wide and 1,300 feet long. The dike structure behind the pier would be approximately 1.5 acres in size. Filling in the 1.5-acre dike area would require establishment of a mitigation site as described in section 2.3.3.1. The mitigation site would be constructed adjacent to Pier B on NASNI, approximately 2 miles southwest of the CVN home port location, and contiguous with the BRAC CVN mitigation site, and generate approximately 48,000 cy of sediment. The wharf would provide steam, condensate return, low-pressure compressed air, potable water, pure water, salt water, sanitary sewer, oily waste, jet (JP-5) fuel and marine diesel fuel. Electrical utilities would include a new 4160-V substation. Steam piping on the wharf would run along the edge of the wharf edge. Condensate return piping would run on pipe hangers along the underside of the wharf. Construction would include a CVN warehouse, relocated ferry/flag landing, a fleet support building, equipment laydown building, and lighting. The security fence would be improved. The second additional CVN would be berthed along the quay wall (Berth L/M) in the location that is currently used as a transient CVN berth. Some additional utility and fencing upgrades would be required.

PSNS
Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs

The Pier D East berth would be dredged from 45 feet to 49 feet MLLW, and the Pier D West berth would be dredged from 43 feet to 49 feet MLLW. Two other CVN berths would also be dredged: Pier B would be dredged from 40 feet to 46.1 feet MLLW, and Pier 3 from 44 feet to 46.1 feet MLLW. Dredging would generate approximately 425,000 cubic yards of sediment requiring disposal. Dredged material determined to be suitable for disposal (estimated at 308,000 cy) at a designated PSDDA disposal site would be disposed of at the Elliott Bay PSDDA site near Seattle. Unsuitable dredged materials (estimated at 117,000 cy) would be disposed of at an appropriately permitted upland landfill, or a combination of landfill and three CDF/CAD sites at PSNS (see Figure 2-9 for potential CDF and CAD site locations). The existing Pier D would be demolished and rebuilt with a new 1,310-foot long, 150-foot wide structure. A variety of utilities associated with the pier would be upgraded. Two 4160-V substations would be placed at the head of the pier to support two CVNs simultaneously on both sides of the pier. Two 480 VAC substations would be located in vaults underneath both sides of the deck. The pier would provide steam, condensate return, low-pressure compressed air, potable water, pure water, salt water, sanitary sewer, oily waste, jet (JP-5) fuel and marine diesel fuel.

NAVSTA Everett
Facilities for Removal of Existing CVN and Addition of Four AOEs: Capacity for Total of No CVNs

Dredging would lower the water depth at North Wharf from between 26 and 28 feet MLLW to 32 feet MLLW, resulting in approximately 50,000 cy of sediment. Dredged material would be suitable for disposal at the designated Port Gardner PSDDA open-water disposal site, 2.2 miles west of NAVSTA Everett. A mooring dolphin would be installed approximately 200 feet southwest of the pier's end in approximately 80 feet of water. North Wharf utility connections would be established (including electricity, water, wastewater disposal, oily wastewater, and compressed air) to accommodate the FFGs moved from the west side of Pier A.

PHNSY
Facilities for No CVN: No Change

No facility or infrastructure improvements would be required.

2.4.2 Alternative Two

NASNI: Facilities for Two Additional CVNs (Capacity for Total of Three CVNs)
PSNS: Facilities for No Additional CVN (No Change – Capacity for Total of One CVN)
NAVSTA Everett: Facilities for No Additional CVN (No Change – Capacity for Total of One CVN)
PHNSY: Facilities for No CVN (No Change)
Preferred Alternative

NASNI
Facilities for Two Additional CVNs: Capacity for Total of Three CVNs

This would be the same level of facility and infrastructure development as for Alternative One, above.

PSNS
Facilities for No Additional CVN: No Change— Capacity for Total of One CVN

Although no change in the existing number of CVNs and AOEs would occur, the two dredging and pier replacement construction projects necessary to bring PSNS into conformity with Naval Sea Systems Command and Naval Facilities Engineering Command guidelines would be implemented. This would be the same level of facility and infrastructure as for Alternative One above, except that only one 4,160-V substation would be constructed for Pier D.

NAVSTA Everett
Facilities for No Additional CVN: No Change— Capacity for Total of One CVN

No facility or infrastructure improvements would be required. As NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN, the PIA maintenance tasks would be performed at PSNS.

PHNSY
Facilities for No CVN: No Change

No facility or infrastructure improvements would be required.

2.4.3 Alternative Three

NASNI: Facilities for Two Additional CVNs (Capacity for Total of Three CVNs)
PSNS: Facilities for No Additional CVN (No Change – Capacity for Total of One CVN)
NAVSTA Everett: Facilities for Removal of Existing CVN (Capacity for No CVN)
PHNSY: Facilities for One CVN (Capacity for Total of One CVN)

NASNI
Facilities for Two Additional CVNs: Capacity for Total of Three CVNs

This would be the same level of facility and infrastructure development as for Alternative One and Two, above.

PSNS
Facilities for No Additional CVN: No Change – Capacity for Total of One CVN

Although no change in the existing number of CVNs and AOEs would occur, the two dredging and pier replacement construction projects necessary to bring PSNS into conformity with Naval Sea Systems Command and Naval Facilities Engineering Command guidelines would be implemented. This would be the same level of facility and infrastructure as for Alternative Two, above.

NAVSTA Everett
Facilities for Removal of Existing CVN: Capacity for Total of No CVNs

No facility or infrastructure improvements would be required.

PHNSY
Facilities for One CVN: Capacity for Total of One CVN

Dredging from existing depths (approximately 43 feet to 49 feet MLLW) to 50 feet MLLW would generate 3,000,000 cy of sediment requiring disposal. Most of the dredged material would be suitable for disposal at the designated South Ocean Dredge Material Disposal Site, 3.25 nautical miles south of Honolulu. Alternative disposal methods are being evaluated for dredge material found to be unsuitable for ocean disposal. A CIF of up to 48,000 square feet would be built. A radiological controlled area of up to 34,900 square feet would be used for industrial work requiring radiological control. It would house both high and low bays. The high bay would be serviced by a high capacity (approximately 60 ton) bridge crane and the low bay would be serviced by a smaller capacity (approximately 25 ton) crane. Personnel entry and exit to the radiological work area would be controlled through a single point located in the adjacent non-radiologically controlled area. The non-radiologically controlled area would be up to 13,100 square feet covering two stories and would house an administrative support area. Berth 2/3 and Drydock #4 would be modified, including a 4,160-V substation, and improvements to pump/valve testing equipment, and pure water, steam, sewer, electrical, and sea water pumping systems. A Fleet Shoreside Facility, a new recreation and support facility for single sailors, including an amusement center, laundromat, vending area, and recreation pavilion, a parking structure, and an equipment laydown area would be built. A child development center would also be constructed.

2.4.4 Alternative Four

NASNI: Facilities for One Additional CVN (Capacity for Total of Two CVNs)
PSNS: Facilities for No Additional CVN (No Change – Capacity for Total of One CVN)
NAVSTA Everett: Facilities for One Additional CVN (Capacity for Total of Two CVNs)
PHNSY: Facilities for No CVN (No Change)

NASNI
Facilities for One Additional CVN: Capacity for Total of Two CVNs

This would require the same level of facility and infrastructure development as for Alternatives One, Two, and Three, though no improvements to Berth L/M (quaywall CVN transient berth) would occur.

PSNS
Facilities for No Additional CVN: No Change — Capacity for Total of One CVN

This would require the same level of facility and infrastructure development as for Alternative Two and Three, above.

NAVSTA Everett
Facilities for One Additional CVN: Capacity for Total of Two CVNs

Dredging from 45 feet MLLW to 50 feet MLLW with a 1-foot overdepth dredging allowance on the west side of Pier A would generate approximately 105,000 cy. Use of the west side of Pier A would require relocation of FFGs to the North Wharf. Approximately 50,000 cy of dredging would be required to accommodate the FFGs at the North Wharf. Currently available data indicate that the 155,000 cy of sediments would be suitable for disposal at the designated Port Gardner PSDDA open-water disposal site, 2.2 miles west of the site. A multi-story parking structure (on the site of the existing parking lot), electrical upgrades, and improvements to the oily water separator system for treating ship bilgewater would also be constructed. Utility infrastructure would be developed to accommodate FFGs at the North Wharf as discussed for Alternative One. As stated before for Alternative Two, since NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN, the PIA maintenance tasks would be performed at PSNS.

PHNSY
Facilities for No CVN: No Change

No facility or infrastructure improvements would be required.

2.4.5 Alternative Five

NASNI: Facilities for No Additional CVN (Capacity for Total of One CVN)
PSNS: Facilities for One Additional CVN and Relocation of Two AOEs (Capacity for Total of Two CVNs)
NAVSTA Everett: Facilities for No Additional CVN and Addition of Two AOEs (Capacity for Total of One CVN)
PHNSY: Facilities for One CVN (Capacity for Total of One CVN)

NASNI
Facilities for No Additional CVN: Capacity for Total of One CVN

No facility or infrastructure improvements would be required.

PSNS
Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs

This would require the same level of facility and infrastructure development as for Alternative One, discussed above.

NAVSTA Everett
Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN

Movement of two AOEs from PSNS to the west side of Pier A would require relocation of FFGs to the North Wharf. Dredging of approximately 50,000 cy of dredging would be required similar to Alternative One, above. A mooring dolphin, would be installed approximately 200 feet southwest of the Pier A end as defined from Alternative One. Utility infrastructure would be developed to accommodate FFGs at the North Wharf as discussed for Alternative One. In addition, the existing hazardous waste facility would be expanded. As stated before for Alternative Two, because NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN, the PIA maintenance tasks would be performed at PSNS.

PHNSY
Facilities for One CVN: Capacity for Total of One CVN

This would require the same level of facility and infrastructure development as for Alternative Three, above.

2.4.6 Alternative Six (No Action Alternative)

This alternative does not create additional home port facilities or infrastructure, and assigns CVN home ports as follows:

NASNI: No Additional Facilities for One Additional CVN (No Additional Capacity for Total of Two CVNs)
PSNS: No Additional Facilities for One Additional CVN (No Additional Capacity for Total of Two CVNs)
NAVSTA Everett: No Additional CVN (Total of One CVN)
PHNSY: No CVN (No Change)

The No Action Alternative (Alternative Six) is required to be analyzed along with others shown in Table 2-1. In as much as the proposed action is to construct the necessary facilities and infrastructure to support the homeporting of CVNs, the No Action Alternative is not to construct the required facilities.

The No Action Alternative distribution of CVNs and AOEs would be berthed in the following facilities:

NASNI
One Additional CVN: Total of Two CVNs

One CVN (as a result of BRAC realignment) would be berthed at Berth K and an additional CVN would be berthed at the existing transient CVN berth. No dredging or new facilities would be included. This would eliminate the ability to berth a transient CVN at NASNI when both homeported CVNs would be present.

PSNS
One Additional CVN: Total of Two CVNs

One CVN as a result of BRAC realignment would be berthed at Pier B, and one additional CVN would be berthed at Pier D. All four AOEs would remain at PSNS. No dredging or new facilities would be included. The CVN berths would not have required water depths.

NAVSTA Everett
No Additional CVN: No Change - Total of One CVN

One CVN would remain as presently homeported at Pier A. No new dredging or new facilities would be constructed. Because NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN, the PIA maintenance tasks would be performed at PSNS.

PHNSY
No CVN: No Change

No CVN would be homeported at Pearl Harbor. No new dredging or new facilities would be needed.

The costs associated with each of the CVN homeporting alternatives (presented in Tables 2-5, 2-6, 2-7, 2-8, 2-9, and 2-10) are compared below based on "best information available" estimates. Alternative Six costs have been purposefully calculated at zero by subtracting "status quo" and "baseline" costs to facilitate homeporting alternative comparisons.

The No Action Alternative would not provide any additional facilities or infrastructure to support additional homeporting of CVNs. The No Action Alternative is not acceptable for several reasons. First, a berth at NASNI must be available to act as a transient berth. All U.S. Pacific Fleet CVNs load and off-load their air wings at NASNI. No other West Coast CVN home port has the capability to off-load non-flyable aircraft from the CVN without extreme measures (conceivably, aircraft could be craned off the CVN, disassembled, trucked to the nearest suitable airfield and reassembled, repaired, and flown to their home naval air station). Additionally, with the preponderance of training performed in the SOCAL operations areas, transient CVNs are in and out of NASNI on a routine basis. Consequently, use of the transient berth as a home port berth with only two CVN berths available would place unacceptable operational constraints on the Fleet Commander. Second, PSNS piers and turning basins, as currently configured, do not meet the requirements for water depth for homeporting CVNs. Water depth requirements are designed to limit fouling of ship's condensers and associated costly repairs. The piers designated as home port

Table 2-5. ALTERNATIVE ONE
Cost Estimate

Alternative Locations:	Changes in Ship Homeporting:	CVN & AOE Totals:
NASNI	+2 CVN, -2 CV[1]	3 CVN
PSNS	+1 CVN, -4 AOE	2 CVN
Everett	-1 CVN, +4 AOE	4 AOE
PHNSY	NA	NA
Cost Elements	**Description**	**Estimated Costs**
Construction at:		
NASNI	P-700 (Wharf)	$54,440,000
	Modifications to Berth L/M[2]	$1,200,000
PSNS[3]	Second CVN Utility Upgrades	$1,900,000
Everett	Dredge, North Wharf	$450,000
	Utilities, North Wharf	$3,375,000
	Structural Repairs	$550,000
	Mooring Dolphins	$270,000
	Electrical for AOEs	$2,500,000
	Alternative One Construction Subtotal =	**$64,685,000**
Operational		
Operation & Maintenance	2% of facilities cost[4]	$22,474,024
Utilities	5% of facilities cost[5]	$3,170,750
TDY	NASNI DMF PIA[6]	$93,803,566
PCS	NASNI CVN DPIA[7]	$118,425,346
PCS	Move CVNs[8]	$32,163,000
PCS	Move AOEs[9]	$7,998,259
Training	Steaming to/from PNW[10]	$23,921,732
	Subtotal	$301,956,678
	Less cost of status quo	($213,047,705)
	Alternative One Operational Subtotal =	**$88,908,973**
Housing[11]		
NASNI	1st additional CVN	$297,044,936
	2nd additional CVN	$297,044,936
PSNS	1st additional CVN	$266,334,695
Everett	AOE (4@$55,682,546)	$222,730,186
	Alternative One Housing Subtotal =	**$1,083,154,753**
	CONSTRUCTION, OPERATIONS, HOUSING TOTAL =	**$1,236,748,726**
	Less cost of status quo[12]	($1,050,517,049
	Less cost of baseline[13]	($43,167,039)
	COST OF ALTERNATIVE ONE COMPARED TO TAKING NO ACTION	**$143,064,637**

1. CVs/CVNs use the same frequency between drydockings, and cost the same for change of station moves.
2. No pure water or salt water provided. (Assumes only minimal maintenance will be accomplished at this berth.)
3. The cost of dredging and pier construction at PSNS is not included in this cost estimate, as the cost incurred would be the same for Alternatives 1-5. The cost for these two construction projects (not including the electrical upgrade necessary to support 2 CVNs) is $81.5 M.
4. Operation and maintenance costs are assumed to be 2 percent of the CVN maintenance facility value per annum.
5. Utility costs are assumed to be 5 percent of the CVN maintenance facility value for the 30-year period.
6. Total per diem, travel, and miscellaneous costs associated with personnel performing nuclear propulsion plant maintenance at the NASNI DMF.
7. Relocation of Navy families during the 10 to 11 month drydocking period to PSNS every 6 years.
8. One-time cost associated with locating CVN crew families at new home ports.
9. One-time cost associated with relocation of AOE crew families from PSNS to NAVSTA Everett.
10. Conventional fuel required to power a CV homeported in the Pacific Northwest to San Diego for 4 training and 1 deployment round trips during each 24-month cycle, for comparison.
11. Includes costs for married and single crew members.
12. Status quo is defined as: 2 CVs at NASNI, 4 AOEs at PSNS, and 1 CVN at Everett. The cost of status quo is the current operations and housing cost of these ships.
13. The baseline for the cost summary is the cost associated with operating, maintaining, and housing the three CVNs and four AOEs as located in Alternative Six.

Table 2-6
ALTERNATIVE TWO
Cost Estimate

Alternative Locations:	Changes in Ship Homeporting:	CVN & AOE Totals:
NASNI	+2 CVN, -2 CV[1]	3 CVN
PSNS	+0 CVN	1 CVN, 4 AOE
Everett	+0 CVN	1 CVN
PHNSY	NA	NA
Cost Elements	**Description**	**Estimated Costs**
Construction at:		
NASNI	P-700 (Wharf)	$54,440,000
	Modifications to Berth L/M[2]	$1,200,000
PSNS[3]		
	Alternative Two Construction Subtotal =	**$55,640,000**
Operational		
Operation & Maintenance	2% of facilities cost[4]	$19,718,595
Utilities	5% of facilities cost[5]	$2,782,000
TDY	NASNI DMF PIA[6]	$93,803,566
PCS	NASNI CVN DPIA[7]	$118,425,346
PCS	Everett CVN DPIA[8]	$59,212,673
PCS	Move CVNs[9]	$21,442,000
Training	Steaming to/from PNW[10]	$23,921,732
	Everett Cross Sound[11]	$11,487,954
	Subtotal	$350,793,867
	Less cost of status quo	($213,047,705)
	Alternative Two Operational Subtotal =	**$137,746,162**
Housing[12]		
NASNI	1st additional CVN	$297,044,936
	2nd additional CVN	$297,044,936
Everett	1 CVN	$298,565,933
PSNS	AOE (4@$49,671,421)	$198,685,684
	Alternative Two Housing Subtotal =	**$1,091,341,487**
	CONSTRUCTION, OPERATIONS, HOUSING TOTAL =	**$1,284,727,649**
	Less cost of status quo[13]	($1,050,517,049)
	Less cost of baseline[14]	($43,167,039)
	COST OF ALTERNATIVE TWO COMPARED TO TAKING NO ACTION	**$191,043,560**

1. CVs/CVNs use the same frequency between drydockings, and cost the same for change of station moves.
2. No pure water or salt water provided. (Assumes only minimal maintenance will be accomplished at this berth.)
3. The cost of dredging and pier construction at PSNS is not included in this cost estimate, as the cost incurred would be the same for Alternatives 1-5. The cost for these two construction projects (not including the electrical upgrade necessary to support 2 CVNs) is $81.5M.
4. Operation and maintenance costs are assumed to be 2 percent of the CVN maintenance facility value per annum.
5. Utility costs are assumed to be 5 percent of the CVN maintenance facility value for the 30-year period.
6. Total per diem, travel, and miscellaneous costs associated with personnel performing nuclear propulsion plant maintenance at the NASNI DMF.
7. Relocation of Navy families during the 10- to 11-month drydocking period to PSNS every 6 years.
8. Relocation of Navy families during the 10- to 11-month drydocking period to PSNS every 6 years.
9. One-time cost associated with locating CVN crew families at new home ports.
10. Conventional fuel required to power a CV homeported in the Pacific Northwest to San Diego for 4 training and 1 deployment round trips during each 24-month cycle, for comparison.
11. Transportation of NAVSTA Everett CVN crew across Puget Sound to PSNS during nearly 6 months PIA every 2 years.
12. Includes costs for married and single crew members.
13. Status quo is defined as: 2 CVs at NASNI, 4 AOEs at PSNS, and 1 CVN at Everett. The cost of status quo is the current operations and housing cost of these ships.
14. The baseline for the cost summary is the cost associated with operating, maintaining, and housing the three CVNs and four AOEs as located in Alternative Six.

Table 2-7
ALTERNATIVE THREE—Cost Estimate

Alternative Locations:	Changes in Ship Homeporting:	CVN & AOE Totals:
NASNI	+2 CVN, -2 CV[1]	3 CVN
PSNS	+0 CVN	1 CVN, 4 AOE
Everett	-1 CVN	0 CVN
PHNSY	+1 CVN	1 CVN
Cost Elements	**Description**	**Estimated Costs**
Construction at:		
NASNI	P-700 (Wharf)	$54,440,000
	Modifications to Berth L/M[2]	$1,200,000
PSNS[3]	—	—
PHNSY	Dredge	$31,920,000
	CIF	$72,120,000
	Pump Test Facility	$6,500,000
	Pure Water	$3,000,000
	Utility Structure	$7,400,000
	Parking Garage	$12,700,000
	Drydock 4	$6,250,000
	Personnel Support	$6,700,000
	Alternative Three Construction Subtotal =	**$202,230,000**
Operational		
Operation & Maintenance	2% of facilities cost[4]	$60,357,188
Utilities	5% of facilities cost[5]	$8,515,500
TDY	NASNI DMF PIA[6]	$93,803,566
TDY	PHNSY PIA/DPIA[7]	$189,627,549
PCS	NASNI CVN DPIA[8]	$118,425,346
PCS	Move CVNs[9]	$32,163,000
Training	Steaming to/from PHNSY[10]	$47,843,464
	Subtotal	$550,735,614
	Less cost of status quo	($213,047,705)
	Alternative Three Operational Subtotal =	**$337,687,908**
Housing[11]		
NASNI	1st additional CVN	$297,044,936
	2nd additional CVN	$297,044,936
PHNSY	1st additional CVN	$341,842,508
PSNS	AOE (4@$49,671,421)	$198,685,684
	Alternative Three Housing Subtotal =	**$1,134,618,062**
	CONSTRUCTION, OPERATIONS, HOUSING TOTAL =	**$1,674,535,970**
	Less cost of status quo[12]	($1,050,517,049)
	Less cost of baseline[13]	($43,167,039)
	COST OF ALTERNATIVE THREE COMPARED TO TAKING NO ACTION	**$580,851,882**

1. CVs/CVNs use the same frequency between drydockings, and cost the same for change of station moves.
2. No pure water or salt water provided. (Assumes only minimal maintenance will be accomplished at this berth.)
3. The cost of dredging and pier construction at PSNS is not included in this cost estimate, as the cost incurred would be the same for Alternatives 1-5. The cost for these two construction projects (not including the electrical upgrade necessary to support 2 CVNs) is $81.5M.
4. Operation and maintenance costs are assumed to be 2 percent of the CVN maintenance facility value per annum.
5. Utility costs are assumed to be 5 percent of the CVN maintenance facility value for the 30-year period.
6. Total per diem, travel, and miscellaneous costs associated with personnel performing nuclear propulsion plant maintenance at the NASNI DMF.
7. Total per diem, travel, and miscellaneous costs associated with personnel performing nuclear propulsion plant maintenance at PHNSY.
8. Relocation of Navy families during the 10- to 11-month drydocking period to PSNS every 6 years.
9. One-time cost associated with locating CVN crew families at new home ports.

10. Conventional fuel required to power a CV homeported at PHNSY to San Diego for 4 training and 1 deployment round trips during each 24-month cycle, for comparison.
11. Includes costs for married and single crew members.
12. Status quo is defined as: 2 CVs at NASNI, 4 AOEs at PSNS, and 1 CVN at Everett. The cost of status quo is the current operations and housing cost of these ships.
13. The baseline for the cost summary is the cost associated with operating, maintaining, and housing the three CVNs and four AOEs as located in Alternative Six.

Table 2-8
ALTERNATIVE FOUR
Cost Estimate

Alternative Locations:	Changes in Ship Homeporting:	CVN & AOE Totals:
NASNI	+1 CVN, -2 CV[1]	2 CVN
PSNS	+0 CVN	1 CVN, 4 AOE
Everett	+1 CVN	2 CVN
PHNSY	NA	NA
Cost Elements	**Description**	**Estimated Costs**
Construction at:		
NASNI	P-700 (Wharf)	$54,440,000
PSNS[2]		
Everett	Dredge, North Wharf	$450,000
	Utilities, North Wharf	$3,375,000
	Structural Repairs	$550,000
	Parking Garage	$8,000,000
	Electrical – 4,160-V	$2,300,000
	Hazardous Waste Facility	$1,900,000
	Transit Shed	$5,500,000
	Steam Plant	$1,500,000
	Oil Waste Tanks	$920,000
	Dredge Pier A	$1,200,000
	Alternative Four Construction Subtotal =	**$80,135,000**
Operational		
Operation & Maintenance	2% of facilities cost[3]	$27,619,855
Utilities	5% of facilities cost[4]	$3,896,750
TDY	NASNI DMF PIA[5]	$46,901,783
PCS	NASNI CVN DPIA[6]	$59,212,673
PCS	Everett CVN DPIA[7]	$118,425,346
PCS	Move CVNs[8]	$21,442,000
Training	Steaming to/from PNW[9]	$47,843,464
	Everett Cross Sound[10]	$22,975,909
	Subtotal	$348,317,779
	Less cost of status quo	($213,047,705)
	Alternative Four Operational Subtotal =	**$135,270,074**
Housing[11]		
NASNI	1st additional CVN	$297,044,936
Everett	1 CVN	$298,565,933
	1st additional CVN	$298,565,933
PSNS	AOE (4@$49,671,421)	$198,685,684
	Alternative Four Housing Subtotal =	**$1,092,862,484**
	CONSTRUCTION, OPERATIONS, HOUSING TOTAL =	**$1,308,267,558**
	Less cost of status quo[12]	($1,050,517,049)
	Less cost of baseline[13]	($43,167,039)
	COST OF ALTERNATIVE FOUR COMPARED TO TAKING NO ACTION	**$214,583,470**

1. CVs/CVNs use the same frequency between drydockings, and cost the same for change of station moves.
2. The cost of dredging and pier construction at PSNS is not included in this cost estimate, as the cost incurred would be the same for Alternatives 1-5. The cost for these two construction projects (not including the electrical upgrade necessary to support 2 CVNs) is $81.5M.
3. Operation and maintenance costs are assumed to be 2 percent of the CVN maintenance facility value per annum.
4. Utility costs are assumed to be 5 percent of the CVN maintenance facility value for the 30-year period.
5. Total per diem, travel, and miscellaneous costs associated with personnel performing nuclear propulsion plant maintenance at the NASNI DMF.
6. Relocation of Navy families during the 10- to 11-month drydocking period to PSNS every 6 years.
7. Relocation of Navy families during the 10- to 11-month drydocking period to PSNS every 6 years.

8. One-time cost associated with locating CVN crew families at new home ports.
9. Conventional fuel required to power a CV homeported in the Pacific Northwest to San Diego for 4 training and 1 deployment round trips during each 24-month cycle, for comparison.
10. Transportation of NAVSTA Everett CVN crew across Puget Sound to PSNS during nearly 6 months PIA every 2 years.
11. Includes costs for married and single crew members.
12. Status quo is defined as: 2 CVs at NASNI, 4 AOEs at PSNS, and 1 CVN at Everett. The cost of status quo is the current operations and housing cost of these ships.
13. The baseline for the cost summary is the cost associated with operating, maintaining, and housing the three CVNs and four AOEs as located in Alternative Six.

Table 2-9
ALTERNATIVE FIVE
Cost Estimate

Alternative Locations:	Changes in Ship Homeporting:	CVN & AOE Totals:
NASNI	+0 CVN, -2 CV[1]	1 CVN
PSNS	+1 CVN, -2 AOE	2 CVN, 2 AOE
Everett	+0 CVN, +2 AOE	1 CVN, 2 AOE
PHNSY	+1 CVN	1 CVN
Cost Elements	**Description**	**Estimated Costs**
Construction at:		
PSNS[2]	Second CVN Utility Upgrades	$1,900,000
Everett	Dredge, North Wharf	$450,000
	Utilities, North Wharf	$3,375,000
	Haz Waste Facility	$1,900,000
	Structural Repairs	$550,000
	Mooring Dolphins	$270,000
	Electrical for AOEs	$2,500,000
PHNSY	Dredge	$31,920,000
	CIF	$72,120,000
	Pump Test Facility	$6,500,000
	Pure Water	$3,000,000
	Utility/Structure	$7,400,000
	Parking Garage	$12,700,000
	Drydock 4	$6,250,000
	Personnel Support	$6,700,000
	Alternative Five Construction Subtotal =	**$157,535,000**
Operational		
Operation & Maintenance	2% of facilities cost[3]	$44,067,374
Utilities	5% of facilities cost[4]	$6,217,250
TDY	PHNSY PIA/DPIA[5]	$189,627,549
PCS	Everett CVN DPIA[6]	$59,212,673
PCS	Move CVNs[7]	$21,442,000
PCS	Move AOEs[8]	$3,999,130
Training	Steaming to/from PNW[9]	$47,843,464
Training	Steaming to/from PHNSY[10]	$47,843,464
	Everett Cross Sound[11]	$11,487,954
	Subtotal	$431,740,859
	Less cost of status quo	($213,047,705)
	Alternative Five Operational Subtotal =	**$218,693,154**
Housing[12]		
PSNS	1st additional CVN	$266,334,695
Everett	1 CVN	$298,565,933
PHNSY	1st additional CVN	$341,842,508
PSNS	AOE 1 & 2 (2@$49,671,421)	$99,342,841
Everett	AOE 3 & 4 (2@$55,682,546)	$111,365,093
	Alternative Five Housing Subtotal =	**$1,117,451,070**
	CONSTRUCTION, OPERATIONS, HOUSING TOTAL =	**$1,493,679,224**
	Less cost of status quo[13]	($1,050,517,049)
	Less cost of baseline[14]	($43,167,039)
	COST OF ALTERNATIVE FIVE COMPARED TO TAKING NO ACTION	**$399,995,135**

1. CVs/CVNs use the same frequency between drydockings, and cost the same for change of station moves.
2. The cost of dredging and pier construction at PSNS is not included in this cost estimate, as the cost incurred would be the same for Alternatives 1-5. The cost for these two construction projects (not including the electrical upgrade necessary to support 2 CVNs) is $81.5M.

3. Operation and maintenance costs are assumed to be 2 percent of the CVN maintenance facility value per annum.
4. Utility costs are assumed to be 5 percent of the CVN maintenance facility value for the 30-year period.
5. Total per diem, travel, and miscellaneous costs associated with personnel performing nuclear propulsion plant maintenance at PHNSY.
6. Relocation of Navy families during the 10- to 11-month drydocking period to PSNS every 6 years.
7. One-time cost associated with locating CVN crew families at new home ports.
8. One-time cost associated with relocation of AOE crew families from PSNS to NAVSTA Everett.
9. Conventional fuel required to power a CV homeported in the Pacific Northwest to San Diego for 4 training and 1 deployment round trips during each 24-month cycle, for comparison.
10. Conventional fuel required to power a CVN homeported in the Hawaii to San Diego for 4 training and 1 deployment round trips during each 24-month cycle, for comparison.
11. Transportation of NAVSTA Everett CVN crew across Puget Sound to PSNS during nearly 6 months PIA every 2 years.
12. Includes costs for married and single crew members.
13. Status quo is defined as: 2 CVs at NASNI, 4 AOEs at PSNS, and 1 CVN at Everett. The cost of status quo is the current operations and housing cost of these ships.
14. The baseline for the cost summary is the cost associated with operating, maintaining, and housing the three CVNs and four AOEs as located in Alternative Six.

Table 2-10
ALTERNATIVE SIX
Cost Estimate

Alternative Locations:	Changes in Ship Homeporting:	CVN & AOE Totals:
NASNI	+1 CVN, -2 CV[1]	2 CVN
PSNS	+1 CVN	2 CVN, 4 AOE
Everett	+0 CVN	1 CVN
PHNSY	NA	NA
Cost Elements	**Description**	**Estimated Costs**
Construction at:		
NASNI	None	$0
PSNS	None	$0
Everett	None	$0
PHNSY	None	$0
	Alternative Six Construction Subtotal =	**$0**
Operational		
Operation & Maintenance	2% of facilities cost[2]	$0
Utilities	5% of facilities cost[3]	$0
TDY	NASNI DMF PIA[4]	$46,901,783
PCS	NASNI CVN DPIA[5]	$59,212,673
PCS	Everett CVN DPIA[6]	$59,212,673
PCS	Move CVNs[7]	$21,442,000
Training	Steaming to/from PNW[8]	$47,843,464
	Everett Cross Sound[9]	$11,487,954
	Subtotal	$246,100,548
	Less cost of status quo	($213,047,705)
	Alternative Six Operational Subtotal =	**$33,052,842**
Housing[10]		
NASNI	1st additional CVN	$297,044,936
PSNS	1st additional CVN	$266,334,695
Everett	1 CVN	$298,565,933
PSNS	AOE (4@$49,671,421)	$198,685,684
	Alternative Six Housing Subtotal =	**$1,050,517,049**
	CONSTRUCTION, OPERATIONS, HOUSING TOTAL =	**$1,083,569,891**
	Less cost of status quo[11]	($1,050,517,049)
	Less cost of baseline[12]	($43,167,039)
	COST OF ALTERNATIVE SIX COMPARED TO TAKING NO ACTION	**$0**

1. CVs/CVNs use the same frequency between drydockings, and cost the same for change of station moves.
2. Operation and maintenance costs are assumed to be 2 percent of the CVN maintenance facility value per annum.
3. Utility costs are assumed to be 5 percent of the CVN maintenance facility value for the 30-year period.
4. Total per diem, travel, and miscellaneous costs associated with personnel performing nuclear propulsion plant maintenance at the NASNI DMF.
5. Relocation of Navy families during the 10- to 11-month drydocking period to PSNS every 6 years.
6. Relocation of Navy families during the 10- to 11-month drydocking period to PSNS every 6 years.
7. One-time cost associated with locating CVN crew families at new home ports.
8. Conventional fuel required to power a CV homeported in the Pacific Northwest to San Diego for 4 training and 1 deployment round trips during each 24-month cycle, for comparison.
9. Transportation of NAVSTA Everett CVN crew across Puget Sound to PSNS during nearly 6 months PIA every 2 years.
10. Includes costs for married and single crew members.
11. Status quo is defined as: 2 CVs at NASNI, 4 AOEs at PSNS, and 1 CVN at Everett. The cost of status quo is the current operations and housing cost of these ships.
12. The baseline for the cost summary is the cost associated with operating, maintaining, and housing the three CVNs and four AOEs as located in Alternative Six.

piers (B and D) presently impose severe limitations on the daily functions of a CVN, both operational and maintenance (lack of sufficient strength, laydown area, and width). Third, homeporting of a second CVN at PSNS and retention of the AOEs would cause PSNS to not be able to provide adequate support for CVN crew. PSNS would be over capacity in the areas of parking, housing, pier space, utilities, general services, and general land use.

Alternatives	*Cost*
Alternative One	$143,064,637
Alternative Two	$191,043,560
Alternative Three	$580,851,882
Alternative Four	$214,583,470
Alternative Five	$399,995,135
Alternative Six	$0

2.5 ENVIRONMENTAL COMPARISON OF ALTERNATIVES

Table 2-11 summarizes the analysis and comparison of the environmental impacts associated with the proposed project alternatives presented in Chapters 3, 4, 5, and 6. The table presents significant impacts and mitigation measures for each alternative. The agency responsible for monitoring each measure is listed in parentheses after the measure (agency acronyms are listed at the end of the table).

2.6 HOME PORT LOCATIONS CONSIDERED BUT ELIMINATED

Additional CVN homeporting locations were analyzed. The following locations cannot reasonably satisfy the CVN Home Port Objectives and Requirements defined in section 2.3.1, illustrating that a range of alternatives has been addressed in this EIS.

2.6.1 San Diego

In addition to NASNI, homeporting locations for a CVN(s) in the San Diego area included Naval Station, San Diego; Naval Amphibious Base, Coronado; Navy Pier Complex; and Naval Submarine Base, San Diego (see Figure 1-1). These locations were previously evaluated and eliminated for the first CVN homeporting decision (DON 1995c). Currently, no location in the San Diego area possesses all of the CVN Home Port Objectives and Requirements outlined previously (DON 1995c) and, except for NASNI, none of the locations could reasonably satisfy them.

2.6.1.1 *Naval Station, San Diego and Naval Amphibious Base, Coronado*

Naval Station, San Diego and Naval Amphibious Base, Coronado are unable to reasonably satisfy CVN Home Port Objectives and Requirements. Specifically, the Coronado bridge is too low for a CVN to pass under to access these locations. The bridge provides 195 feet vertical clearance at mean high water. The top of a NIMITZ-class carrier reaches 206 vertical feet at designed draft and higher still with light fuel, weapons, and aircraft loads.

Table 2-11. Summary of Significant Environmental Impacts and Mitigations (page 1 of 5)

Resource	*Alternative One*	*Alternative Two*	*Alternative Three*	*Alternative Four*	*Alternative Five*	*Alternative Six (No Action)*
Topography, Geology, and Soils	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Terrestrial Hydrology and Water Quality	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Marine Water Quality	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Sediment Quality	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Marine Biology	*Impact 1*: Dredging for CVN berths and relocation of the flag/ferry landing at NASNI would impact marine and eelgrass habitats.	*Impact 1*: Dredging for CVN berths and relocation of the flag/ferry landing at NASNI would impact marine and eelgrass habitats.	*Impact 1*: Dredging for CVN berths and relocation of the flag/ferry landing at NASNI would impact marine and eelgrass habitats.	*Impact 1*: Dredging for CVN berths and relocation of the flag/ferry landing at NASNI would impact marine and eelgrass habitats.	*Impact 1*: Dredging and marine construction between March 15 to June 15 at PSNS and at NAVSTA Everett North Wharf for the relocated FFGs during the peak juvenile salmon outmigration window, and at NAVSTA Everett during the Dungeness crab molting period, would impact these species' reproductive success and survival.	Not significant.
	Mitigation 1: Construct habitat mitigation area at NASNI of equivalent size in consultation with affected regulatory agencies (COE, CDFG, USFWS, NMFS, EPA, and USCG, who would provide notice to mariners during construction).	*Mitigation 1*: Construct habitat mitigation area at NASNI of equivalent size in consultation with affected regulatory agencies (COE; CDFG; USFWS; NMFS; EPA; and USCG, who would provide notice to mariners during construction).	*Mitigation 1*: Construct habitat mitigation area at NASNI of equivalent size in consultation with affected regulatory agencies (COE; CDFG; USFWS; NMFS; EPA; and USCG, who would provide notice to mariners during construction).	*Mitigation 1*: Construct habitat mitigation area at NASNI of equivalent size in consultation with affected regulatory agencies (COE; CDFG; USFWS; NMFS; EPA; and USCG, who would provide notice to mariners during construction).	*Mitigation 1*: Avoid dredging and marine construction between March 15 and June 15 (COE; WDFW; WDOE).	

Table 2-11. Summary of Significant Environmental Impacts and Mitigations (page 2 of 5)

Resource	*Alternative One*	*Alternative Two*	*Alternative Three*	*Alternative Four*	*Alternative Five*	*Alternative Six (No Action)*
Marine Biology	*Impact 2:* Losses of California least tern and brown pelican foraging habitat due to fill at Pier J/K (1.5 acres) and shading (1.5 acres), and potential disturbance during in-water activities for in-bay sediment disposal at NAB during the nesting season could adversely affect the foraging and nesting success of California least turns at the Delta Beach colony adjacent to NAB Habitat Enhancement Area.	*Impact 2:* Losses of California least tern and brown pelican foraging habitat due to fill at Pier J/K (1.5 acres) and shading (1.5 acres), and potential disturbance during in-water activities for in-bay sediment disposal at NAB during the nesting season could adversely affect the foraging and nesting success of California least turns at the Delta Beach colony adjacent to NAB Habitat Enhancement Area.	*Impact 2:* Losses of California least tern and brown pelican foraging habitat due to fill at Pier J/K (1.5 acres) and shading (1.5 acres), and potential disturbance during in-water activities for in-bay sediment disposal at NAB during the nesting season could adversely affect the foraging and nesting success of California least turns at the Delta Beach colony adjacent to NAB Habitat Enhancement Area.	*Impact 2:* Losses of California least tern and brown pelican foraging habitat due to fill at Pier J/K (1.5 acres) and shading (1.5 acres), and potential disturbance during in-water activities for in-bay sediment disposal at NAB during the nesting season could adversely affect the foraging and nesting success of California least turns at the Delta Beach colony adjacent to NAB Habitat Enhancement Area.		
	Mitigation 2: Construct equivalent area of shallow water habitat disturbed by construction and shading near Pier B. Schedule dredging and in-water demolition and construction outside of the California least tern breeding season (April 15 to September 1) to the maximum extent feasible. Use best management practices (BMPs) if avoidance infeasible to limit the spread of turbidity (COE, CDFG, USFWS, NMFS).	*Mitigation 2:* Construct equivalent area of shallow water habitat disturbed by construction and shading near Pier B. Schedule dredging and in-water demolition and construction outside of the California least tern breeding season (April 15 to September 1) to the maximum extent feasible. Use best management practices (BMPs) if avoidance infeasible to limit the spread of turbidity (COE, CDFG, USFWS, NMFS).	*Mitigation 2:* Construct equivalent area of shallow water habitat disturbed by construction and shading near Pier B. Schedule dredging and in-water demolition and construction outside of the California least tern breeding season (April 15 to September 1) to the maximum extent feasible. Use best management practices (BMPs) if avoidance infeasible to limit the spread of turbidity (COE, CDFG, USFWS, NMFS).	*Mitigation 2:* Construct equivalent area of shallow water habitat disturbed by construction and shading near Pier B. Schedule dredging and in-water demolition and construction outside of the California least tern breeding season (April 15 to September 1) to the maximum extent feasible. Use best management practices (BMPs) if avoidance infeasible to limit the spread of turbidity (COE, CDFG, USFWS, NMFS).		

Table 2-11. Summary of Significant Environmental Impacts and Mitigations (page 3 of 5)

Resource	*Alternative One*	*Alternative Two*	*Alternative Three*	*Alternative Four*	*Alternative Five*	*Alternative Six (No Action)*
Marine Biology	*Impact 3:* Marine mammals and turtles may pass through the dredging and construction areas on a very infrequent basis, if at all. *Mitigation 3:* Inform construction staff in writing of the possibility of such occurrences and the general appearance of whales (especially gray whales), dolphins, seals/sea lions, and green turtles. Instruct staff to temporarily suspend activities until the animal(s) move out of the active construction area of ongoing construction (COE, CDFG, USFWS, NMFS).	*Impact 3:* Marine mammals and turtles may pass through the dredging and construction areas on a very infrequent basis, if at all. *Mitigation 3:* Inform construction staff in writing of the possibility of such occurrences and the general appearance of whales (especially gray whales), dolphins, seals/sea lions, and green turtles. Instruct staff to temporarily suspend activities until the animal(s) move out of the active construction area of ongoing construction (COE, CDFG, USFWS, NMFS).	*Impact 3:* Marine mammals and turtles may pass through the dredging and construction areas on a very infrequent basis, if at all. *Mitigation 3:* Inform construction staff in writing of the possibility of such occurrences and the general appearance of whales (especially gray whales), dolphins, seals/sea lions, and green turtles. Instruct staff to temporarily suspend activities until the animal(s) move out of the active construction area of ongoing construction (COE, CDFG, USFWS, NMFS).	*Impact 3:* Marine mammals and turtles may pass through the dredging and construction areas on a very infrequent basis, if at all. *Mitigation 3:* Inform construction staff in writing of the possibility of such occurrences and the general appearance of whales (especially gray whales), dolphins, seals/sea lions, and green turtles. Instruct staff to temporarily suspend activities until the animal(s) move out of the active construction area of ongoing construction (COE, CDFG, USFWS, NMFS).		
	Impact 4: Dredging and marine construction between March 15 to June 15 at PSNS and at NAVSTA Everett North Wharf for the relocated FFGs during the peak juvenile salmon outmigration window, and at NAVSTA Everett during the Dungeness crab molting period, would impact these species' reproductive success and survival.	*Impact 4*: Dredging and marine construction between March 15 to June 15 at PSNS during the peak juvenile salmon outmigration window would impact species' reproductive success and survival.	*Impact 4* Dredging and marine construction between March 15 to June 15 at PSNS during the peak juvenile salmon outmigration window would impact species' reproductive success and survival.	*Impact 4*: Dredging and marine construction between March 15 to June 15 at PSNS and at NAVSTA Everett North Wharf for the relocated FFGs during the peak juvenile salmon outmigration window, and at NAVSTA Everett during the Dungeness crab molting period, would impact these species' reproductive success and survival.	*Impact 2:* If dredged materials are used to create CDF/CAD sites at PSNS, the permanent loss of deep-water marine habitat would be a significant impact.	Not significant.
	Mitigation 4: Avoid dredging and marine construction between March 15 and June 15 (COE; WDFW; WDOE).	*Mitigation 4:* Avoid dredging and marine construction between March 15 and June 15 (COE; WDFW; WDOE).	*Mitigation 4:* Avoid dredging and marine construction between March 15 and June 15 (COE; WDFW; WDOE).	*Mitigation 4:* Avoid dredging and marine construction between March 15 and June 15 (COE; WDFW; WDOE).	*Mitigation 2:* Compensate by creation of shallow marine habitat at the CAD site (COE; WDFW; WDOE; WDNR; USFWS, NMFS, EPA).	

Table 2-11. Summary of Significant Environmental Impacts and Mitigations (page 4 of 5)

Resource	*Alternative One*	*Alternative Two*	*Alternative Three*	*Alternative Four*	*Alternative Five*	*Alternative Six (No Action)*
Marine Biology	*Impact 5:* If dredged materials are used to create CDF/CAD sites at PSNS, the permanent loss of deep-water marine habitat would be a significant impact.	*Impact 5:* If dredged materials are used to create CDF/CAD sites at PSNS, the permanent loss of deep-water marine habitat would be a significant impact.	*Impact 5:* If dredged materials are used to create CDF/CAD sites at PSNS, the permanent loss of deep-water marine habitat would be a significant impact.	*Impact 5:* If dredged materials are used to create CDF/CAD sites at PSNS, the permanent loss of deep-water marine habitat would be a significant impact.		
	Mitigation 5: Compensate by creation of shallow marine habitat at the CAD site (COE; WDFW; WDOE; WDNR; USFWS, NMFS, EPA).	*Mitigation 5:* Compensate by creation of shallow marine habitat at the CAD site (COE; WDFW; WDOE; WDNR; USFWS, NMFS, EPA).	*Mitigation 5:* Compensate by creation of shallow marine habitat at the CAD site (COE; WDFW; WDOE; WDNR; USFWS, NMFS, EPA).	*Mitigation 5:* Compensate by creation of shallow marine habitat at the CAD site (COE; WDFW; WDOE; WDNR; USFWS, NMFS, EPA).		
Terrestrial Biology	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Land Use	Not significant.	'Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Socioeconomics	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Ground Transportation	Not significant.	Not significant.	*Impact 1:* An increase in daily trips associated with the PHNSY CVN crew and families would impact local transportation network.	*Impact 1:* An increase in daily trips associated with an additional NAVSTA Everett CVN crew and families would impact local transportation network.	*Impact 1:* An increase in daily trips associated with the PHNSY CVN crew and families would impact local transportation network.	Not significant.
			Mitigation 1: Provide road widening improvements in the local area and implement peak hour trip reduction program during PIA/DPIAs (U.S. Navy; Hawaii State Department of Transportation).	*Mitigation 1:* Provide road widening improvements in the local area and implement peak hour trip reduction program during PIA/DPIAs (City of Everett, if implemented).	*Mitigation 2:* Provide road widening improvements in the local area and implement peak hour trip reduction program during PIA/DPIAs (U.S. Navy; Hawaii State Department of Transportation).	
Vessel Transportation	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Air Quality	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Noise	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Aesthetics	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Cultural Resources	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.

Table 2-11. Summary of Significant Environmental Impacts and Mitigations (page 5 of 5)

Resource	*Alternative One*	*Alternative Two*	*Alternative Three*	*Alternative Four*	*Alternative Five*	*Alternative Six (No Action)*
General Services	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	*Impact 1*: Substantial deficiencies in general services at PSNS would result due to the demand associated with additional crew members and their families, resulting in exceedance of PSNS infrastructure capacities.
						Mitigation 1: None, consistent with No Action.
Health and Safety	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.
Utilities	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	*Impact 1*: Substantial deficiencies in utilities at PSNS would result due to the demand associated with additional crew members and their families, resulting in exceedance of PSNS infrastructure capacities. *Mitigation 1*: None, consistent with No Action.
Environmental Justice	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.	Not significant.

U.S. Army Corps of Engineers [COE]
California Department of Fish and Game [CDFG]
U.S. Fish and Wildlife Service [USFWS]
National Marine Fisheries Service [NMFS]
Environmental Protection Agency [EPA]
U.S. Coast Guard [USCG]
Washington State Department of Fish and Wildlife [WDFW]
Washington State Department of Ecology [WDOE]
Washington State Department of Natural Resources [WDNR]

2.6.1.2 *Navy Pier*

Navy Pier also is unable to satisfy CVN Home Port Objectives and Requirements. Specifically, Navy Pier is located on only 5.9 acres of land, representing insufficient space to provide for the necessary shore facility infrastructure (e.g., wharf, warehouse). Additionally, there is inadequate truck ingress/egress to the pier area.

2.6.1.3 *Naval Submarine Base, San Diego*

Naval Submarine Base, San Diego is fully developed so that there is insufficient space to construct CVN home port facilities and infrastructure (e.g., adequate utility services [high-voltage shore power, high-volume shore steam, water, sewer, and oily water], wharfage, warehouse space, maintenance facilities, and parking). Further, the location lacks sufficient roads and traffic control to accommodate the addition of the large crew complement of a CVN and the associated maintenance personnel. Naval Submarine Base is accessible only by a single, two-lane residential street that extends for several miles beyond the base.

2.6.2 Pacific Northwest

2.6.2.1 *SUBASE Bangor*

In addition to PSNS Bremerton and NAVSTA Everett, the only other home port location in the Pacific Northwest is SUBASE Bangor. Currently, no other location in the Pacific Northwest could satisfy CVN Home Port Objectives and Requirements. SUBASE Bangor is a Trident submarine home port located on the shores of the Hood Canal in Kitsap County, approximately 12 miles northwest of PSNS Bremerton (DON 1995b; see Figure 1-2). As a candidate for carrier homeporting, SUBASE Bangor offers good water depth, a sheltered harbor in Hood Canal, and deep-water passage to the Pacific. No dredging would be needed to achieve sufficient CVN transit water depth in the approach channel, the turning basin, or at pierside. Support facilities and equipment, however, are primary constraints to CVN homeporting. All basic carrier support facilities would need to be constructed there, including a pier. Construction of home port berth and community support facilities and infrastructure would generate substantially more environmental impacts compared to PSNS and NAVSTA Everett. SUBASE Bangor is an active port, with three to four Trident-class submarines typically in port at any time. The addition of a homeported CVN would interfere with these existing submarine operations along the waterfront (DON 1995b).

2.6.3 Pearl Harbor

2.6.3.1 *Ford Island F5*

Pier F5 on Ford Island was constructed in 1991 for homeporting an IOWA-class battleship that was subsequently removed from active service (see Figure 2-6). The pier belongs to NAVSTA and is located on the southeast side of Ford Island adjacent to the Pearl Harbor turning basin. The pier is planned to be used as the temporary berth for the battleship ex-USS MISSOURI, which is being donated to a non-profit organization as a memorial. Water depth at the pier face is 45 feet MLLW, and approximately 48 feet MLLW at the adjacent main turning basin (DON 1996). Dredging would be required to achieve sufficient CVN homeporting depths of 50 feet MLLW. Under-channel utility lines would also require relocation.

F5 is 1,000 by 80 feet, with an additional 25,000 square feet of laydown area directly behind the pier. The pier would need to be lengthened and possibly widened to accommodate a NIMITZ-class aircraft carrier. Substantial open space (mostly paved) is located 600 feet north of the pier. Existing utility connections would provide only about one-third the services required by a CVN. Increasing utility service at F5 would cause system limitations on Ford Island. Therefore, CVN homeporting on Ford Island would require upgrading service to the island as well as to the pier.

2.6.3.2 *NAVSTA Berths B22 and B23*

Berths B22 and B23 (B22/23) are located within NAVSTA and adjacent to PHNSY, at the west end of the B22 to B26 pier complex, on the south side of Merry Loch. Design depth along the pier is 40 feet. Dredging to a 50-foot depth would require that Merry Loch be dredged from the turning basin to the end of B23, in addition to dredging the entrance channel and turning basin. If B22/23 were used as a CVN home port berth, maintenance would occur at B2/B3 such that both sites would require dredging. Dredging adjacent to these berths appears to be feasible without structural impairment. However, a structural evaluation would be necessary. Utility lines coming onshore at B22 would not need to be relocated to accommodate the deeper project depth.

B22 is 500 by 75 feet, and B23 is 580 by 75 feet, for a total length of 1,080 feet; the 1,300-foot length and 120-foot width needed for CVN mooring is also achievable using Pier B24. The two piers combined have approximately four acres of potential support area, half of which is infrequently used. PHNSY has several old, unused warehouses available for CVN homeporting, including a 75,000-square-foot warehouse (Building 68) directly behind B22. Both berths have utility connections, but they would require substantial upgrades to support a CVN home port.

B22/23 are general use berths certified for limited explosives handling (DON 1995c). These berths are considered the least desirable among the B piers because of their distance from the center of the Naval Station. Although capable of supporting a CVN home port berth, B22/23 is considered inferior to B2/B3 due to the need for additional dredging (for a separate maintenance berth and the increased distance between B2/B3 and the turning channel) and structural upgrades.

2.7 HOME PORT FACILITIES AND INFRASTRUCTURE CONSIDERED BUT ELIMINATED

Additional CVN homeporting facility and infrastructure development scenarios at each of the four selected locations were analyzed. The following scenarios cannot reasonably satisfy the CVN Home Port Objectives and Requirements defined in section 2.3.1, illustrating that a range of alternatives has been addressed in this EIS.

2.7.1 NASNI

Facilities for Three Additional CVNs: Capacity for Total of Four CVNs

Homeporting a third additional CVN at NASNI, for a total of four CVNs, would require substantial infrastructure improvements, including dredging, berthing, parking, warehouse, barracks, recreation fields, family housing, transient berth, and utility upgrades. These improvements would be substantial, because historically NASNI has the infrastructure to support a total of three CVs. The fourth CVN places a substantial additional support requirement on NASNI. Environmental impacts would be far greater if the third additional CVN were homeported at NASNI rather than in the Pacific Northwest area. Because of these reasons, it is unreasonable to expect NASNI to be able to support three additional CVNs, for a total of four.

2.7.2 PSNS

Facilities for Two Additional CVNs: Capacity for Total of Three CVNs

Homeporting a second additional CVN at PSNS, for a total of three CVNs, would result in an unreasonable constraint on available berthing areas, requiring use of Pier 3 inside the CIA. This would be undesirable due to conflicts with sailor QOL and the PSNS ship maintenance mission. Depending on CVN scheduling and work levels, PSNS could be required to support maintenance on a fourth CVN, impacting the normal maintenance workload. Four CVNs in addition to homeported ships and other ships undergoing maintenance would not be possible to support given the size of the waterfront and maintenance areas.

2.7.3 NAVSTA Everett

Facilities for Two Additional CVNs: Capacity for Total of Three CVNs

Homeporting a second additional CVN at NAVSTA Everett, for a total of three CVNs, would require extensive infrastructure and maintenance facility development. New berths would need to be constructed for a second additional homeported CVN. Additional CVN crew support facilities (e.g., parking, recreation) would also be required. Because of the limited size of available support areas and the waterfront, developing homeporting facilities in support of two additional CVNs would not be reasonable.

The option of constructing a Depot Maintenance Facility at NAVSTA Everett was examined but deemed to be unreasonable. Both cost and close proximity to depot maintenance facilities at Puget Sound Naval Shipyard were significant factors in this decision. Construction of more propulsion plant depot maintenance capacity in the Pacific Northwest would create excess regional maintenance infrastructure, and would be counter to BRAC efforts to reduce excess infrastructure. However, use of PSNS maintenance facilities while the ship is homeported at NAVSTA Everett is viable if sailor quality of life concerns related to the commute between NAVSTA Everett and PSNS during PIAs can be mitigated.

2.7.4 PHNSY

Facilities for Two Additional CVNs: Capacity for Total of Two CVNs

Homeporting a second additional CVN at PHNSY, for a total of two CVNs, would require construction of a second homeporting berth. This development would exacerbate difficulties involved with transiting to the SOCAL training ranges, affecting operations and training and sailor quality of life due to family separation. It would cause significant impacts to transportation, parking, housing, and recreational facilities. Therefore, operating homeporting facilities in support of two or more CVNs at PHNSY would not be reasonable.

3.0 NAVAL AIR STATION NORTH ISLAND

HISTORICAL BASELINE AND EXISTING CONDITIONS

A detailed discussion of NASNI's historical status as a carrier home port is necessary to define the appropriate baseline for evaluating impacts resulting from proposed action alternatives at this location. As described in section 2.3.2.1, NASNI has provided the requisite facilities and infrastructure to homeport three aircraft carriers since World War II. This is considered the historic baseline in terms of its carrier homeporting facilities and infrastructure. For this EIS, the historic baseline at NASNI is defined as the capacity to provide homeporting facilities for up to three carriers at a time.

Although historically three carriers have been homeported at NASNI, the number of homeported carriers actually *in port at any one time* has varied. This is a result of the traditional operational deployments and training and maintenance schedules of Pacific Fleet aircraft carriers. Aircraft carrier schedules from 1975 through 1998 were analyzed to determine the number of days homeported carriers were actually in port at NASNI (see Volume 3, Section 3.0). A summary of the number of days homeported carriers were in port at NASNI is presented in Table 3-0.

Table 3-0
NASNI HOMEPORTED CARRIERS IN PORT

Number of Homeported Carriers in Port at NASNI	*Average Number of Days Per Year Homeported Carriers Were in Port When Three Carriers Were Homeported at NASNI (1975-1993)*	*Average Number of Days Per Year Homeported Carriers Were in Port When Two Carriers Were Homeported at NASNI (1994-1998)*
3 Carriers	13	0
2 Carriers	98	104
1 Carrier	173	197
0 Carriers	81	64

The table illustrates that the number of carriers *actually in port at any one time* varies due to the dynamic nature of carrier deployment, training, and maintenance schedules. During the period 1975 - 1993 when NASNI was home port to three carriers, all three carriers were simultaneously in port an average of 13 days per year. Since the number of days the carriers are actually in port will vary due to changes to deployment, training, and maintenance schedules, as well as the number of carriers homeported at NASNI, the historical data have been used as a reasonable means to predict the future environmental impacts of the proposed action.

The deployment, training and maintenance schedules for a CVN are nearly identical to that of a CV. Therefore, there would be no expected difference in the average number of homeported carriers in port per day based upon the type of carrier homeported at NASNI. Also, based on operational requirements, the Navy does not contemplate any changes to CVN deployment, training, and maintenance policies which would significantly change the average number of days three carriers would simultaneously be in port.

Because the proposed action is the construction of facilities and infrastructure to support homeporting of CVNs, the existing capability to home port carriers at NASNI was used as a baseline against which impacts of the proposed action and alternatives at NASNI were compared. Table 3-0 demonstrates that the number of homeported carriers in port at NASNI is substantially the same regardless of the whether or not NASNI homeporting capacity is fully utilized. In analyzing environmental impacts on those resource areas directly affected by the physical presence of homeported carriers at NASNI (e.g., traffic and air quality) the analysis relied upon data collected when two homeported carriers were in port at NASNI. Consequently, the impact analysis addresses the foreseeable impacts associated with homeporting either two or three CVNs at NASNI. In analyzing environmental impacts for those resource areas directly affected by military dependents or other factors associated with the home port assignment and not associated with the physical presence of carriers at NASNI (e.g., schools and housing), the analysis relied upon data that reflects the fact that currently only two carriers are homeported at NASNI.

3.1 TOPOGRAPHY, GEOLOGY, AND SOILS

3.1.1 Affected Environment

Topography

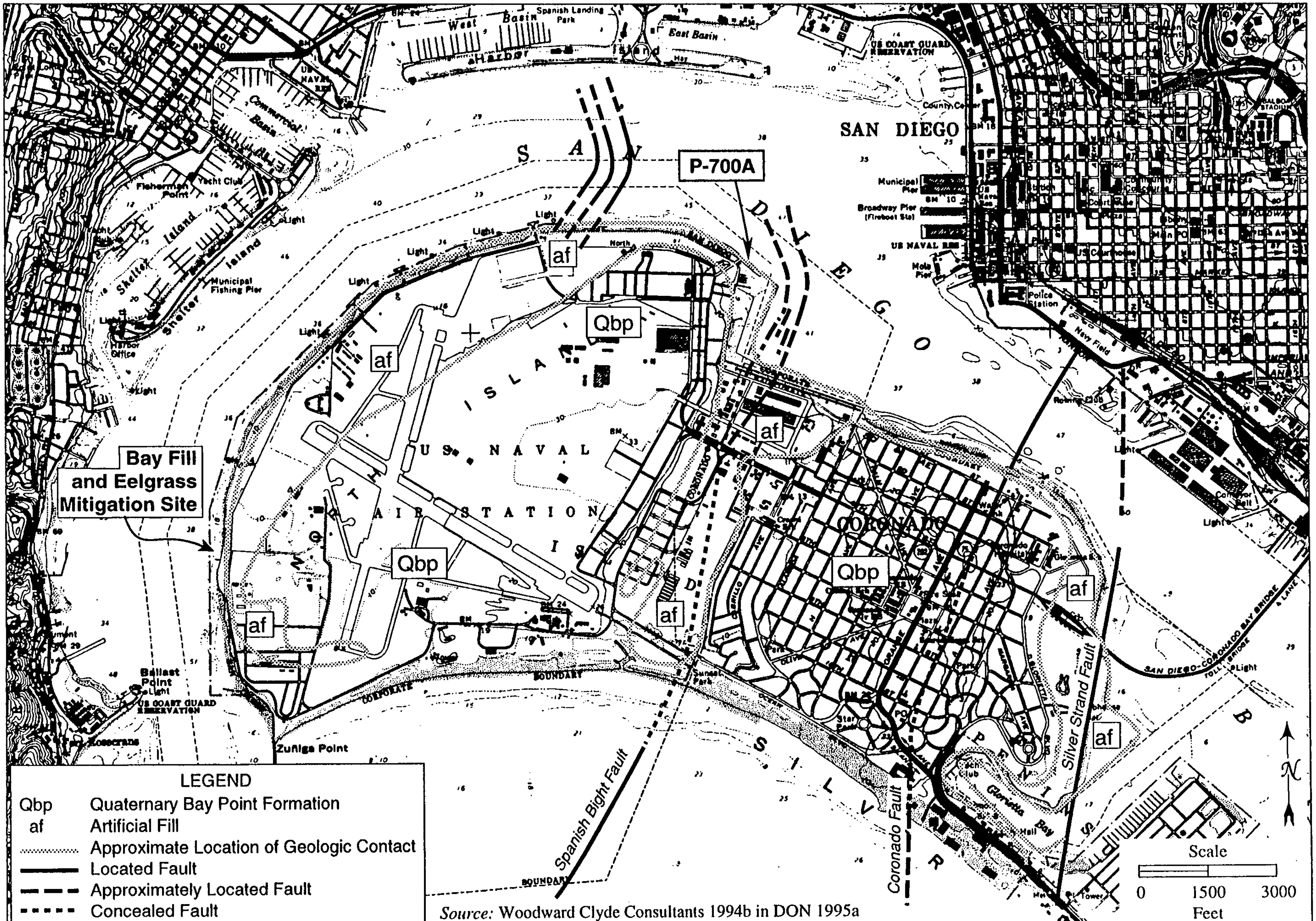
Naval Air Station North Island (NASNI) is predominantly flat, with an average elevation of approximately 20 feet above mean sea level. Nearly all of the island has been graded for development. Bulkheads for quaywall and seaplane ramps have been installed along areas of the bay shoreline, including the shores of the BRAC CVN improvements under construction and transient CVN berth locations (DON 1991).

Geology and Soils

The proposed NASNI home port location is underlain by artificial fill deposits and the Quaternary-age Bay Point Formation. Artificial fill associated with development of NASNI covers the majority of the location. The underlying Bay Point Formation consists of poorly consolidated, fine- to medium-grained sandstone. The artificial fill consists of primarily hydraulic fill of bay material. However, the fill may consist partially of native soils, including the Marina-Chesterton association, which occurs predominantly on NASNI and in the City of Coronado. This soil series consists of an upper sandy loam, which is moderately to excessively well-drained, underlain by a variable subsoil layer of coarse sandy loam to sandy clay. Beach sands, consisting of excessively drained sands and gravels, may also be present within the fill material (DON 1995a; see Volume 3, section 3.1).

Faulting and Seismicity

The Spanish Bight fault, a segment of the Rose Canyon fault zone, crosses the proposed NASNI home port location in a northeast/southwest direction (Figure 3.1-1) (Woodward-Clyde Consultants 1998; DON 1995a; see Volume 3, section 3.1). The Rose Canyon fault zone is a complex system of north- to northwest-trending faults extending from within San Diego Bay to the continental shelf offshore near Carlsbad (Treiman 1984). Although no large earthquakes have been attributed to the Rose Canyon fault zone during historic times, the Spanish Bight fault is considered active, indicating fault movement within Holocene time (past 11,000 years). The maximum credible earthquake (MCE) (maximum earthquake likely to occur) on a nearby fault would be an earthquake of Richter magnitude 7.0, associated with the Rose Canyon fault zone. A peak horizontal ground acceleration (estimation of the ground motion associated with an earthquake) of 0.7g is possible from an earthquake of this magnitude. The intensity of earthquakes is related to the effects of the earthquakes on structures and people, and can be quantified using the Modified Mercalli scale. An earthquake associated with the Rose Canyon fault could result in a Modified Mercalli Intensity of IX to X, on a scale of XII. Effects to structures could include destruction of masonry and wooden structures, breakage of underground pipes, and serious damage to dams, dikes, and embankments. People could be thrown to the ground, and cracks could appear in the ground. The intensity of the 1994 Northridge earthquake, in the Los Angeles area, was estimated a Modified Mercalli Intensity of IX to X (DON 1995a).



Source: Woodward Clyde Consultants 1994b in DON 1995a

Figure 3.1-1. Rose Canyon Fault Zone, San Diego Bay Area

The Coronado fault, another segment of the Rose Canyon fault zone, traverses Coronado Island 1.1 miles east of the proposed NASNI home port location, and is considered active. Other nearby faults include the active Coronado Bank fault zone, located 12 miles offshore of Coronado Island, and the potentially active La Nacion fault, located 7 miles east of the subject location. Potentially active faults display evidence of Pleistocene fault movement (11,000 to 1.6 million years ago).

San Diego is located within Seismic Zone 4, as defined by the Uniform Building Code. Seismic Zone 4 is a highly active seismic region where intense ground motion can be expected. Although San Diego is a highly active seismic region, none of the recorded earthquakes in the San Diego Bay area have been catastrophic. In 1964, three earthquakes of magnitude 3.5 occurred in San Diego Bay, east of the Naval Amphibious Base (City of Coronado 1974). The La Nacion fault is capable of producing a MCE and associated peak horizontal ground acceleration of Richter magnitude 6.8 and 0.43g, respectively. Similarly, the Coronado Bank fault is capable of producing a MCE and peak horizontal ground acceleration of magnitude 6.75 and 0.32g, respectively. Less ground accelerations would be expected from large earthquakes on more distant active faults, such as the San Andreas and San Jacinto faults (DON 1995a; see Volume 3, section 3.1).

Geologic Hazards

As previously noted, the proposed NASNI home port location is in a highly active seismic region. Ground accelerations up to 0.7g are possible as a result of a large earthquake on the Rose Canyon fault zone. However, it is believed that a single peak of intense motion (peak acceleration) may contribute less to cumulative damage potential than several cycles of less intense shaking (Ploessel and Slosson 1974). The estimated repeatable high ground acceleration at the project location is 0.47g (DON 1995a; see Volume 3, section 3.1).

The active Spanish Bight fault segment of the Rose Canyon fault zone crossing the proposed NASNI home port location in a northeast-southwest direction may potentially cause ground rupture of approximately 0.4 feet (Woodward-Clyde Consultants 1998). However, fault rupture may cause large differential settlement on the earth's surface at or near the fault trace and result in surface offsets up to several feet. (Woodward-Clyde Consultants 1994a, 1994b, 1994c; DON 1995a; see Volume 3, section 3.1).

Fill soils along the shoreline of Coronado Peninsula have been constructed primarily by hydraulic filling of dredged bay mud material, which provides little or no consolidation of soils. These types of soils are highly prone to liquefaction, which is a seismically induced phenomenon in which loose to medium-dense, saturated, predominantly granular material loses its cohesive properties, resulting in loss of bearing capacity, excessive settlement, excessive lateral spreading, and loss of stability. Based on geotechnical studies, the liquefaction potential of the fill material at the proposed project location is high, whereas the liquefaction potential of the underlying Bay Point Formation is low. Artificial fill, consisting primarily of hydraulic fill of bay mud material, may also be subject to long-term settlement due to placement of structures (DON 1995a; see Volume 3, section 3.1).

Tsunamis (seismically induced sea waves) are very long, shallow, high-velocity ocean waves, which are usually generated by earthquakes. The greatest recorded tsunami in San Diego Bay had a recorded height of 4.6 feet in 1960 (DON 1992a). The potential for tsunami damage to land areas adjacent to San Diego Bay exists but has not been quantified. The offshore San Clemente fault could generate a tsunami (Inman and Nordstrom 1973) that would likely be manifested in San

Diego Bay as a gradual upswelling of water. Associated currents could damage structures in the water or along the coastal shoreline (DON 1995a; see Volume 3, section 3.1). In addition, portions of the project location along San Diego Bay, which are below 10 feet in elevation, are located within the 100-year flood potential area. This area would be subject to flooding during a 100-year storm event when combined with an extreme high tide or a tsunami (DON 1995a).

A seiche is an earthquake-induced wave occurring in a confined or embayed body of water. Potential seiches in San Diego Bay have been estimated to have maximum heights above the still water level between 6 and 12 feet, and a period of 20 to 30 minutes (Woodward-Clyde Consultants 1994c). A seiche in San Diego Bay would only be expected as a result of a relatively large earthquake in the San Diego area.

3.1.2 Environmental Consequences and Mitigation Measures

The impacts on topography, geology, and soils associated with the capacity to homeport three aircraft carriers at NASNI would be from the construction of facilities and infrastructure (e.g., new piers, electrical transformers, utility pipes, etc.). Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of incremental changes to the capacity previously created for the CV that would be replaced by the CVN. Facilities for the first additional CVN would be developed by 2002 and facilities for the second additional CVN by 2005.

Significance Criteria

Impacts of the proposed project on the geologic environment would be considered significant if:

- Unique geologic features of unusual scientific value, for study or interpretation, would be adversely affected.
- Geologic processes such as major landsliding or erosion would be triggered or accelerated.
- Substantially adverse alteration of topography beyond that resulting from natural erosional and depositional processes would occur.
- Substantially adverse disruption, displacement, compaction, or overcovering of the soil would occur. Substantial irreversible disturbance of the soil materials at the location could cause their use for normal purposes in the area to be compromised.

Impacts of the following geohazards on the proposed project would be considered significant if:

- Ground rupture occurs due to an earthquake on an active fault, causing damage to structures and limiting their use due to safety considerations or physical conditions.
- Earthquake-induced ground shaking occurs causing liquefaction, settlement, or surface cracks at the location and attendant damage to proposed structures, causing a substantial loss of use or exposing the public to substantial risk of injury.
- Historic soil failure (primarily fill) occurs due to liquefaction.
- Slope failure occurs on hillsides or dikes (ship berths area).

- Flooding caused by 100-year storm events or when combined with an extreme high tide or seismic sea wave occur that are capable of causing substantial damage to structures or exposing the public to substantial risk of injury.
- Seiches or tsunamis caused by nearby or distant earthquakes that are likely to occur in the lifetime of the project and are capable of causing substantial damage to structures or exposing the public to substantial risk of injury.

None of the alternatives would impact geology or seismicity.

3.1.2.1 *Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new improvements.

Geologic Environment

DREDGING/MITIGATION SITE

Because no dredging is proposed and a mitigation site is not required, no impacts on the geologic environment would result.

FACILITY IMPROVEMENTS

Because no construction is proposed, no impacts on the geologic environment would result.

OPERATIONS

Because no additional CVN and associated infrastructure is proposed, no impacts on the geologic environment would result.

Geohazards

DREDGING/MITIGATION SITE

Because no dredging or mitigation site is proposed, impacts associated with geologic hazards on dredging or the mitigation site would remain unchanged.

FACILITY/IMPROVEMENTS

Because no construction is proposed, impacts associated with geologic hazards at the project location would remain unchanged and, therefore, be less than significant.

OPERATIONS

Because no new CVNs would be added, operational impacts would remain unchanged.

3.1.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging.

Geologic Environment

DREDGING/MITIGATION SITE

Bathymetry would be modified by the required dredging of approximately 582,000 cubic yards (cy) to deepen the CVN homeporting berth turning area. The berth is located in an industrial, predominantly disturbed area, where previous dredging has been completed, including, the adjacent channel and turning basin, which have already been dredged to a comparable depth. Dredging would temporarily disrupt underwater depositional processes; however, similar to prior dredging episodes in this area, depositional equilibrium would be reestablished within a short period of time. No regional, long-term depositional disruptions would occur as a result of dredging in this area. Therefore, impacts on geological resources due to dredging are less than significant.

Development of the mitigation site would require excavation of approximately 1.2 to 2.5 acres of artificial fill to create a shallow wetland in place of vacant upland. Topography and bathymetry at the mitigation site would be modified slightly. Similar to impacts associated with dredging in the berth area, no regional, long-term depositional disruptions would occur as a result of dredging in this area. Therefore, these impacts are minor and less than significant.

Sediments dredged from the navigation channel would be disposed at either the NAB Enhancement Area or the designated ocean dredged material disposal location (LA-5) or in a manner consistent with responsible resource agency (e.g., Regional Water Quality Control Board [RWQCB], U.S. Army Corps of Engineers [COE], California Environmental Protection Agency [CalEPA]) practices.

FACILITY IMPROVEMENTS

Additional construction for providing capacity for homeporting one additional CVN would include a new pier to replace the existing Pier J/K, relocating a ferry/flag landing, constructing a CVN warehouse, a fleet support building, an equipment laydown building, and electrical upgrades and lighting. Ferry/flag landing construction would not require dredging and would not affect the underwater bathymetry. Topography would be slightly modified during construction. However, North Island is predominantly flat and nearly all of the island has previously been graded for construction. Therefore, these impacts to topography would be less than significant.

Construction of the proposed facilities would result in temporary soil disturbance and some temporary soil erosion on land. Because of the relatively flat terrain, short-term erosion resulting from construction would be limited. Standard erosion control measures and pollutant control measures are specified in the Storm Water Pollution Prevention Plan (SWPPP) currently in place. The SWPPP would be amended to incorporate the proposed project, thus further minimizing impacts to less than significant.

OPERATIONS

Operations associated with providing capacity for homeporting one additional CVN would not result in additional disturbance or impacts to the geologic environment at NASNI beyond what has been previously created to provide the historical three-carrier homeporting capacity.

Geohazards

DREDGING/MITIGATION SITE

Geohazard (seismicity, fault rupture, liquefaction, tsunamis, seiches, settlement) impacts during dredging are unlikely and, therefore, less than significant. The shallow-water mitigation site, located directly inshore of Pier B and contiguous with the BRAC CVN mitigation site, would be subject to the same geohazards as the shallow-water biological communities already present in the area. Impacts from geohazards on the mitigation site are not significant.

FACILITY IMPROVEMENTS

Impacts of geohazards (seismicity, fault rupture, liquefaction, settlement, flooding) on structures or personnel associated with providing capacity for homeporting one additional CVN would be less than significant because they would be mitigated by the project design as discussed below.

Earthquake-related hazards such as ground acceleration, ground shaking, fault rupture, liquefaction, and settlement are possible in this active seismic region and, in particular, in the project area where surface fault rupture is possible and hydraulic fill soils with a high potential for liquefaction are pervasive. An earthquake associated with the Rose Canyon fault could result in a Modified Mercalli Intensity of IX to X, on a scale of XII. Effects to structures could include destruction of masonry and wooden structures, breakage of underground pipes, and serious damage to dikes and embankments. In addition, people could be thrown to the ground, and cracks could appear in the ground. The MCE on a nearby fault would be an earthquake of Richter magnitude 7.0, associated with the Rose Canyon fault zone. A peak horizontal ground acceleration (estimation of the ground motion associated with an earthquake) of 0.7g is possible from an earthquake of this magnitude. In addition, ground rupture could potentially occur along the Spanish Bight fault in the vicinity of the proposed NASNI home port location. Potentially significant impacts could result from these seismic-related phenomena.

However, the project design would incorporate the criteria and requirements for the seismic design of buildings on defense installations set forth in the Department of the Army, the Navy, and the Air Force technical manual (TM) 5-809-10/NAVFAC P-355/AFM 88-3 Seismic Design for Buildings. Chapter 4 of this manual states that "the general objectives are approached with reference to a major level (or maximum expected level) of earthquake ground motion having a 10 percent probability of exceedance in 50 years." A recent study by the Naval Civil Engineering Laboratory (NCEL) has determined the ground acceleration with 10 percent probability of exceedance at NASNI as 0.24g (Ferrito 1993).

The seismic design would also consider potential fault rupture in the vicinity of the proposed NASNI home port location. Two fault displacement scenarios have been developed to model the various potential modes of faulting (Table 3.1-1). The scenario judged most likely (Case 2) assumed that the fault movement would be distributed among numerous faults in San Diego Bay, rather than only on the Spanish Bight fault, which traverses the proposed NASNI home port location.

Table 3.1-1
Spanish Bight Fault Rupture Scenario

Scenario Likelihood of Occurrence	*Assumed Rupture Characteristics*	*Rupture Length (km)*	*Earthquake Magnitude*
Case 1 (33%)	Fault rupture occurs on Spanish Bight fault. Little to no displacement along Coronado and Silver Strand faults	20	6.5
Case 2 (67%)	Fault rupture occurs on Rose Canyon fault zone. Displacements approximately equally distributed between Spanish Bight, Coronado, and Silver Strand Faults in San Diego Bay.	100	7.2

Source: Woodward-Clyde Consultants 1988

Combining these two scenarios, the fault displacement associated with a 10 percent probability of exceedance in a 50-year time frame is estimated to be approximately 0.4 feet (Table 3.1-2). It is anticipated that fault movements on this order would not cause collapse of the proposed CVN wharf (Woodward-Clyde Consultants 1998). The project design would include mitigations for fault rupture, including: additional bollards for emergency reconfiguration of mooring; emergency isolation valves to prevent releases of hazardous materials from utility pipelines; and wharf seismic joints to limit damage in the event of differential displacement.

Table 3.1-2
Probabilistic Fault Displacement Analysis Results for the Proposed NASNI Home Port Location

Scenario No.	*Probability of Exceeding 1 Foot of Fault Displacement in 50 Years*	*Estimated Fault Displacement for 10 Percent Probability of Exceedance in 50 Years (in feet)*
Case 1	3.2%	0.25
Case 2	1.1%	0.50
Case 3	1.8%	0.40

Source: Woodward-Clyde Consultants 1988

The project design would also incorporate the 1997 Uniform Building Code, and the criteria for the seismic design of waterfront structures provided in NCEL Report R939 and Naval Facilities Engineering Command Design Manual DM26 (DON 1995a). The design would contain requirements and guidelines to safeguard against major failures and loss of life, but would not limit damage or provide for easy repair. Structures designed in accordance with the guidelines are expected to (1) withstand minor earthquake ground motion without damage; (2) resist a moderate earthquake without structural damage, but allow for some nonstructural damage; and/or (3) resist major earthquake ground motion without collapse, but with possible structural damage (DON 1995a).

The berthing structure would be designed in accordance with guidelines in the following military design manuals: (1) MIL-HDBK-1025: *Waterfront Facilities Criteria Manuals,* (2) NACFAC-

ENGCOM DM 26: *Harbor and Coastal Facilities Design Manuals* and (3) NFESC TR-2069-SHR: *Design Criteria for Earthquake Hazard Mitigation of Navy Piers and Wharves*, by J.M. Ferrito, dated March 1997. In addition, the design would address the issue of transferring shaking loads from the wharf to the CVN berthed alongside (DON 1995a). These design manuals address construction measures necessary to withstand potential geohazards at the project location. However, the cited regulations and guidelines do not set forth recommendations with respect to earthquake-induced ground loss strength such as liquefaction. Liquefaction aspects of the design of Navy facilities are discussed in NCEL Technical Note N-1862 (Youd 1993 in DON 1995a). In order to avoid potential damage to structures due to ground shaking, liquefaction, or differential settlement of foundation soils, berthing structure fill materials would be compacted using standard geotechnical engineering techniques.

Criteria and guidelines for the design of pile foundations are contained in the American Association of State Highway and Transportation Officials (AASHTO) bridge standards as amended by California Department of Transportation (Caltrans). These guidelines use the MCE as the design seismic event, a more conservative design criteria than that identified in NAVFAC P-355. The AASHTO bridge standards would be used for the design of the pile foundations for the new pier and relocated ferry/flag landing (Ferver 1994 in DON 1995a).

Design guidelines and recommendations associated with settlement of soils due to the compressibility of structures are provided in NAVFAC Manual DM-7.01, 7.02, and 7.03 (DON 1992d). Settlement of a structure is considered acceptable as long as activities conducted in or on the structure are not adversely affected, and the structural integrity is not jeopardized.

Earthquake-related hazards cannot be avoided in the region and, in particular, in the coastal area where hydraulic fill is pervasive. Implementation of the above design measures would reduce the effects of seismically induced structural failure. Engineering design criteria incorporated into the project would mitigate the geohazard impacts to less than significant.

To avoid potential damage to structures due to flooding, structures would be built outside of 100-year flood zones or designed to withstand such flooding events. The project design would incorporate Federal Emergency Management Agency (FEMA) Documents 267, dated August 1995, and 267A, dated March 1997, which address improvements in potential flood hazard areas. These measures would reduce impact levels to less than significant. Tsunamis and seiches may result in upswelling damage along the shoreline and overwashing (i.e., flow of water in restricted areas). However, because tsunamis and seiches are extremely rare, are unlikely to occur during construction of the project, and are considered an unavoidable, acceptable risk, potential impacts due to flooding associated with the occurrence of a tsunami or seiche would be less than significant.

OPERATIONS

Impacts of geohazards (seismicity, fault rupture, liquefaction, settlement, flooding, tsunamis, seiches) on facilities and personnel would be less than significant because they would be mitigated by the project design as discussed above. In addition, an effective earthquake preparedness plan is in place at the proposed project location including computer-based command and control, which is networked throughout the state and approved by the California Office of Emergency Services and the California Department of Health.

Geohazards could also result in the rupture of chemical storage containers and release of chemicals to the environment. However, as described in section 3.2.2.2, these operation-related impacts would be reduced to levels that are less than significant by the implementation of the existing SWPPP, the existing safety and health programs described in section 3.15, and compliance with federal, state, and local statutes and regulations pertaining to storm water retention and treatment and soil and groundwater contamination.

3.1.2.3 *Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)*

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Geologic Environment

DREDGING/MITIGATION SITE

Providing the capacity to homeport a second additional CVN would not require additional dredging or require creating additional mitigation acreage beyond that listed in section 3.1.2.2. Therefore, a second CVN would result in less than significant impacts which would be the same as those described in section 3.1.2.2.

FACILITY IMPROVEMENTS

There would be a minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those needed to provide the capacity to homeport one additional CVN. Only additional minor utility and fencing upgrades would be required. These facilities and infrastructure would be minimal when compared to the facilities and infrastructure previously created at NASNI to provide the historical three-carrier homeporting capacity. Therefore, impacts on geological resources would be the same as those described in section 3.1.2.2 and would remain less than significant.

OPERATIONS

Operations associated with providing the capacity to homeport a second additional CVN would not result in additional disturbance or impacts to the geologic environment at the home port location beyond what has been previously created to provide the historical three-carrier homeporting capacity.

Geohazards

DREDGING/MITIGATION SITE

Geohazards (seismicity, fault rupture, liquefaction, tsunamis, seiches, settlement) would not adversely impact dredging or the mitigation site. In addition, homeporting a second additional CVN would not require additional dredging or require creating additional mitigation acreage, beyond that discussed in section 3.1.2.2. Therefore, a second CVN would result in less than significant impacts which would be the same as those described in section 3.1.2.2.

FACILITY IMPROVEMENTS

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. A CVN berthing wharf and several miscellaneous structures would be constructed in support of a second additional CVN. Changes to the facilities and infrastructure would be minimal when compared to facilities and infrastructure previously created to provide the historical three-carrier homeporting capacity. Therefore, the capacity to homeport a second CVN would result in less than significant impacts which would be the same as those described in section 3.1.2.2.

OPERATIONS

Operations associated with providing the capacity to homeport a second additional CVN would not result in additional impacts from geohazards. Impacts of geohazards (seismicity, fault rupture, liquefaction, settlement, flooding) on facilities and personnel during operations would be less than significant because they would be mitigated by the project design as discussed in section 3.1.2.2 above. As described in section 3.1.2.2, an earthquake preparedness plan is in place to provide for a coordinated and effective emergency response.

Tsunamis and seiches may result in upswelling damage along the shoreline and overwashing (i.e., flow of water in restricted areas) of the home port location. However, because such events are extremely rare, are unlikely to occur during the lifetime of the project, and are considered an unavoidable, acceptable risk, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant. In addition, an effective earthquake preparedness plan is in place at the proposed location, including computer-based command and control networked throughout the state and approved by the California Office of Emergency Services and the California Department of Health.

3.1.2.4 *No Additional Facilities for One Additional CVN : No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new improvements.

Geologic Environment

DREDGING/MITIGATION SITE

Because no dredging is proposed and a mitigation site is not required, no impacts would occur on the geologic environment at the home port location. Construction of new facilities would not be required. Therefore, no dredging would be required either for construction of a new wharf or a mitigation site. No impacts would result.

FACILITY IMPROVEMENTS

Because no construction is proposed, no impacts would occur on the geologic environment at the home port location.

OPERATIONS

Operations associated with the addition of one additional CVN would have no impact on the geologic environment.

Geohazards

DREDGING/MITIGATION SITE

Because no dredging or mitigation site is proposed for this action, there would be no impacts associated with geologic hazards on dredging or the mitigation site.

FACILITY IMPROVEMENTS

Because no construction is proposed, impacts associated with geologic hazards at the project location would remain unchanged and, therefore, be less than significant.

OPERATIONS

Because the CVN would be moored at the wharf by flexible attachments (rather than solid fixed attachments), the likelihood of substantial damage to the additional CVN during earthquakes due to shaking of the existing wharf is minimal. Therefore, impacts would be less than significant. Tsunamis and seiches could result in upswelling damage along the shoreline and overwashing (i.e., flow of water in restricted areas) of the location, and could cause substantial damage. However, because such events are extremely rare, are unlikely to occur during the lifetime of the project, and are considered an unavoidable, acceptable risk, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant. In addition, an effective earthquake preparedness plan is in place at the proposed location, including computer-based command and control networked throughout the state and approved by the California Office of Emergency Services and the California Department of Health.

3.1.2.5 Mitigation Measures

Impacts on the proposed project and on the geologic environment and geohazards are less than significant. No mitigation measures are proposed.

3.2 TERRESTRIAL HYDROLOGY AND WATER QUALITY

3.2.1 Affected Environment

Surface Water

There are no natural streams, major drainages, natural surface impoundments, or surface water sources on NASNI. Drainage is controlled by a series of man-made collection basins and storm sewers that discharge into San Diego Bay or the Pacific Ocean. Storm water runoff during construction and operational phases of the project would be regulated under a National Pollutant Discharge Elimination System (NPDES) Permit and the required Storm Water Pollution Prevention Plan (SWPPP), currently in place. The SWPPP is designed to protect water quality and would be amended, if necessary, to incorporate the proposed project. Guidance provided by the Council on Environmental Quality (CEQ 1993) has also been considered concerning pollution prevention.

Groundwater

Groundwater beneath NASNI is influenced by the proximity to San Diego Bay and the Pacific Ocean, resulting in water that is too saline (high in salt content) for general use. The groundwater has no designated beneficial uses (not available as a water supply source). All water used on NASNI is imported from the City of San Diego via a single pipeline across San Diego Bay (DON 1995a).

Soil and Groundwater Contamination

Previous maintenance and repair of aircraft at NASNI has introduced contaminants in soils and groundwater. Liquid wastes were disposed in the storm drain system, which emptied into San Diego Bay and contributed to heavy metal contamination of nearshore bay sediments. Leaking underground storage tanks and associated fuel pipelines have also contributed to subsurface contamination. Currently, contaminated locations are in the Navy Installation Restoration Program (IRP), which includes the Navy's Underground Storage Tank (UST) program. The contaminated locations are being addressed in accordance with requirements established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 U.S.C. 9601 *et seq.*), the National Oil and Hazardous Substance Pollution Contingency Plan (NCP, 40 C.F.R. 300), and/or RCRA Subtitle I (UST Program), 42 U.S.C. 6991, et seq. In addition, a Resource Conservation and Recovery Act (RCRA, 42 U.S.C. 6901) permit for NASNI includes the IRP locations as Solid Waste Management Units (SWMUs) for investigation and which meet the requirements of both CERCLA and RCRA (DON 1997).

Installation Restoration (IR) Sites

Three IR sites (Site 1, Site 9, and Site 12) are located in the vicinity of the proposed pier replacement project, including the proposed mitigation site (see Figure 3.2-1 in Volume 3, section 3.2). IR Site 1 is comprised of contaminated shoreline sediments adjacent to an original 16-outfall storm drain system that received hazardous wastes for approximately 50 years, beginning in the 1920s. Because this site is in the marine environment it is described and discussed in section 3.3.

IR Site 9 is located adjacent to the proposed mitigation site (Figure 3.2-1 in Volume 3, section 3.2). Because this site is located in the vicinity of the marine water of the proposed mitigation site and not in the vicinity of the surface water or groundwater of the homeporting site, it is described and discussed in section 3.3.

IR Site 12 is the location of a large underground gasoline pipeline leak that occurred in the 1950s (Figure 3.2-1 and Figure 3.2-2 in Volume 3, section 3.2). Subsequent to recovery of free-phase gasoline from the groundwater in the 1950s and 40 years of natural biodegradation of spilled fuel, low levels of subsurface contaminants were detected. The California Regional Water Quality Control Board (RWQCB), which provided regulatory oversight for the former petroleum fuel site, issued a closure letter to the Navy in March 1996 indicating that no mitigation measures are proposed (see Volume 3, section 3.2).

Other Sites

Elevated concentrations of volatile organic compounds (VOCs) were detected in groundwater samples collected from the excavation of underground storage tank 475 (Figure 3.2-1). Subsequently, remedial action was completed and a report requesting closure from the RWQCB, the lead regulatory agency, is expected to be prepared by May 1998 (personal communication, R. Mach and W. Collins 1997).

Gasoline-saturated soil and free-phase petroleum hydrocarbons (gasoline floating on the groundwater) were encountered in the vicinity of the intersection of Bay Drive and Quay Road (see Figure 3.2-1 in Volume 3, section 3.2). This site is referred to as the Quay Wall Excavation. Several thousand cubic yards of soil and free-phase petroleum hydrocarbons were removed from this location. The corrective action was completed in September 1997. A closure request is expected to be prepared for this site in May 1998 (personal communication, R. Mach 1997).

During construction of the BRAC CVN Homeporting MILCONS, additional petroleum contamination was encountered along the underground fuel pipeline system at NASNI. These fuel pipelines, which range in size from 2 to 10 inches in diameter, formerly conveyed aviation gasoline and Jet Petroleum No. 5. The portion of the underground fuel pipeline system in the vicinity of the BRAC CVN homeporting construction projects was investigated and remediated with the County of San Diego Department of Environmental Health and the RWQCB providing regulatory oversight. Approximately 8,400 linear feet of trenching were completed to remove the inactive pipelines north and west of the intersection of Bay Road and Quay Road. The pipeline removed extended north on Bay Drive and then west on Roe Street and in the vicinity of P-701, P-702, and P-703. The pipeline removal ended at the intersection of Roe Street and Moffett Road. A closure report for this CVN construction site is expected to be submitted for regulatory review in May of 1998. Underground fuel pipelines currently exist east of the intersection of Bay Road and Quay Road, west along Moffett Road and south of the proposed second additional CVN homeporting location for P-700A (Figure 3.2-1) (personal communication, R. Mach 1997).

Information regarding former and existing fuel pipelines and tanks is currently being compiled and would be installed on the NASNI Activity Land and Facilities Assets, Version 2, Facility Information System (ALFA-FIS). ALFA-FIS would provide a database map showing pipeline and tank locations as well as buildings and other utilities. ALFA-FIS is expected to be available in May 1998 (personal communication, R. Mach 1997).

3.2.2 Environmental Consequences and Mitigation Measures

The impacts on terrestrial hydrology and water quality associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, although the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

Significant impacts on surface water or groundwater in the project area would occur if the project results in the following:

- Degradation of water quality, affecting existing and future beneficial uses of receiving waters.
- Discharge that creates pollution, contamination, or nuisance in violation of applicable federal or state standards.
- Release of substances that would result in substantial toxic effects to humans, animals, or plant life.

3.2.2.1 *Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new projects.

Dredging/Mitigation Site

Because no dredging is proposed, no impacts on surface water or groundwater would occur in the home port location area.

Facility Improvements

Because no construction is proposed, no impacts on surface water or groundwater would occur in the home port location area.

Operations

Operations would not result in additional construction or excavations in potentially contaminated areas. Impacts on surface and groundwater would remain unchanged. Continued implementation of the SWPPP and on-going compliance with environmental regulations would remain in effect.

3.2.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging/Mitigation Site

No potable or confined aquifers are present beneath NASNI; therefore, dredging would not intercept and adversely impact beneficial groundwater (i.e., to be used for municipal, industrial, or agricultural purposes) beneath the location. In addition, artesian conditions (confined aquifer) would not be disrupted as a result of proposed dredging. Because dredging to provide the capacity to homeport one additional CVN would potentially impact only marine water quality, dredging of approximately 582,000 cy of sediment in San Diego Bay would not adversely impact surface water or groundwater in the project area. Similarly, because construction of the mitigation site at NASNI would occur in marine waters, it is not anticipated to adversely impact surface water or groundwater. In addition, sediments dredged from the navigation channel would be disposed behind Pier J/K and either at the NAB Enhancement Area or at the designated ocean dredged material disposal location (LA-5), both marine environments. Therefore, adverse impacts to surface and groundwater would not occur.

Facility Improvements

Additional construction to provide the capacity to homeport one additional CVN would include a new pier to replace the existing Pier J/K, relocating a ferry/flag landing, constructing a CVN warehouse, a fleet support building, an equipment laydown building, and electrical upgrades and lighting. Surface and groundwater quality could potentially be impacted by fuel spills or erosion and surface water run-off associated with demolition and construction-related (excavation and grading) activities. However, these potential impacts would be reduced to less than significant levels by the implementation of the existing SWPPP. The SWPPP is designed to minimize water quality degradation through establishment of project-specific Best Management Practices (BMPs), implementation of standard erosion control measures, and implementation of spill prevention and containment measures. In accordance with Navy Specifications 01575, Temporary Environmental Controls, the Stormwater Pollution Prevention Plan will be completed in accordance with 40 CFR 122.26, EPA 832-R-92-005. These specifications require that the following be implemented in association with construction and operation of the proposed project:

- Identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharge from the site.

- Describe and ensure implementation of practices that will be used to reduce the pollutants in storm water discharge associated with industrial activity at the construction site.

- Ensure compliance with terms of EPA general permit for storm water discharge.

- Select applicable management practices from EPA 832-R-92-005.

- Provide completed copy of Notice of Intent and Notice of Termination, except for effective date. Submit to the Contracting Officer a minimum of 14 days prior to start of construction the original Notice of Intent, completed and ready for signature, including the SWPPP, a Monitoring Program Plan, and other documents as required by Order No. 92-08-DWQ.

The SWPPP must be approved by the California State Water Resources Control Board prior to initiation of construction and/or grading associated with the project. The permit must be continually updated as necessary to reflect current and changing conditions on-site.

In addition, design and construction would follow all applicable federal, state, and local regulations and ordinances regarding storm water retention and treatment.

As shown on Figure 3.2-1 in Volume 3, section 3.2, Tank 475 and the Quay Wall Excavation are not located in the vicinity of any of the proposed facility improvements. Therefore, potential subsurface contamination in these areas is not expected to be encountered during construction or impact the surface water or groundwater in the location area. However, the proposed CVN warehouse location partially coincides with the location of IR Site 12 (see Figure 3.2-1). Furthermore, the fleet support building, equipment laydown building, and associated electrical upgrades and lighting may overlap with portions of the inactive fuel pipelines recently removed. Although the RWQCB issued closure status for IR Site 12 (i.e., no additional assessment or remediation required) and a closure report is currently being prepared for the pipeline removal action, it is possible that residual contamination remains in the subsurface at these locations and may be excavated or disturbed during construction. In addition, unknown or undocumented subsurface contamination may also be encountered in construction areas.

If contaminated soil or groundwater is encountered or disturbed during demolition or construction-related activities, potentially significant impacts on surface water or groundwater could occur as a result of a discharge or accidental release. However, these potential impacts would be reduced to less than significant levels by implementation of the following project actions:

- Prior to any demolition, excavation, or construction activities, all known utilities (including fuel, sewer, steam, and electrical) would be identified by the demolition and construction contractor.

- Remedial actions of contaminants encountered (or expected to be encountered) would be conducted prior to or in conjunction with construction activities.

- All remedial actions and excavations would be conducted in compliance with all federal and state statutes and regulations pertaining to soil and groundwater contamination.

These actions would be subject to the requirements of CERCLA. The Navy would coordinate with CERCLA program managers before executing the proposed action to ensure conformance with CERCLA requirements for this location. In addition, construction in contaminated areas would be conducted in accordance with RCRA (42 U.S.C. 6901), NCP (40 C.F.R. 300, CERCLA Section 105), the UST Program, and the following regulations and guidance manuals:

- 29 C.F.R. 1910.120. Addresses hazardous waste releases and health and safety of workers,
- Navy and Marine Corps Installation Restoration Manual February 1997. Protocol to evaluate, characterize, and control the potential migration of possible contaminants resulting from past operations and disposal practices at DOD facilities,
- EM 385-1-1 U.S. Army Corps of Engineers Safety and Health Requirement Manual September 1996. Addresses health and safety issues for workers handling potentially hazardous materials or waste, and
- Chief of Naval Operations Instruction (OPNAVINST) 5090.1B, Environmental and Natural Resources Program Manual.

These statutes and regulations are aimed at protecting human health and the environment. They address worker safety, regulatory notification, clean-up requirements, and handling, storage, treatment, and disposal requirements for hazardous materials and waste. Compliance with all applicable federal, state, and local regulations would reduce the potential for significant adverse impacts from contaminants, if encountered, to less than significant levels.

Although remediation has been completed at IR Site 12 and the fuel pipeline spill areas, unknown or undocumented subsurface contamination could be encountered during facility construction excavations. Soil and/or groundwater remediation completed in association with proposed construction would reduce further impacts associated with exposure of contaminants to on-location workers and the general public. This is a beneficial impact.

Operations

Providing the capacity to homeport one additional CVN would not result in any increase in handling, storage, or disposal of chemicals potentially affecting terrestrial hydrology and water quality relative to the historic capacity to homeport three carriers at NASNI. Therefore, no impacts would result.

Since 1994, NAS North Island has implemented a successful Pollution Prevention (P2) program for shore operations and will continue to do so in the future. In kind, the Navy has an aggressive P2 Afloat program (CVNs included) administered by Naval Surface Warfare Center (NSWC) Carderock with the main objective of reducing hazardous material offload, handling, and disposal. Together, these programs ensure P2 opportunities are explored, demonstrated, and transitioned on a continuous basis throughout the facility, as well as, the Fleet. Facility operations associated with the support of two additional CVNs are in no way an exception to this reiterative process.

NAS North Island has been a major participant in the Navy's P2 equipment procurement program by adopting "cleaner" processes resulting in the substitution or reduction in the use of hazardous materials. Great strides have been made in replacing solvent cleaning operations with aqueous technologies throughout the facility reducing hazardous waste generation and air emissions by nearly 100,000 lbs. per year. Recent P2 efforts aboard ship, in particular a CVN, have led to an average hazardous waste reduction of 75,000 lbs. per year to shore facilities. In 1994, the Fleet and Industrial Supply Center (FISC) established a centralized Hazardous Material Center at NAS North Island. Since inception in 1992, the FISC Hazardous Material Program, serving the Navy in

San Diego, has diverted over thirteen million pounds of hazardous material from the waste stream by implementing the philosophy of source reduction, substitution, and reutilization.

3.2.2.3 *Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)*

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site

Impacts would be the same as those described in section 3.2.2.2. Dredging required to provide the capacity to homeport a second additional CVN at NASNI would not result in further impacts to water quality because no additional dredging beyond that discussed in section 3.2.2.2 and minimal construction would be needed at the present transient pier. Addition of a second new CVN would not generate increased volumes of dredged materials or require creation of additional mitigation acreage.

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. A CVN berthing wharf and several miscellaneous structures would be constructed in support of a second additional CVN. Changes to the facilities and infrastructure would be minimal when compared to facilities and infrastructure previously created to provide historical carrier homeporting capacity. Impacts to surface water and groundwater would be similar to that described in section 3.2.2.2. However, utility and fencing upgrades would be required south of the additional BRAC CVN and east of the intersection of Bay Road and Quay Road to support the additional CVN. Fuel pipelines are known to be present in this area. Excavations required for utility and fencing upgrades in the vicinity of these pipelines may encounter contamination and require remediation. However, these potential impacts would be reduced to less than significant levels by implementation of the same project actions described in section 3.2.2.2.

As described in section 3.2.2.2, soil and/or groundwater remediation completed in association with proposed construction in areas of contamination would reduce further impacts associated with exposure of contaminants to on-location workers and the general public. This is considered a beneficial impact.

Operations

Providing the capacity to homeport a second additional CVN would result in intermittent, short-term increases in handling, storage, or disposal of chemicals potentially affecting terrestrial hydrology and water quality during those 13 days/year that three CVNs would be simultaneously in port. The amount of chemicals involved would be extremely small in relation to NASNI's handling and storage capacity. Therefore, any impacts would be short-term and less than significant.

Compliance with the Pollution Prevention (P2) program would be consistent with that discussed in section 3.2.2.2, Operations.

3.2.2.4 *No Additional Facilities for One Additional CVN : No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site

Because no dredging is proposed, no impacts on surface water or groundwater would occur in the home port location area.

Facility Improvements

No construction or excavations in potentially contaminated areas is proposed, therefore, no impacts on surface water or groundwater would occur in the home port location area.

Operations

Since the number of aircraft carriers at NASNI would not increase over the historical baseline of three, no additional impacts over existing conditions would occur as a result of the No Action alternative.

3.2.2.5 *Mitigation Measures*

Because impacts on the terrestrial hydrology and water quality (i.e., surface water and groundwater) are less than significant, no mitigation measures are required.

3.3 MARINE WATER QUALITY

The following sections characterize water quality conditions in San Diego Bay (section 3.3.1), and describe environmental impacts and potential mitigation measures (section 3.3.2) associated with the proposed actions.

3.3.1 Affected Environment

Beneficial uses and specific water quality objectives for San Diego Bay are described in the Basin Plan, prepared by the Regional Water Quality Control Board, San Diego Region (RWQCB 1994). The Basin Plan lists 12 beneficial uses: (1) industrial service supply; (2) navigation; (3) water-contact recreation; (4) non-water-contact recreation; (5) commercial/sport fishing; (6) preservation of biological habitats of special significance; (7) estuarine habitat; (8) wildlife habitat; (9) rare, threatened, or endangered species; (10) marine habitat; (11) migration of aquatic organisms; and (12) shellfish harvesting. The Basin Plan also specifies numerical water quality objectives for nutrients (less than 0.025 mg/L of non-ionized ammonia and total phosphorus); bacteria, *E. coli*, and enterococci; and pH (values must be greater than 7 and less than 9). Descriptive criteria also are defined for floating material, oil and grease, pesticides, radioactivity, suspended and settleable solids, sediment, taste and odor, temperature, toxicity, toxic pollutants, and turbidity. In most cases, these descriptive criteria prohibit harm or adverse impacts to the beneficial uses.

The relevant federal, state, and local statutes governing water quality are identified in section 1.5. In particular, issues associated with sediment dredging and disposal activities are governed by Sections 401 and 404 of the Clean Water Act and by the Marine Protection, Research and Sanctuaries Act.

Water quality conditions within San Diego Bay are influenced by circulation patterns, flushing or exchange of bay and ocean waters, and the duration of the flushing cycle or water residence times. Circulation processes and patterns are summarized for the Homeporting Site and Mitigation Sites in sections 3.3.1.1 and 3.3.1.2, respectively.

3.3.1.1 Homeporting Proposed Site

Circulation

Circulation patterns in the central portion of San Diego Bay are primarily influenced by tides. Tides within the bay are mixed, semi-diurnal (two high and two low tides per day), with an average and maximum tidal range of 5.6 feet and 9.8 feet, respectively. The volume of water exchanged during a tidal cycle is approximately one-third of the volume of the entire bay. The period in which water is within the bay varies from one tidal cycle near the mouth to over 1 month in the south bay (Largier 1995).

Current speeds in the main channel offshore from the project site are approximately 0.4 knots (20 cm/sec). Relatively lower current speeds typically occur near shore in shallower areas outside of the main channel, although divers conducting studies in the vicinity of Pier J/K have reported current speeds of 1-2 knots. George and Largier (1995) estimated that waters within the main channel in the vicinity of Coronado Bridge may move distances up to 2.8 miles during one tidal cycle, with good mixing within this portion of the bay.

Water quality conditions in San Diego Bay vary between the northern and southern portions of the bay due to differences in the influences of mixing with ocean waters. Freshwater inputs to the bay are minimal, except during periods of heavy rainfall. Evaporation, along with reduced mixing and flushing, produces higher temperatures and salinities in the south bay than in the northern and central portions of the bay. Differences in temperature between the head (south bay) and mouth (north bay) may reach 7 to 10°C during summer (Largier 1995).

Hammond and Wallace (1982) described patterns in bottom water movement within the central and southern portions of the bay. Northward flowing bottom waters from south bay meet southward flowing bottom waters from the bay mouth (north bay) within an area of the central bay between Glorietta Bay and Silver Gate Power Plant, located on the eastern shoreline of the bay across from the entrance to Glorietta Bay near the Coronado Bridge. This convergence promotes settling and deposition of particles suspended in bottom waters. Results from this study also identified minimal horizontal exchange between bottom waters within semi-enclosed docking basins where large and small vessels are moored and those in the main channel. These conditions restrict transport of suspended sediments out of the immediate areas of the docking basins.

Waves within the bay typically are generated by local winds, and are generally less than 2 to 3 feet high (SDUPD 1980). The project area is well-protected from waves generated by predominant northwest winds.

Water Quality Conditions

Processes affecting marine water quality at the proposed project site, such as circulation and exchange of bay and ocean waters, are not substantially different from those affecting water quality in other portions of the central bay. Thus, because water quality parameters have not been measured within the immediate vicinity of Pier J/K the water quality conditions are characterized using existing information from adjacent areas of the bay.

Temperature/Salinity

Water temperatures in the bay range from approximately 14 to 27°C, and salinities (salt content) can range from 31 to 39 parts per thousand (ppt) (Allen 1998). Higher water temperatures and slightly higher salinities occur in summer than in winter, particularly due to seasonal differences in evaporation, heating, and freshwater inputs to the south bay. A smaller range in temperature and salinity conditions occurs at the project site because the effects of these processes are moderated by mixing of bay and ocean waters. Differences with depth in temperature and salinity conditions are minimal in the central bay, whereas small-scale spatial differences in salinity are important to the circulation of the south bay and temperature gradients are important to the mixing of bay and ocean waters near the mouth of the bay (Largier 1995). During the summer period, a strong temperature gradient (thermocline) of about 10°C occurs near the mouth of the bay. This vertical temperature gradient is much smaller (approximately 2°C) during the winter season (Largier 1995).

Dissolved Oxygen

Dissolved oxygen is the amount (expressed as a concentration) of oxygen present in seawater, which is important to the health of biological communities.

Dissolved oxygen concentrations within San Diego Bay waters typically range from 5 to 10 mg/L. Low oxygen levels in bay waters, similar to conditions that occurred prior to the 1960s when sewage and industrial wastes were discharged to the bay, do not presently exist near the project site. Depth-related differences in dissolved oxygen concentrations are minimal in the central bay (DON 1995a).

Water Clarity/Turbidity

Present water clarity (Secchi depths) in the bay averages 7.8 feet (DON 1992a). Relatively higher turbidity levels occur within shallow areas of the bay due to resuspension of bottom sediments. Low, persistent water clarity levels that accompanied historically low dissolved oxygen concentrations do not presently exist in the central bay to south bay. Seasonal decreases in water clarity may accompany stormwater runoff, particularly in the vicinity of storm drains, or plankton blooms (large growth periods). However, these are typically single-event, short-term conditions.

Chemical Contaminants

Elevated concentrations of some metal contaminants (copper and silver) have been measured in surface waters of San Diego Bay near East Harbor Island (north of the CVN homeporting site; Flegal and Sañudo-Wilhelmy 1993). Organic contaminant levels in San Diego Bay waters have not been measured directly but can be characterized by concentrations in tissues of bivalves (mussels) sampled as part of the National Oceanic and Atmospheric Administration's Mussel Watch Program (O'Connor and Beliaeff 1995). Mussel samples from Coronado Bridge, collected during the late 1980s and early 1990s, contained concentrations of the chlorinated pesticides DDT and chlordane, polychlorinated biphenyls (PCB), and petroleum hydrocarbon residues (polycyclic aromatic hydrocarbons [PAH]) that are considered high (exceeds the mean plus one standard deviation of the lognormal distribution of concentrations among sites) compared to levels found in other parts of the coastal United States (O'Connor and Beliaeff 1995). Due to its proximity to the Coronado Bridge, trends in water quality at the CVN homeporting site are expected to be similar.

Results of Marine Water Sampling for Radioactivity

To provide additional assurance that procedures used by the Navy to control radioactivity are adequate to protect the environment, the Navy conducts environmental monitoring in harbors frequented by its nuclear-powered ships. The current Navy environmental monitoring program in the San Diego area includes analyzing samples of marine water (see below), sediment (see section 3.4.1), and marine life (see section 3.5.1).

Sampling of marine water in San Diego in 1996, including North Island, showed no detectable radioactivity associated with Naval nuclear propulsion plant operation or servicing (Naval Nuclear Propulsion Program [NNPP] 1997). In addition to Navy sampling, the Environmental Protection Agency (EPA) has conducted detailed environmental surveys of selected U.S. harbors. A previous EPA survey of San Diego Bay in 1987 detected only naturally occurring radioactivity in marine water samples (EPA 1989a), and trace amount of NNPP radioactivity in a few sediment samples at levels less than 100 times below comparable naturally occurring radionuclides.

For further discussion on the Navy's radiological environmental monitoring program, see section 7.4.4.

Installation Restoration (IR) Sites

Three IR sites (Sites 1, 9, and 12) are located in the vicinity, including the proposed mitigation site (Figure 3.2-1). IR Site 12 does not impact marine water quality and is, therefore, described and discussed in section 3.2. IR Site 1 mostly impacts sediment quality and is addressed in section 3.4.

IR Site 9 was operated as a chemical waste disposal area from the 1940s through 1978 (Figure 3.2-1). Chemical wastes deposited at this site may have included solvents, caustics, acid, metal carbides, borides, oxides, and silicides. This site has been the subject of several investigations, beginning in 1983. Sixteen shoreline monitoring wells to verify groundwater contaminant levels near San Diego Bay were installed in 1995. An RF/RFI report completed in 1995 by Jacobs Engineering Group, Inc. (JEG) recommended implementing a long-term groundwater monitoring program utilizing the 16 shoreline monitoring wells recently installed. Assessment work conducted in 1996 indicated that low concentrations of contaminants from IR Site 9 groundwater were discharging into San Diego Bay (JEG 1997).

3.3.1.2 *Mitigation Site*

The proposed mitigation site for this project represents an area of the NASNI bayfront immediately inshore from the northern portion of Pier B. This portion of the NASNI shoreline was constructed from fill materials in 1936.

Circulation

Currents in the vicinity of the mitigation site would be influenced by tides, and are expected to be similar to those near the adjacent BRAC mitigation site (e.g., 2 to 3 knots at ebb flow). The major influence to shoreline erosion is wave energy due to wakes from shipping traffic. This causes extensive shoreline erosion at the toe or the slope, as well as sediment resuspension (personal observation, R. Hoffman, NMFS and M. Perdue, DON, 1999).

Water Quality

Studies by Largier (1995) indicate that waters in areas near the mouth to San Diego Bay are exchanged with the ocean more frequently than those in the central bay. Therefore, water quality conditions at the mitigation site are expected to reflect the magnitude and range of conditions in ocean waters to a greater extent than waters in the central bay. The relatively cleaner water quality associated with ocean waters are reflected in the low contaminant concentrations that occur in tissues of filter-feeding mussels from near the mouth of the bay compared to concentrations in mussels from other locations within the bay (Largier 1995).

3.3.1.3 *NAB Habitat Enhancement Area*

Circulation

Maximum tidal current velocities in the vicinity of Naval Amphibious Base (NAB) Small Craft Berthing Pier, on the northeastern shore of the NAB peninsula, range from 12 to 52 cm/sec (SDUPD 1991, as cited in DON, 1992a). Currents at the NAB Habitat Enhancement Area are predicted to be comparable to, or weaker than, those off the NAB Berthing Pier. San Diego Gas & Electric Co. (1980 as cited in SDUPD 1980) measured average flood-tide currents of approximately 5 cm/sec near the bottom of the channel off Coronado Cays, in the western portion of the south bay. Average ebb-tide current velocities were less than half that of the average flood-tide currents (SDUPD 1980). Wave heights in the vicinity of the NAB Habitat Enhancement Area tend to be smaller than those in the middle and eastern parts of the bay due to the short fetch (distance) associated with predominant winds from the northwest.

Water Quality

The general water quality conditions for San Diego Bay described above are also applicable to the NAB Habitat Enhancement Area. Water quality measurements during May 1994 in the vicinity of the NAB Habitat Enhancement Area (DON 1998) indicated water temperatures from 19.0° to 19.6° C. Salinity values ranged from 32.63 to 33.26 ppt. No differences in water temperature or salinity with depth or between sites were apparent. Similarly, pH values were relatively constant (8.06 to 8.09) at all locations and depths. Dissolved oxygen concentrations ranged from 6.0 to 8.0 mg/L, with no substantial differences with depth or between sites. Light transmittance values ranged from 41 to 58 percent, and total suspended solids concentrations ranged from 8 to 12 mg/L. These parameters did not exhibit any consistent differences with depth or between sampling locations. These data are comparable with other studies of the bay (e.g., Allen 1998; SDUPD 1980; and DON 1992b).

3.3.2 Environmental Consequences and Mitigation Measures

The impacts on marine water quality associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, although the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

An impact would be significant if one of the following occurred:

- Alteration of water circulation in the project site to the extent that persistent adverse effects on water quality or biological resources result.

- Discharge that creates pollution, contamination, or nuisance in violation of applicable federal or state standards. This would include state water quality standards or objectives, or the EPA National Ambient Water Quality Criteria, outside of a specified discharge mixing zone or immediate construction area.

- Creation of turbidity (suspended solids), dissolved oxygen, contaminant, or other conditions that would result in substantial mortality of aquatic organisms.

3.3.2.1 *Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new projects.

Dredging/Mitigation Site/NAB Habitat Enhancement Area

No dredging activities would occur at NASNI or at a mitigation site. Therefore, no dredging-related impacts to water quality would result.

Facility Improvements

No construction activities would occur at NASNI. Therefore, no significant adverse impacts to water quality would result.

Operations

Changes to marine water quality are associated with minor reductions in contaminant inputs from anti-fouling paints, hull corrosion, and/or accidental spills (discussed in section 3.3.2.2). Thus, impacts to marine water quality would not be increased as no new capacity to support additional CVNs would result from this alternative.

3.3.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging

Dredging of an estimated 534,000 cubic yards (cy) of bottom sediments from areas adjacent to and immediately offshore from the wharf would be required to provide the capacity to homeport one additional CVN. Dredging would be conducted in accordance with permit specifications and other requirements of EPA, U.S. Army Corps of Engineers, and RWQCB Permit conditions, intended to reduce potential impacts to water quality, are expected to include the following:

- Dredging would be performed using a clamshell and/or hydraulic dredge, which minimizes losses or spillage to adjacent waters;
- Water quality monitoring would be conducted during dredging to ensure compliance with conditions specified in the water quality permit; results from monitoring would be reported to regulatory agencies on a regular (e.g., monthly) basis;
- Visual monitoring of turbidity (discoloration of surface waters visible to the naked eye) may be required to assess potential impacts within bird foraging areas.
- Barges transporting dredged material to a disposal site would be required to monitor draft depths prior to disposal to verify that wastes are not leaking during transport; and

- A debris management plan would be prepared that addresses types of debris expected, separation and retrieval methods, and disposal methods.

Dredging operations are expected to generate localized and temporary turbidity plumes associated with resuspension of bottom sediments. Increased suspended sediment concentrations would result in other water quality changes, such as reduced light transmittance and increased oxygen demand leading to reduced dissolved oxygen concentrations. However, dredging operations would not cause persistent changes in dissolved oxygen concentrations or in other water quality parameters because sediments suspended during dredging would settle to the bottom, and natural mixing processes would reduce any other localized changes to water quality, within a period of several hours after dredging stops. Tidal currents in the vicinity of the dredging site would transport suspended sediments up to several kilometers, but currents would also promote rapid dilution of the turbidity plume. The water quality permit issued for the dredging operations is expected to define criteria for turbidity levels, suspended solids concentrations, and other chemical constituents. The receiving water criteria for turbidity and suspended solids are expected to be defined as light transmittance levels at a point downcurrent from the dredge cannot be less than 80 percent of ambient levels.

Dredging operations to provide the capacity to homeport one additional CVN are not expected to cause turbidity levels that exceed the criterion because (1) most of the materials planned for dredging consist of sand-sized particles, which settle rapidly; (2) dredging equipment has a high removal efficiency, thus minimizing the amounts of fine particles which could leak into surface waters; and (3) the remaining fine particles will be diluted below the permit limits. Monitoring of water quality impacts associated with BRAC CVN dredging projects confirmed that light transmittance levels within the dredging plume were not reduced below 80 percent of ambient levels. Similarly, evaluations of potential water quality impacts performed for the BRAC CVN project (DON 1996a) indicated that under conservative (worst-case) conditions, suspended solids concentrations associated with dredging approximately 56,000 cubic yards of sediments containing 40 percent fines would dissipate within 25 minutes and levels would not be expected to exceed 60 mg/L at a distance 250 feet from the dredge. Similarly, dredging operations in San Francisco Bay generated average total suspended solids concentrations from 30 to 90 mg/L at locations about 150 feet downcurrent from the dredge compared to average background concentrations of 40 mg/L (COE 1976).

Allowable concentrations of other chemical constituents are expected to be the respective instantaneous maximum concentrations specified in the California Ocean Plan. As discussed in Section 3.4, sediments proposed for dredging in the vicinity of Pier J/K are primarily sands, with generally low concentrations of chemical contaminants and low potentials for contaminant solubilization or adverse biological effects. Rapid settling of suspended particles would be expected to limit dredging impacts to water quality to the initial mixing zone in the immediate vicinity of the dredge.

Water quality monitoring for the BRAC CVN dredging project measured low oil and grease concentrations (i.e., maximum total recoverable petroleum hydrocarbon concentrations of 2 mg/L) and nondetectable (<0.05 mg/L) sulfides concentrations, which were in compliance with permit criteria. Concentrations of other chemical constituents in receiving waters have also been in compliance with specified permit limits.

Based on the results of elutriate and bioassay tests (DON 1995b) and turbidity modeling (DON 1996a), conducted for the BRAC CVN homeporting, sediment resuspension for the proposed action would not result in significant releases of chemical contaminants to bay waters or mortality to aquatic organisms. Thus, impacts to water quality would occur, but these would be less than significant.

Minor, temporary impacts to water quality would also occur at the site of the new wharf construction in association with placement of fill materials. The fill material would consist of cohesive dredged sediments from other areas of the project (the mitigation site) and covered by armor rock to stabilize the slope. The wharf backfill would not be used as a facility for disposal and isolation of contaminated sediments because existing information did not indicate the need for disposal of contaminated materials for the proposed project. These impacts would consist of formation of turbidity plumes, increased suspended sediment concentrations, and decreased water clarity. Adverse long-term impacts to water quality, such as low dissolved oxygen concentrations and/or elevated contaminant levels, would not occur. This is because the material used to cover the fill area would not contain significant contaminant concentrations or result in substantial releases of contaminants to site waters or toxicity to marine organisms as indicated by the results of sediment elutriate tests. Impacts would be less than significant.

Sediments dredged from the navigation channel would be disposed in a manner that is acceptable and permitted by the resource agencies. Disposal options may include using dredged sediments for creation of a habitat enhancement area near NAB, as backfill for new wharf construction (as noted above) or disposal at a designated ocean dredged material disposal site. Sediment quality characterizations for materials from within the dredging footprint, performed as part of the BRAC CVN homeporting project, demonstrated that the material would be suitable for ocean disposal at the ocean dredged material disposal site (at LA-5). Additional testing of sediments within the proposed dredging footprint is in progress. Results from this testing should be adequate to evaluate the suitability of the materials for ocean disposal and confirm results obtained for the BRAC CVN project. Some ordnance was present in sediments dredged as part of the BRAC CVN homeporting project. The presence of ordnance in sediments that would be dredged for this project presently is unknown but recent sediment testing results indicated nondetectable levels of explosives compounds, and magnetometer and diver surveys did not detect any ordnance within the proposed dredging area. Ordnance in dredged materials would be addressed by a solids debris management plan consistent with Corps of Engineers Permit No. 94-20861-DZ issued to the Navy for the Turning Basin Dredging (FY 97 MCON Project P-549).

Mitigation Site

Construction of the mitigation site would also require the dredging and disposal of bay sediments, resulting in short-term and localized resuspension of sediments. Excavation volumes would be up to 48,000 cy, depending on the final configuration of the mitigation site, with approximately 29,000 cy used as fill in the wharf area and the remainder stockpiled at NASNI for future habitat enhancement or construction purposes. Creation of a mitigation site, along with alterations in the present site bathymetry, would not result in substantial changes to hydrological conditions that would impact biological communities or navigation. As discussed in section 3.4.1, previous testing of sediments from the vicinity of the mitigation site indicates that bottom sediments from the vicinity of the site contain more than 80 percent sand (plus gravel), with generally low concentrations of metals and petroleum hydrocarbons (CAS 1994). Some sediments from sites immediately offshore from the pier in water depths of 36 to 41 feet and in the northern inshore area at depths of 10 to 32 feet MLLW contained elevated concentrations of PAH that likely had leached from creosote-soaked pier pilings. Sediments from these areas would not be disturbed during dredging at the mitigation site because dredging would occur only in water depths shallower than -4 feet MLLW.

During construction of the mitigation site, sediment excavation would resuspend bottom sediments, causing increased turbidity and decreased water clarity in the immediate vicinity of the pier. Based on the results of previous testing, sediment resuspension would not result in releases of chemical contaminants to the water column or toxicity to marine organisms. Impacts to water quality at the disposal site would be comparable to those described for disposal of sediments dredged from the vicinity of the new CVN wharf. Thus, the magnitude of these impacts to water quality are similar to those associated with the construction and dredging in the vicinity of the new pier, and therefore less than significant.

NAB Habitat Enhancement Area

Placement of sediments dredged from the Pier J/K project area at an in-bay habitat enhancement area near NAB would cause short-term, adverse unavoidable impacts to the water quality due to the creation of a turbidity plume and elevated suspended sediment concentrations. Long-term impacts to water quality from dredged material disposal operations would not be expected because sediments released at the site will sink rapidly or be dispersed by currents and natural mixing processes. Placement of sediments at an NAB area would not result in significant releases of chemical contaminants to bay waters or mortality to aquatic organisms. Thus, impacts to water quality would occur, but these would be less than significant. Following disposal, some of the sediments, particularly the finer grained portion of the dredged material, could be selectively resuspended and transported by wave-induced turbulence and local bottom currents. However, the magnitude of this process would be reduced in time due to the progressive removal of fine-grained sediments from the site.

Ocean Disposal Site

Requirements for the use of LA-5 would be specified in a dredging permit issued by the Corps of Engineers and EPA, Region IX. Short-term, adverse unavoidable impacts to the water quality at the disposal site would include creation of a turbidity plume and elevated suspended sediment concentrations. These impacts, which were evaluated generically as part of the site designation EIS for LA-5 (EPA 1988), would occur as a result of normal site use.

Short-term impacts to water quality at the LA-5 disposal site would include elevated turbidity levels and suspended sediment concentrations, with potentials for locally depressed dissolved oxygen concentrations. However, long-term impacts to water quality from dredged material disposal operations at the disposal site would not be expected because sediments released at the site will likely sink rapidly or be dispersed by currents and natural mixing processes. For example, water quality measurements at the LA-2 dredged material disposal site (off Los Angeles County) did not show any significant changes to water temperature, pH, turbidity, or dissolved oxygen concentrations even though the site had been used historically for several years (EPA 1988). Modeling conducted for this site indicated that suspended sediment levels would be diluted to levels of 4-5 mg/L within 5 hours of a disposal event. Based on considerations of the volume and dilution capacity of site waters, and ambient concentrations of suspended particles and contaminants, disposal operations were not expected to have significant adverse impacts on water quality. Consequently, impacts to water quality at the ocean disposal site from disposal of dredged materials from the navigational channel would be less than significant. Periodic monitoring of the disposal site would be conducted to determine the impacts of disposal, and mitigation of these impacts, if necessary, through changes in site management.

NNPP RADIOLOGICAL IMPACT. Dredged material may contain trace amounts of radioactivity as a result of past Navy operations. These trace amounts, however, are far below the levels of comparable naturally occurring radionuclides, and would have no significant effect on the environment during or after the dredging operation or in the disposal of sediment, regardless of the location selected for disposal of the sediment. There is also scientific evidence that cobalt-60 from Naval nuclear propulsion plants does not build up in marine life (NNPP 1997). Thus, there would be no short-term or long-term dredging-related impacts on water quality due to radioactivity from homeporting additional NIMITZ-class aircraft carriers at North Island.

Facility Improvements

Some minor changes in circulation (current conditions) in the project area required to provide the capacity to homeport one additional CVN would result from the removal of Pier J/K and construction of a new wharf with backfilling because these structures affect local water circulation. However, these construction-related changes would not result in hydrologic conditions that would cause persistent adverse effects to water quality, navigation, or biological resources. Resuspension of sediments and formation of turbidity plumes during installation of new pier pilings and backfilling the new wharf with dredged materials would be temporary and localized to the immediate vicinity of the new pier. Results from recent sediment elutriate and bioassay tests indicated that sediment resuspension would not result in significant contaminant releases to the water column or substantial mortality to aquatic organisms. Accidental releases of construction debris to the bay can be prevented by placing booms around the construction site. Other water quality parameters such as salinity, pH, or dissolved oxygen, would not be affected by demolition and construction of piers. Long-term effects to water quality would be avoided by use of pre-stressed concrete pier piling instead of creosote-soaked pilings. Thus, construction-related impacts to water quality would be less than significant.

Operations

Progressive declines in water quality associated with providing the capacity to homeport one additional CVN would not result within San Diego Bay because the minor impacts associated with vessel operations would be offset by decommissioning of the remaining CV. Standard operating procedures include the following:

1. Best management practices (BMP) would be implemented by the Navy to minimize waste discharges to the bay during maintenance operations as well as the magnitude of any accidental waste discharges to the bay during normal operations. These would include spill response and contingency plans prepared by the Navy in consultation with the Coast Guard for preventing or minimizing the effects of accidental discharges and spills.

2. Annual spill response exercises would be conducted by the Navy to practice implementation of response actions. Additionally, measures to reduce dispersion of a turbidity plume during construction of the mitigation site would be constructed to minimize potential impacts to the adjacent BRAC mitigation site.

The National Defense Authorization Act of 1996 amended Section 213 of the Federal Water Pollution Control Act (or "Clean Water Act") to require that the Secretary of Defense and the

Administrator of the U.S. Environmental Protection Agency jointly develop Uniform National Discharge Standards (UNDS) for discharges incidental to the normal operation of vessels of the Armed Forces. The intent of this act is to establish a consistent set of effluent standards that improves environmental protection while enhancing the operational flexibility of military vessels that visit various ports as part of their missions. The Navy and EPA are currently working together and in consultation with states and other stakeholders in a three-phase process to (1) determine those discharges that have the potential to cause environmental effects and that can be practically controlled with a marine pollution control device (MPCD); (2) set performance standards for the MPCDs; and (3) publish regulations governing the MPCD design, installation, and use. The Navy and EPA completed Phase I of the UNDS effort in May 1999. Upon completion of the UNDS regulatory development process, all vessels of the Armed Forces, including CVNs at NASNI, would operate in compliance with the requirements on the effective dates set forth in the final rules.

Normal operations associated with berthing one CVN at a new wharf would not affect water quality in the bay, although leaching from anti-fouling hull paints, corrosion, and dissolution of sacrificial anodes would add metals such as copper and zinc to bay waters. Copper-based ablative paints are applied to the hulls of Naval vessels (and most other commercial and recreational vessels) to prevent fouling by marine organisms. Copper leaches continuously from these paints at an average rate of approximately 10 micrograms per square centimeter per day (Valkirs et al. 1994). Copper is a widespread contaminant associated with many industrial and non-point sources, including hull leachate and cooling water discharges from naval vessels. The DOD and EPA are evaluating potential control options for the discharges that generate copper, including hull coating leachate, seawater cooling, and underwater hull cleaning. The DOD and EPA will be establishing discharge standards for these discharges from Armed Forces vessels. Navy hull leachate presently contributes an estimated 22 percent of the dissolved copper input to San Diego Bay (Johnson et al., 1998). For comparison, the civilian pleasure boat hull leachate contributes an estimated 33 percent of the dissolved copper input. According to the Nature of Discharge (NOD) report prepared for UNDS, leachate from antifouling paints on all Naval vessels in San Diego Bay adds an estimated 0.19 micrograms per liter to bay waters, compared to ambient concentrations of 3.7 micrograms per liter. Although this represents a proportionately small increase, existing copper concentrations exceed the water quality criterion. The amount of copper leaching from a CVN hull is estimated to be slightly greater (0.37 pounds per day) than that from a CV. However, this increase in copper inputs to the bay associated with berthing a CVN would be offset by decreases of 6 vessels in the size of the Navy fleet, resulting in a net decrease over the next several years in the total copper input from anti-fouling paints on Navy vessels. The number of Navy ship homeported in San Diego has seen a steady reduction from 76 ships in 1992 to 55 ships in 1999. Reductions in hull leachate from Navy vessels are expected to be roughly proportional to decreases in the number and average size (wetted surface) of the ships in San Diego Bay. Thus, CVN homeporting is not expected to exacerbate copper loadings to San Diego Bay.

Hull coating leachate is a candidate for regulation under UNDS. The UNDS Phase I evaluated three marine pollution control devices (MPCD) for hull coating leachate. Of these, controlling the maximum allowable release rates and eliminating use of tributyltin paints were considered reasonable and practical MPCDs. (Tributyltin-based paints are not used on CVNs.) Less-toxic silicone-based paints have been tested, but the technology has not yet been proven effective. The schedule for replacing copper-based paints with non-biocidal paints for anti-fouling has not yet been determined. Based on performance and cost, it is unlikely that the Navy will switch from copper-based hull paints within the next 10 years (Seligman and Zirino, 1998).

Copper is also released to surrounding waters from in-water hull cleanings that, on average, occur once every two years for Naval vessels in San Diego Bay (PRC, 1997). The contributions of in-water hull cleanings of aircraft carriers to copper inputs to bay waters are relatively small (approximately 10 kg per year) compared with those associated with pleasure craft and small commercial vessels (approximately 12,000 kg per year) (PRC 1997), and represents less than one percent of the total dissolved copper input to San Diego Bay (Johnson et al., 1998). UNDS may require pollution control devices for underwater hull cleaning (Seligman and Zirino, 1998).

Cathodic protection of Naval vessels is maintained primarily using a passive electrical system, although sacrificial anodes are used to a minor extent on propeller shafts. Anodes contribute small amounts of zinc to surrounding waters. These sources of metals are not presently regulated; therefore, comparisons to water quality criteria or permit limits are not possible.

All operational discharges, including stormwater runoff, would meet applicable regulations and permit standards. Wastewaters generated by CVNs, such as sanitary sewage, oily wastes such as bilge waters, and industrial process waters would be collected and transferred to mechanical systems that would be provided for this project. Domestic sewage would be delivered to the City of San Diego municipal wastewater treatment facility at Point Loma. Industrial wastewaters would be transported to a treatment facility on NASNI, and oily wastewaters would be treated at an existing treatment facility on NASNI. Consequently, impacts to water quality from normal berth-side vessel operations would be less than significant.

Runoff from a CVN deck, wharf, and pier is not covered under a stormwater permit. Thus, the Navy is not required to treat or monitor stormwater flows for these facilities. However, deck runoff is one of the operational discharges being evaluated under the UNDS program, and may eventually be included under a uniform discharge standard.

CVNs, CVs, and other Naval vessels discharge cooling waters during transit within the harbor and while docked pierside. While CVs and CVNs use different sources of fuel (oil vs. nuclear), both types of ships rely upon steam propulsion plants that require seawater cooling. The seawater cooling requirements are similar and the thermal and marine life impacts from CVs and CVNs are comparable.

Potentials for contaminant spills to San Diego Bay associated with providing the capacity to homeport one additional CVN are expected to be similar to those for the existing BRAC CVN (DON 1995a). Spill-related impacts to water quality are potentially substantial. The actual significance of impacts to water quality from spills would depend on the volume, frequency, and location of spill events and types of material spilled. BMPs have been developed and implemented by the Navy to prevent spills and/or minimize impacts. For example, homeported vessels would be surrounded by a surface boom when in berth to contain any spilled or discharged materials and to facilitate cleanup. Additionally, spill response/contingency plans would be developed to describe the types and amount of equipment and personnel resources, emergency and notification requirements, and response procedures needed to minimize the potential impacts of a spill (see section 3.15, Health and Safety). Consequently, impacts to water quality from vessel operations would be less than significant.

Operations associated with providing the capacity to homeport one additional CVN would also result in an increase in the quantity of chemicals handled, stored, and disposed at the home port site. Therefore, there would be an increase in the potential for chemical releases to occur, resulting in potential adverse impacts to marine water. However, these operation-related impacts to water quality would be reduced to levels that are less than significant by the implementation of the existing SWPPP, the existing safety and health programs described in section 3.15, and compliance with federal, state, and local statutes and regulations pertaining to soil and groundwater contamination described in section 3.2.1. The SWPPP is designed to minimize water quality degradation through the implementation of spill prevention and containment measures and standard erosion control measures. The statutes and regulations are focused on protecting human health and the environment and include release/spill notification and cleanup requirements; and handling, storage, treatment, and disposal requirements for hazardous materials and waste. Implementation of the SWPPP, existing safety and health programs, and continued compliance with environmental regulations would reduce the potential for adverse impacts to less than significant levels.

NNPP RADIOLOGICAL IMPACT. Since the early 1970s, the Navy has prohibited intentional discharges of even negligible radioactivity into harbors. Stringent, long-standing controls have proven effective in protecting the marine environment from radioactivity. The total amount of long-lived gamma radioactivity released into harbors and seas within 12 nautical miles of shore has been less than 0.002 Curie during each of the last 26 years. This is from the Naval nuclear-powered ships and from the supporting nuclear-capable shipyards, tenders, and operating bases, and at other U.S. and foreign ports that were visited by Naval nuclear-powered ships. To put this small quantity of radioactivity into perspective, it is less than the quantity of naturally occurring radioactivity in the volume of saline harbor water occupied by a single nuclear-powered submarine (NNPP 1997). Because these controls would continue, there would be no significant long-term onshore maintenance facilities or vessel-related operational impacts on water quality due to radioactivity from providing the capacity to homeport additional NIMITZ-class aircraft carriers at NASNI.

3.3.2.3 *Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)*

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site/NAB Habitat Enhancement Area

Additional dredging (i.e., beyond that required for providing the capacity to homeport the first additional CVN) or an additional mitigation site would not be required. Therefore, impacts on water quality would be the same as those described in section 3.3.2.2.

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Additional in-water construction (i.e., beyond that required for providing the capacity to homeport the first additional CVN) would not be required. A CVN berthing wharf and several miscellaneous structures would be constructed in support of a second additional CVN. Changes to the facilities and infrastructure would be minimal when compared to facilities and infrastructure previously created to provide historical carrier homeporting capacity, and no impact on water quality would result.

Operations

Potential impacts to water quality and related mitigation measures associated with normal operations and spills for the second additional CVN would be similar to those described for the providing the capacity to homeport the first additional CVN. For example, copper leaching from hull paints on the second CVN would be the same as for the first CVN. During the 13 days/year that 3 CVNs would be in port simultaneously, the increase in mass of copper potentially released to the bay would be very minor, intermittent and short-term. These impacts would offset by reductions in the total fleet size in San Diego Bay from 76 naval ships in 1992 to 55 ships in 1999. Therefore, there would not be a future net increase in copper loading or related water quality impacts related to providing the capacity to homeport two additional CVNs.

Providing the capacity to homeport a second additional CVN would result in intermittent, short-term increases in handling, storage, or disposal of chemicals potentially affecting terrestrial hydrology and water quality during those 13 days/year that three CVNs would be simultaneously in port. The amount of chemicals involved would be minimal in relation to NASNI's handling and storage capacity. Therefore, any impacts would be very minor, short-term, intermittent, and less than significant.

NNPP RADIOLOGICAL IMPACT. Since the early 1970s, the Navy has prohibited intentional discharges of even negligible radioactivity into harbors. Stringent, long-standing controls have proven effective in protecting the marine environment from radioactivity. Because these controls would continue, there would be no significant long-term onshore maintenance facilities or vessel-related operational impacts on water quality due to radioactivity from providing the capacity to homeport two additional NIMITZ-class aircraft carriers at NASNI.

3.3.2.4 *No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site/NAB Habitat Enhancement Area

This alternative would involve homeporting one additional CVN at existing facilities (Chapter 2). Therefore, since dredging would not be required for installation of a new wharf or construction of a mitigation site, no impacts would result.

Facility Improvements

No construction would be required either for installation of a new wharf or construction of a mitigation site. Therefore, no impacts related to facility improvements would result.

Operations

As described in section 3.3.2.2, impacts to marine water quality from operations of one additional CVN would be less than significant.

These operations would result in an increase in the quantity of chemicals handled, stored, and disposed at the home port site. Therefore, there is an increase in the potential for chemical releases to occur, resulting in potential adverse impacts to marine water. However, as described in section

3.2.2.2, these operations-related impacts to water quality would be reduced to levels that are less than significant by the implementation of the existing SWPPP, the existing safety and health programs described in section 3.15, and compliance with federal, state, and local statutes and regulations pertaining to soil and groundwater contamination described in section 3.2.1.

NNPP RADIOLOGICAL IMPACT. Since the early 1970s, the Navy has prohibited intentional discharges of even negligible radioactivity into harbors. Stringent, long-standing controls have proven effective in protecting the marine environment from radioactivity. Because these controls would continue, there would be no significant long-term onshore maintenance facilities or vessel-related operational impacts on water quality due to radioactivity from homeporting one additional NIMITZ-class aircraft carrier at NASNI.

3.3.2.5 *Mitigation Measures*

Project actions would be implemented in conformance with permit conditions intended to protect water quality (section 3.3.2.2). Therefore, additional mitigation other than construction of the mitigation site would not be proposed.

3.4 SEDIMENT QUALITY

This section characterizes sediment quality in San Diego Bay associated with the various actions discussed under section 3.4.2.

Regulatory Setting

Beneficial uses for San Diego Bay are described in the Basin Plan, and are identified in section 3.3. Relevant sediment quality criteria typically are descriptive and defined based on potentials for causing impacts to organisms or biological communities. Numerical sediment quality criteria (e.g., representing maximum allowable constituent concentrations) presently do not exist. The Basin Plan specifies that sediments can not contain concentrations of pesticides that adversely affect beneficial uses or which bioaccumulate in aquatic organisms to levels that are harmful to human health, wildlife, or aquatic organisms. Further suspended sediment concentrations cannot be altered to cause nuisance or adversely affect beneficial uses.

The relevant federal, state, and local statutes governing sediment quality are identified in section 1.5. In particular, issues associated with sediment dredging and disposal activities are governed by Sections 401 and 404 of the Clean Water Act and by the Marine Protection, Research and Sanctuaries Act.

3.4.1 Affected Environment

Sediment quality conditions are summarized for the homeporting site, mitigation site, and NAB Habitat Enhancement Area in sections 3.4.1.1 through 3.4.1.2, respectively. A tabular summary of data collected by the Navy for the Pier J/K dredging footprint and mitigation site areas is provided in Volume 3, section 3.4.

3.4.1.1 Homeporting Site

Sediment quality data were collected by the Navy within the turning basin and adjacent shipping channel as part of NIMITZ-class CVN Homeporting Project (DON 1995b). Sediment samples also were collected within the turning basin and analyzed as part of the Bay Protection and Toxic Cleanup Program (BPTCP) (Fairey et al. 1996). These data are appropriate for characterizing sediment quality in the general vicinity of Pier J/K for the EIS. Sampling and analyses of sediments within the dredging footprint are being performed (during January through April 1999) according to protocols defined by EPA/COE to evaluate the suitability of the materials for ocean disposal. The sampling design and numbers of sites sampled for sediment testing are described in the "Dredged Material Sampling and Analysis Plan: MCON Project P-700A Berthing Wharf – Phase II at Naval Air Station North Island, Coronado, California," which was reviewed by state and federal resource agencies prior to sediment collection and testing. Results from these analyses are expected to be available by June 1999, and to provide adequate information for evaluating the suitability of the material for aquatic (e.g., ocean) disposal. No information on the source and rate of sedimentation within the project area is presently available.

Two recent surveys in the vicinity of Pier J/K were conducted to assess the presence of ordnance in bottom sediments. No evidence of ordnance was detected in either survey. A magnetometer survey (Moffet & Nichols 1998) detected several targets within the proposed dredging area, but subsequent diver surveys determined that these were due primarily to metal debris from unknown sources. Further, analyses of bottom sediments from cores collected within the proposed dredging area did not contain detectable quantities of explosives (see section 3.10).

Grain Size

Grain size is an important property of bottom sediments because bottom-dwelling organisms typically have preferences for specific grain size characteristics, and this affects the suitability of materials used to construct subtidal habitat. Additionally, the distribution and magnitude of chemical contaminants are strongly influenced by grain size.

Surface sediments collected by the Navy at three locations offshore from Pier J/K (Stations I-1, I-2, and I-3), and within the dredging footprint for the proposed project, consisted primarily of sand-sized particles (76 to 93 percent). Middle- and bottom-core sediments contained similar proportions of sand-sized particles (64 to 98 percent and 81 to 99 percent, respectively). Samples collected within the turning basin by the BPTCP contained higher proportions of fine-grained particles (<63 micron diameter; 41 to 64 percent). Some of these BPTCP sampling sites were within or close to an area identified by DON (1995b) with sediments containing less than 80 percent sand.

Organic Carbon

Organic carbon concentration is another important property of bottom sediments that influences the distributions of bottom-dwelling organisms and sediment contaminants.

Surface sediments collected by the Navy at Stations I-1, I-2, and I-3 contained total organic carbon (TOC) concentrations of 0.01-0.61 percent (DON 1995b). Middle- and bottom-core sediments contained similar TOC concentrations (0.05 to 1.09 percent and 0.01 to 0.73 percent, respectively). Sediments at adjacent sites (0-1 and 0-2) in the northwest portion of the approach channel contained similar TOC concentrations. Samples collected within the turning basin by the BPTCP contained relatively higher TOC concentrations (1.1 to 1.7 percent), consistent with the presence of higher percentages of fine-grained materials.

Bulk Chemistry

Bulk chemistry describes the concentrations (on a mass-per-dry-mass basis) of individual chemical constituents of bottom sediments.

Results obtained by the Navy from sediment testing using EPA/U.S. Army Corps of Engineers protocols (EPA/COE 1991) from an area in the northwestern portion of the approach channel (Site 1) demonstrated that this area is generally free of significant contamination (DON 1995a). One exception was concentrations of mercury that were intermediate between contaminant levels where effects are rarely observed (effects range-low; 0.15 ppm mercury) and levels where effects are expected to occur (effects range-median; 0.7 ppm mercury).

Recent (December 1997) sampling and analyses of sediments in the vicinity of Pier J/K were performed to provide an evaluation of the potential presence of sediment contaminants (Woodward-Clyde 1998). The results indicated that concentrations of all metals were below the respective effects range-median values, and most concentrations were below the respective effects range-low values. Further, concentrations of total petroleum hydrocarbons, volatile organic compounds, and organotins typically were less than or approaching the respective method detection limits. The study concluded that the sediments likely would not be classified as hazardous for waste disposal purposes relative to the State of California Title 22 criteria.

Results of chemical analyses of sediment samples from the turning basin performed for the BPTCP were consistent with those obtained by the Navy. The BPTCP results indicated that levels of some metals (copper, mercury, and zinc) and organic contaminants (polychlorinated biphenyls [PCB] and polycyclic aromatic hydrocarbons [PAH]) were above those where effects rarely occur, but were below those expected to cause biological effects.

Elutriate Chemistry

Elutriate chemistry describes the concentrations of sediment constituents released to waters when sediments and site waters are mixed. This process may simulate conditions during dredging or sediment dispersal.

Analyses of elutriate chemistry was performed by the Navy on sediments near the foot of Pier 700 (the home port site presently under construction for the BRAC CVN [DON 1995b]). In all cases, contaminants were nondetectable in the water phase, indicating negligible potentials for major releases of chemicals from sediments to bay waters.

Toxicity/Contaminant Bioaccumulation

Toxicity and bioaccumulation tests are conducted to determine whether and to what extent sediment contaminants may be expected to cause adverse impacts to plants and animals.

Sediments from the approach channel (Site 1) tested by the Navy did not exhibit any major toxicity to test bioassay organisms (DON 1995b). Further, with the exception of lead in clam tissues, no major contaminant bioaccumulation was observed in test organisms exposed for 28 days to Site 1 sediments (DON 1995b). All of the testing results, when evaluated by the federal agencies responsible for approval of the proposed dredging project, indicated that the sediments were suitable for ocean disposal according to criteria contained in the testing protocol.

Installation Restoration Sites

Three IR sites (Sites 1, 9, and 12) are on or adjacent to NASNI. IR Site 1 is the only site that primarily impacts sediment quality. Sites 9 and 12 are addressed in sections 3.3 and 3.2, respectively.

IR Site 1 comprises contaminated shoreline sediments adjacent to an original 16-outfall storm drain system that received hazardous wastes for approximately 50 years, beginning in the 1920s. The chemicals of concern include heavy metals, semivolatile organic compounds (SVOCs), PAHs, and pesticides (DON 1997). IR Site 1/Outfalls 9-15 is in the BRAC project area. The next closest is IR Site 1/Outfall 8 located approximately 1,500 feet west of the proposed home port site. In addition, IR Site 1/Outfall 3 is located adjacent to the mitigation site

IR Site 1/Outfalls 9-15 were the subject of a time-critical removal action that was conducted in concert with the BRAC CVN homeporting to construct a confined disposal facility (CDF) for impacted sediments (DON 1997). The CDF is located in the same area as Outfalls 9-15. The impacted sediment inside the CDF is separated from the surrounding land and bay by a 50-foot-thick buffer of soil and a 25- to 50-foot-thick dike structure. A focused Remedial

Investigation/Feasibility Study (RI/FS) workplan for IR Site 1/Outfalls 9-15 was submitted to the California Department of Toxic Substances Control (DTSC) in October 1997 (personal communication, M. Bonsavage 1997). Quarterly monitoring of the CDF is conducted under RWQCB waste discharge requirements. Additional assessment or remediation activities would be conducted with regulatory oversight by DTSC.

IR Site 1/Outfalls 1-8 and 16 are currently in the Remedial Investigation/RCRA Facility Investigation (RI/RFI) phase. In October 1996, the Navy presented the preliminary results and recommendations for No Further Action to DTSC, the lead regulatory agency. The draft RI/RFI report for Outfalls 1-8 and 16 was issued in January 1997. Comments were provided by DTSC on July 25, 1997. The report is expected to be finalized in 1999 (personal communication, M. Bonsavage 1999).

Results of Sediment Sampling for Radioactivity

Sampling of sediments in the North Island project area in 1996 showed no detectable radioactivity associated with Naval nuclear propulsion plant operation or servicing (NNPP 1997). The detectable level of cobalt-60 for Navy radiological surveys is approximately 0.1 pCi/gram. The actual value varies depending on the amount of naturally occurring radioactivity in the survey sample. A previous EPA radiological survey of San Diego Bay in 1987 (EPA 1989a) showed detectable cobalt-60 in one of eight sediment samples at the North Island project area at a concentration of 0.030 ± 0.011 pCi/g dry. This concentration is less than 1 percent of the concentration of comparable naturally occurring background radioactive materials in the harbor sediment. This and other trace amounts of cobalt-60 detectable near some Navy piers in San Diego Harbor are a result of releases of low-level radioactivity from nuclear-powered ships in the 1960s. These levels are well below the naturally occurring radioactivity levels in the harbor, and have no radiological impact on the area. Nevertheless, since the early 1970s, the Navy has prohibited intentional discharges of radioactivity to the harbor, and the level of radioactivity in the sediments has significantly decreased due to radioactive decay. Cobalt-60 decays with a half-life of 5.2 years. Therefore, in 50 years the amount originally present is reduced by a factor of approximately 1,000, and in 100 years, by a factor of approximately 1,000,000. Otherwise, only naturally occurring radioactivity and traces of cesium-137 from nuclear weapons testing fallout were observed in the sediment samples.

3.4.1.2 Mitigation Site

Sediments in the vicinity of Pier B, immediately offshore from the mitigation site, consist primarily (greater than 80 percent) of sand plus gravel with low total organic carbon concentrations (0.2-0.5 percent) (MEC 1992; CAS 1994). Concentrations of metals are generally low and comparable to those in sediments from reference locations (as defined by testing protocols contained in EPA/COE 1991). Concentrations of chlorinated pesticides, PCBs, and phenols are also low or nondetectable. In contrast, elevated concentrations of PAHs (up to several parts per million) occur in sediments from areas immediately offshore from the pier and inshore from the pier on the north side of the pier access road, which are attributable to leaching from creosote-soaked pier pilings.

Recent additional sampling (both in-bay and upland) confirmed that soils and sediments from areas that would be dredged to construct the mitigation site do not contain significant contaminant levels. Additionally, results from surveys of the upland portion of the site did not detect the presence of buried ordnance (see section 3.10). Tabular listings of the data are provided in Volume 3, section 3.4.

Results from bioassay tests conducted on sediments from areas immediately offshore from the mitigation site (i.e., inshore from the northern extension of the pier) generally showed low potentials for toxicity and contaminant bioaccumulation (MEC 1992; CAS 1994). Elutriate tests did not indicate any measurable releases of contaminants to waters mixed with suspended sediments from the site. CAS (1994) concluded that sediments from the area immediately offshore from the mitigation site would be suitable for ocean disposal. In general, these observations should also apply to sediments from the mitigation site because this area is relatively farther from the effects of creosote leaching and activities on the pier that may contribute contaminants to bay sediments.

3.4.1.3 NAB Habitat Enhancement Area

Sediments in the vicinity of the NAB Habitat Enhancement Area consist of 51 to 88 percent fine sands and from 12 to 49 percent silts and clays. Concentrations of total organic carbon in sediments range from 0.41 to 0.62 percent. Bottom sediments do not contain detectable concentrations of organic contaminants (PAHs and PCBs). Trace metal concentrations were similar to metal concentrations in bottom sediments in the north bay (e.g., West Harbor and Shelter Islands) but up to several times higher than the respective concentrations in sediments from the outer Paleta Creek channel (DON 1998a).

3.4.2 Environmental Consequences and Mitigation Measures

The impacts on sediment quality associated with the capacity to homeport three aircraft carriers at NASNI would be from the construction of facilities and infrastructure (e.g., new piers, electrical transformers, utility pipes, etc.). Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental changes to the capacity previously created for the CV that would be replaced by the CVN. Facilities for the first CVN would be developed by 2002, and facilities for the second CVN by 2005.

Elements of the proposed project that could affect sediment quality include (1) demolition of Pier J/K; (2) construction of a new wharf; (3) dredging from shore to the adjacent shipping channel; (4) dredged material disposal; (5) operational and/or accidental discharges or releases from Naval vessels; and (6) construction of a mitigation site, including dredging and dredged sediment disposal.

Potential impacts to sediment quality from the proposed project include the following: (1) dredging-related impacts associated with resuspension and possible redistribution of sediments; (2) inputs of contaminants such as metals from anti-fouling paints, corrosion, and sacrificial anodes; (3) accidental spills of contaminants into the harbor; and (4) cumulative effects and long-term accumulation of contaminants in bay sediments.

Significance Criteria

An impact would be significant if the following occurred:

- A discharge of dredged material occurs at the surface of a disposal site or sediments are exposed at a dredging site, which would cause substantial toxicity or bioaccumulation of contaminants in aquatic biota.

3.4.2.1 *Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new projects.

Dredging/Mitigation Site/NAB Habitat Enhancement Area

No sediment dredging activities would occur at NASNI or at a mitigation site. Therefore, no significant adverse impacts to sediment quality would result.

Facility Improvements

No construction activities would occur at NASNI. Therefore, no significant adverse impacts to sediment quality would result.

Operations

Changes to sediment quality would be associated with minor reductions in contaminant inputs from anti-fouling paints, hull corrosion, and/or accidental spills (discussed in section 3.3.2.2). Thus, impacts to sediment quality would not be increased based on removal of two CVs.

3.4.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging Site

Dredging approximately 534,000 cy of sediments from shore to the navigation channel adjacent to the new wharf to provide the capacity to homeport one additional CVN would expose bay waters and biological organisms to presently buried sediments. Based on results from analyses of sediment cores collected for the BRAC CVN project, subsurface sediments within the navigation channel do not have appreciably different grain size or bulk chemical characteristics from those sediments that would be removed by dredging. Thus, dredging would not substantially alter sediment quality in the immediate project area.

NASNI (P-700a) Mitigation Site

Dredging up to 48,000 cy for construction of the mitigation site would not substantially alter the texture of bottom sediments at this site because subsurface sediments that would be exposed after surface sediments are removed are expected to have similar grain size. Prior studies of sediment quality in the vicinity of Pier B (e.g., CAS 1994) were conducted to determine whether the materials would be suitable for ocean disposal. Results from chemical and biological (toxicological) analyses of samples from areas near Pier B, including samples closest to the proposed mitigation site, were considered free of significant contamination and potentially suitable for ocean disposal. In contrast, results also indicated that sediments primarily from an area immediately bayward of the pier in water depths of 36 to 41 feet contained elevated PAH concentrations and would not be acceptable for ocean disposal. However, sediments from this area would not be disturbed during dredging at the mitigation site because dredging would not occur in water depths greater than -4 feet MLLW. Additional sampling and analyses of sediments within the mitigation site have confirmed the general absence of significant chemical contamination. Thus, dredging at the mitigation site is not expected to alter the local sediment quality. Dredged materials would be disposed in a manner that is acceptable and permitted by the resource agencies. Results from monitoring at the adjacent BRAC mitigation site have indicated stable bathymetry and minimal erosion/transport of bottom sediments (personal observation, M. Perdue, DON). Similarly, changes in bathymetry at the mitigation site would not result in substantial alterations in the depositional conditions, such as greater erosion, which, in turn, affect sediment grain-size characteristics. Consequently, impacts to sediment quality associated with construction of a mitigation site would be less than significant.

NAB Habitat Enhancement Area/Ocean Disposal Site

Dredged materials would be disposed in a manner that is acceptable and permitted by the resource agencies. Results of sediment testing conducted as part of the BRAC CVN Homeporting project, using protocols specified by the EPA and U.S. Army Corps of Engineers (EPA/COE 1991), demonstrated that the material from the dredging footprint would be suitable for disposal at the ocean dredged material disposal site (DON 1995b). Additional testing of sediments from the vicinity of Pier J/K is being conducted as described in "Dredged Material Sampling and Analysis Plan: MCON Project P-700A Berthing Wharf – Phase II at Naval Air Station North Island, Coronado, California." Results from this testing are expected to be adequate for evaluating the suitability of the material for ocean disposal or for creation of shallow-water, in-bay habitat near NAB. Short-term impacts to sediment quality associated with normal use of the ocean dredged material disposal site were evaluated in the LA-5 site designation EIS (EPA 1988). Based on existing sediment grain size and contaminant concentration data, sediment conditions at the NAB Habitat Enhancement Area are generally similar to those within the proposed Pier J/K dredging area. Thus, placement of the dredged materials at the Habitat Enhancement Area would not result in significant impacts to sediment quality.Wave-induced turbulence and bottom currents may resuspend and transport some of the finer-grained sediments placed at the Habitat Enhancement Area. However, this process will diminish with time and is not expected to require long-term maintenance or result in increased sediment deposition around NAB piers.

Facility Improvements

Pier demolition and wharf construction to provide the capacity to homeport one additional CVN would result in localized sediment resuspension and redistribution. This would not cause a persistent or substantial effect on sediment quality because the affected sediments consist largely (greater than 80 percent) of clean, sand-sized materials. Prior to any demolition, excavation, or construction activities, all known utilities and facilities (such as fuel lines) would be identified by the demolition and construction contractor in accordance with DON (1996a). In addition, a geophysical survey would be conducted to locate any buried ordnance or other undocumented features. Backfilling a 1.5-acre area behind the new wharf would not significantly alter sediment characteristics (grain size) in the immediate project area because materials used for fill would be comparable in grain size and sediment quality, as related to bulk sediment chemical characteristics, to those of the existing sediments. Accidental releases of construction debris to the bay would be prevented by placing booms around the construction site. Thus, impacts to sediment quality in the vicinity of the construction site would be less than significant.

Operations

As discussed in section 3.3.2, leaching of metals from hull paints and sacrificial anodes, or contaminant inputs to the bay associated with accidental discharges or spills, represents a potential for impacts to sediment quality because many of the environmentally persistent chemical contaminants have strong affinities for particles that eventually settle to the bottom and become incorporated into bay sediments. These potential impacts associated with providing the capacity to homeport one additional CVN at NASNI would be offset by the decommissioning of one existing CV, and impacts to sediment quality from vessel operations are considered insignificant.

However, standard measures to minimize potential impacts would be implemented during each aspect of the project as described in section 3.3.2. Similarly, contaminant levels in bottom sediments following a spill or accidental discharge could be measured to evaluate the need for sediment cleanup or remediation. These measures would serve to minimize sediment quality impacts.

Propeller wash from transiting vessels may cause episodic and localized resuspension of bottom sediments. Sediment resuspension due to propeller-induced or natural turbulence does not alter sediment quality. Instead, resuspension allows sediment particles to be transported and settle out in other areas of the bay, resulting in some sediment redistribution. Similar processes occur throughout the bay, and they do not degrade the overall quality of bay sediments. Further, the frequency and extent of sediment resuspension events associated with a providing the capacity to homeport an additional CVN are not likely to be significantly different from those associated with the existing CV. Thus, disturbance by prop wash of bottom sediments is not considered a significant impact.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 3.3.2 would continue, there would be no significant impacts on sediment quality due to radioactivity from homeporting an additional NIMITZ-class aircraft carrier at North Island.

3.4.2.3 *Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)*

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site/NAB Habitat Enhancement Area

Providing the capacity to homeport a second additional CVN at NASNI would not result in further impacts to sediment quality because no additional dredging or construction would be needed at the present transient pier. Providing the capacity to homeport a second additional CVN would not generate increased volumes of dredged materials or construction debris, or require creation of additional mitigation acreage.

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional

CVN. No additional in-water facility improvements would be required associated with providing the capacity to homeport a second additional CVN. Minor additional utility and fencing upgrades would be minimal when compared to facilities and infrastructure previously created to provide historical carrier homeporting capacity. Therefore, impacts on sediment quality and identification of any buried utilities would be no different than those described in section 3.4.2.1.

Operations

Contaminant loading to bay sediments from normal operations and from spills and accidental discharges for the second additional CVN are expected to be similar in magnitude to those associated with the providing the capacity to homeport a first additional CVN and the BRAC CVN. For example, copper leaching from a second CVN hull would be equivalent to that from the first CVN. During the 13 days per year that a total of three CVNs would be in port simultaneously, the mass of copper potentially released would be minimal, intermittent and short term. These impacts would be offset by reductions in the total fleet size in San Diego Bay from 76 naval ships in 1992 to 55 ships in 1999. Overall, impacts to sediment quality would be very minor, intermittent, short-term, and less than significant.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 3.3.2 would continue, there would be no significant impacts on sediment quality due to radioactivity from providing the capacity to homeport two additional NIMITZ-class aircraft carriers at North Island.

3.4.2.4 *No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site/NAB Habitat Enhancement Area

This alternative would involve homeporting one additional CVN at existing facilities (Chapter 2). Therefore, since no dredging would be required either for installation of a new wharf or a mitigation site, no impacts would result.

Facility Improvements

No construction would be required either for installation of a new wharf or a mitigation site. Therefore, no impacts would result.

Operations

Potential impacts to sediment quality would be associated only with operational discharges, such as copper leaching from hull paint, and accidental spills or discharges. As discussed for the other CVN homeporting alternatives, potential impacts to sediment quality are less than significant and offset by CV decommissioning.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 3.3.2 would continue, there would be no significant impacts on sediment quality due to radioactivity from homeporting one additional NIMITZ-class aircraft carrier at North Island.

3.4.2.5 *Mitigation Measures*

No action described in this section would generate significant sediment quality impacts, so no mitigation measures are proposed.

3.5 MARINE BIOLOGY

3.5.1 Affected Environment

This section describes biological communities at NASNI that would be affected by dredging, fill, and construction activities for the proposed project. Biological communities that are addressed include plankton, eelgrass and algae, invertebrates, fishes, birds, marine mammals, threatened and endangered species occurring in the project area, and the results of marine life sampling for radioactivity. This section uses the best available data to adequately characterize biological resources at the project, mitigation, and enhancement sites. Some information is provided for organisms having a distribution extending into the south bay, including eelgrass, commercial mullet fisheries, and green sea turtles, because these data are believed to be reasonably comparable to conditions in the project area.

3.5.1.1 Homeporting Alternative Site

The general habitat at the homeporting site consists of 1.5 acres of waters of the United States. This is determined by using MLLW as the vertical datum and bathymetric regimes of +7.8 to -2.2 for intertidal, -2.2 to -10 for shallow subtidal -10 to -20 for medium subtidal and greater than -20 as deep water. The 1.5 acres at the homeporting site consists primarily of low intertidal (0.82 acres) from about +1.0 to -2.2 feet MLLW, shallow subtidal (0.63 acres) from -2.2 to -10 feet MLLW, and medium subtidal (0.05 acres) from -10 to -20 feet MLLW. Of the total area 55 percent is intertidal and 45 percent is subtidal habitat. These habitats are predominantly soft bottom (section 3.4). The intertidal area is backed by an almost vertical quay wall that is subject to boat wake and wave surge, and does not represent gradually sloping habitat (e.g., 15:1) that typically is utilized by foraging shorebirds. The typical range of intertidal habitats in the bay is +7.8 to -3 feet MLLW, but the toe of the quay wall is at +1 foot MLLW, thereby substantially reducing the actual intertidal range in this location.

Plankton

Plankton are free-floating or weakly swimming plants and animals that form the base of the marine food chain. No information is available on plankton assemblages near the homeporting action site (proposed action site). However, it is expected that species composition at this site is similar to other parts of San Diego Bay. This is because currents distribute these organisms throughout the bay. Based on extensive data summarized by Ford (1968), SDG&E (1980), and SDUPD (1990), dominant phytoplankton communities consist of pennate (oval-shaped) and chain-forming diatoms such as *Pleurosigma* and *Gyrosigma* (Zedler and Nordby 1986) and dinoflagellates such as *Gymnodinium* spp. *Pleurosigma* and *Gyrosigma* are a primary food source for various species of marine molluscs and fishes throughout the bay. The sampling stations used in most of these plankton studies are in south San Diego Bay.

Information is also unavailable on invertebrate zooplankton communities at the site. However, calanoid and harpacticoid copepods (micro-crustaceans) are likely the most common zooplankton species based on their predominance in many other areas of the bay (SDG&E 1980, SDUPD 1990). Also, larvae of benthic polychaetes (segmented worms) and molluscs are carried by currents into the area and represent an additional food source for many local fishes and invertebrates. As described above for phytoplankton, zooplankton studies have been conducted mostly in South San Diego Bay.

Other plankton assemblages at the proposed site would include fish eggs and larvae (ichthyoplankton), although no surveys of this type have been conducted in the vicinity of the project site. Patterns in local distributions of several ichthyoplankton species were described by McGowan (1981), who concluded that eggs of the deepbody anchovy (*Anchoa compressa*) and diamond turbot (*Hypsopsetta guttulata*) were the most commonly collected species. Sampling locations used by McGowan (1981) were in South San Diego Bay near the SDG&E power plant.

Eelgrass/Algae

Eelgrass (*Zostera marina*) is a valuable resource in southern California bays and estuaries (NMFS 1991). Eelgrass provides refuge for numerous species of algae, invertebrates, and fishes, as well as nursery habitat for juvenile fishes and may provide limited foraging habitat for the endangered California least tern, among other open-water habitats (DON 1995a). Eelgrass is found at water depths of 0 to 24 feet in the north and north-central bay and 0 to 13 feet in the south and south-central bay. Over 90 percent of the 441 hectares of eelgrass occurs in the south and south-central bay (DON 1994d).

Eelgrass distributions immediately north and east of the project site were described by DON (1995a). Eelgrass east of the project site covers approximately 20 percent (~1.8 acres) of the area surveyed, with 51 percent of the eelgrass bed comprised of low-density concentrations (up to 8 growth shoots [turions] per 1/16 m^2, corresponding to 128 turions/m^2), 22 percent moderate-density concentrations (8-17 turions per 1/16 m^2, corresponding to 128-272/m^2), and 27 percent high-density concentrations (>17 turions per 1/16 m^2, corresponding to >272/m^2) (Volume 3, Section 3.5, Figure 3.5-1). Most of the eelgrass occurred at water depths of 0-10 feet below MLLW, with the highest densities at 5 feet below MLLW or shallower. Eelgrass densities east of the project site (the vicinity of the proposed P-549 turning basin) covered 17 percent (3.9 acres) of the area surveyed (DON 1995a). Low density of eelgrass was found over 35 percent of the beds surveyed, while 16 percent had moderate density, and 49 percent high density (Volume 3, section 3.5, Figure 3.5-2). Eelgrass was found at the same depths as in the area surveyed north of the project site, with the highest density found at 5 feet below MLLW. In contrast to these eelgrass measurements, diver-conducted surveys in November 1997 documented much lower densities throughout the proposed site area (Volume 3, section 3.5). In general, eelgrass occurred along transects in less than 5 percent of the area surveyed on the northwest side of Pier J/K, and was patchy in distribution. Principal depths for eelgrass were from approximately 0-5 feet MLLW. Densities ranged from 56-100 turions/m^2 in the densest beds to only 8-16 turions/m^2 in low density areas. No eelgrass was observed along the transect located on the southeast side of the pier. Similarly, no eelgrass was seen along three transects in the Navigational Channel leading from Pier J/K. The lower densities in 1997 appear to be consistent with a bay-wide trend over the past several months. This likely is influenced, at least in part, by naturally warmer water temperatures associated with a strong El Niño event. A pre-construction survey will be conducted a minimum of six months prior to construction to determine the actual amount of eelgrass in the project area.

Algae are important photosynthetic plants that provide food and refuge to other marine organisms. Several common algal species are found on soft bottom habitats in San Diego Bay.

These include mats of the red algae *Gracilaria verrucosa* (DON 1992a) and green algae such as *Ulva* spp. (referring to more than one species in a genus), *Chaetomorpha* spp., *Cladophora* spp., and *Enteromorpha* spp. (SDUPD 1990). Descriptions of epibenthic (attached subtidal) algae near the proposed site (DON 1995a) are based on qualitative observations made during the eelgrass surveys. The most common species were the red algae *G. verrucosa* and Sargasso seaweed *Sargassum muticum*. *Sargassum* was commonly found on hard substrate along the side of the turning basin. No algae were common along the soft-bottom transects surveyed during November 1997 (see Volume 3, section 3.5).

Invertebrates

Invertebrates are important components of marine ecosystems that represent a food source for many fish and birds. Invertebrates consist of infauna (organisms living in the sediments) and epifauna (organisms living on the sediments). Infaunal communities at the project site are likely similar to other parts of north and north-central San Diego Bay. This is because of the similarity of sediment types and depths and likely distribution of the larvae of these organisms over broad areas of the bay. Dominant infaunal taxa include numerous polychaete families (and genera), including Opheliidae (*Armandia*), Capitellidae (e.g., *Capitella* and *Mediomastus*), Cirratulidae, Phyllodocidae (*Etone*), Sabellidae (*Fabricia*), Syllidae (*Exogene*), Glyceridae (*Glycera*), Lumbrineridae (*Lumbrineris*), Eunicidae (*Marphysa*), Neriidae (*Neanthes*), and Spionidae (*Prionospio, Rhynchospio,* and *Streblospio*) (SAIC 1994). Recent surveys near the project site by DON (1995a) collected 33 infaunal species, of which polychaetes represented 84 percent of the total number of individuals, and the highest densities (up to approximately 3,600/0.1 m^{2}). This group also comprised 81 percent of the total organisms collected near the proposed site, as compared with 46 percent at reference stations.

Over 80 epifaunal invertebrates were observed near the proposed site as part of the eelgrass surveys (DON 1995a). The most common epifauna were molluscs, including the Japanese mussel *Musculista senhousii*, cnidarians (hydroids and sea anemones), arthropods (barnacles, shrimp, and crabs), and porifera (sponges). The introduced Japanese mussel is commonly found on muddy bottom habitats throughout San Diego Bay, occurring in similar densities at the proposed site as in other parts of the bay. However, these mussels typically are absent from areas dominated by eelgrass. Other common epifauna collected near the proposed site include the glass palm hydroid *Corymorpha palma*, mud tube anemone *Pachycerianthus fimbriatus*, western mud whelk *Nassarius tegula*, and bubble snail *Bulla gouldiana*. Diver-conducted surveys in November 1997 verified that the anemone, whelk, and bubble snail were common on the northwest side of Pier J/K, with the snail in particular ranging from average densities of 3-41/m^2 (Volume 3, section 3.5). Other species present but in low abundance included several molluscs (chione bivalves, snails, nudibranchs, and sea slugs), bryozoans, gorgonians, sponges, and tunicates. On the southeast side of the pier, the most common species were the bubble snail and the native oyster (*Ostrea lurida*), each averaging about 5/m^2.

Fishes

Fish assemblages have been documented in many parts of San Diego Bay, including near the proposed construction, mitigation, and enhancement sites. Allen (1998) collected a total of 72 fish species (pelagic and demersal combined) over a four-year period in San Diego Bay, of which 39 species were collected near the proposed construction site (Volume 3, Section 3.5, Figure 3.5-3).

Pelagic species spend all or most of their life in the water column, while demersal fishes spend most of their life on or near the bottom. Results of the Allen study, SAIC (1994), and DON (1995a) showed that the most common pelagic fish species include topsmelt (*Atherinops affinis*), jacksmelt (*Atherinopsis californiensis*), northern anchovy (*Engraulis mordax*), chub mackerel (*Scomber japonicus*), and Pacific sardine (*Sardinops sagax*). Demersal fish species common in non-vegetated areas of San Diego Bay (similar to many parts of the project site) include round stingray (*Urolophus halleri*), spotted sand bass (*Paralabrax maculatofasciatus*), barred sand bass (*P. nebulifer*), yellowfin goby (*Acanthogobius flavimanus*), arrow goby (*Clevelandia ios*), bay goby (*Lepidogobius lepidus*), diamond turbot (*Hypsopsetta guttulata*), and California halibut (*Paralichthys californicus*). A list of common fish species in San Diego Bay is presented in Volume 3, Section 3.5, Table 3.5-1. Fish surveys conducted by divers in November 1997 (Volume 3, section 3.5) documented similar species as noted historically by Allen (1996) and DON (1995a), although abundances of some species associated with eelgrass likely are reduced along with the general reductions noted above for eelgrass densities and distribution.

Few commercially important species are found in the bay. However, a small fishery exists for striped mullet (*Mugil cephalus*) south of the Coronado Bridge. California halibut are another commercially important species, with adults primarily taken offshore. Juvenile California halibut move into bays and estuaries in southern California (including San Diego Bay) seasonally, using various habitats as nursery grounds (Allen 1988). For example, a total of 170 juvenile California halibut was collected by Allen (1996) near the project site, and a single halibut was observed on the northwest side of Pier J/K during the November 1997 survey (see Volume 3, section 3.5 for the reconnaissance report)

No threatened or endangered fish species are known to occur in San Diego Bay, according to the U.S. Fish and Wildlife Service (USFWS) Endangered Species List (dated 30 November 1996).

Birds

The open waters and shorelines of San Diego Bay provide important foraging and roosting habitats for migratory, wintering, and resident-breeding marine birds (including shorebirds), waterfowl, wading and diving birds, generalist waterbirds (e.g., gulls), and several raptors. Recent studies conducted by the Point Reyes Bird Observatory (Page et al. 1992), San Diego Unified Port District (MBA 1990), USFWS (e.g., Fancher 1993; Manning 1993; Stadtlander 1994), and the Navy (DON 1994a, 1995a) have begun to establish spatial and temporal patterns of marine bird use of the bay, and critical nesting, roosting, and foraging areas for particular species.

The Navy conducted grid surveys covering the northern part of the bay from Ballast Point at the entrance channel to the Coronado Bridge, at weekly intervals throughout 1993 (DON 1994a). Results indicate peak numbers from fall through spring, corresponding to heavy use of the bay by migratory (including short-distance migrants such as the endangered California brown pelican) and wintering species. Combining all survey counts, the 15 most abundant species were Heermann's gull, Brandt's cormorant, California brown pelican, surf scoter, bufflehead, western grebe, elegant tern, lesser and greater scaup (combined), double-crested cormorant, mallard, great blue heron, Forster's tern, snowy egret, the endangered California least tern, and eared grebe.

The structures and shallow water habitat along the northeastern shoreline of North Island are heavily used by waterbirds, representing some of the primary use areas for many species and groups of waterbirds that occur in northern San Diego Bay. The piers and structures are used for resting, while the intertidal and shallow water areas provide foraging and on-water resting habitat (DON 1994a). Volume 3, Section 3.5, Table 3.5-2, lists species that are expected to occur in the vicinity of the proposed homeporting site. For most species and groups (= foraging guilds as distinguished in DON [1994a]), the site is expected to receive a low-to-medium frequency of use as resting or foraging habitat (DON 1994a), although the intertidal area backed by the quay wall in the immediate project region is generally too steep to support shorebird foraging. The site overlaps or is adjacent to areas that in 1993 were of high to very high use by greater and lesser scaups, California brown pelicans, and wading birds (herons) (DON 1994a).

California Department of Fish and Game Species of Special Concern that are known to rest and/or forage, but do not nest, around the northeastern shoreline of North Island include long-billed curlew, osprey, common loon, double-crested cormorant, California gull, black skimmer, gull-billed tern, and elegant tern (DON 1994a). The elegant tern is also a federal species of concern.

Marine Mammals

Marine mammals are protected under the Marine Mammal Protection Act. Occasional sightings of two marine pinniped species (California sea lion, *Zalophus californianus*, and harbor seal, *Phoca vitulina richardsi*), have been made throughout San Diego Bay, although sea lions in particular are commonly observed using marker buoys as haul-out areas (locations where marine mammals congregate out of the water). Bottlenose dolphin (*Tursiops* spp.) have been observed in the northern part of the bay, and California gray whales (*Eschrichtius robustus*) also occasionally wander into the bay

California sea lions are found from British Columbia south to Tres Marias Islands off Mexico (Hanan and Sisson 1992). This species breeds in June and early July from the Channel Islands south into Mexico. California sea lions feed on a variety of prey, including squid, octopus, and a variety of fishes (anchovy, mackerel, herring, rockfishes, hake, and salmon), and are often observed in the bay swimming and feeding.

Harbor seals range from Alaska to Cedros Island, Baja California (Hanan and Sisson 1992). Harbor seals have been divided into three stocks, including a California group. Harbor seals are abundant along the entire California coast, typically occupying bays, harbors, and river mouths preying on epibenthic and benthic species (Ainley and Allen 1992).

Bottlenose dolphin occur from southern California to the tropics. In California, both coastal and offshore forms are found (Lagomarsino 1992). The coastal form inhabits shallow areas beyond the surfzone and is sometimes observed in bays and estuaries. This species is believed to be very abundant, especially in southern California coastal waters. The majority of bottlenose dolphin have been observed in open water near the northern part of San Diego Bay.

Gray whales spend summers in the Bering and Chukchi seas, off Alaska, and migrate to feeding grounds in winter along the west coast of Baja California, Mexico (Lagomarsino 1992). Gray whales differ from other baleen whales, primarily in their feeding behavior. Gray whales are bottom feeders, taking up mouthfuls of sediment and then straining out water and mud through the baleen, swallowing the benthic invertebrates. Gray whales are infrequently observed in San

Diego Bay, averaging approximately one to two sightings per year during migration periods. Migrations past San Diego characteristically occur between December and March.

Threatened and Endangered Species

The Navy has informally consulted with USFWS, NMFS, and CDFG on threatened and endangered species issues for this project as part of the EIS scoping process. These informal consultations will continue as required by the agencies. Two state- and federally listed endangered bird species, the California brown pelican and California least tern, occur along shoreline and nearshore waters at the proposed homeporting site. Brown pelicans commonly rest on piers and other structures along the North Island shoreline, and forage in the nearshore waters where project activities would occur. This area receives a medium to very high frequency of use by California brown pelicans (DON 1994a). California least terns nest near the airfield at North Island and forage in the nearshore waters around the island (Volume 3, section 3.5, Figures 3.5-4 and 3.5-5). The proposed homeporting site and adjacent waters receive a low-to-medium level of use by foraging least terns (DON 1994a). To prevent adverse impacts requiring a formal consultation on the least terns, the Navy is proposing construction activities in accordance with the February 1993, as amended, *Memorandum of Understanding Between U.S. Fish and Wildlife Service and Southwest Division, Naval Facilities Engineering Command.*

Other listed bird species whose transient occurrence is possible but unlikely are the American peregrine falcon and western snowy plover.

Green sea turtles *(Chelonia mydas)*, a federally threatened species, are year-round residents in San Diego Bay, typically in South Bay near the SDG&E plant. However, this species moves throughout the bay in summer during periods of higher water temperatures. During winter they tend to be restricted to the South Bay due to elevated water temperatures from the plant's thermal discharge and the availability of food such as algae (McDonald et al. 1994). The population may be as high as 72 individuals, based on tagging and recapture data between March 1990 and 1993 (McDonald et al. 1994). Due to increased movements in the summer, it is likely that this species could be found near the proposed site.

Results of Marine Life Sampling for Radioactivity

Sampling in San Diego in 1996 of molluscs, crustaceans, and marine plants showed no detectable radioactivity associated with Naval nuclear propulsion plant operation or servicing (NNPP 1997). These results demonstrate that no bioaccumulation of NNPP radioactivity has occurred. A previous EPA radiological survey of the San Diego Bay in 1987 (EPA 1989a) detected only naturally occurring radioactivity and radioactivity attributed to fallout from past nuclear weapons tests.

3.5.1.2 *Mitigation Site*

The proposed mitigation site is located directly inshore of Pier B and contiguous with the BRAC CVN mitigation site (DON 1995a) (see Figure 2-2). Details concerning biological communities near the mitigation site come from a DON (1992a) eelgrass and biological survey and a November 1997 diver-conducted survey for eelgrass, fish, and macroinvertebrates (see Volume 3, section 3.5). Existing conditions at the site consist of a steep rip-rap slope, the toe of which is at +1 foot MLLW, and a very narrow intertidal area of about 30 feet in width, merging to mostly sandy soft-bottom habitat in the present dredged channel (section 3.4). Mitigation site construction would account for 1.5 acres of United States waters replacement, as discussed in section 3.5.1.1, that would be lost due to fill in the wharf area. A maximum of 0.9 acres of additional habitat loss during construction at the mitigation site would also be mitigated as part of the final design (section 3.5.2.5). At the request of the agencies (NMFS, USFWS, COE, Navy of 15 April 1999), the Navy has provided two design options for the mitigation site. Both options meet the replacement requirement required under the Clean Water Act, 1972, as amended. The first option is the creation of intertidal habitat from +4 to +1 feet MLLW. The second is the creation of intertidal/subtidal habitat from +2 to -4 feet MLLW. Determination of the final design will be in accordance with agency specifications during permitting.

Plankton

Similar to the proposed project site, no site-specific information is available on plankton communities at the mitigation site. However, it is likely that species composition is the same as noted for the north and north-central San Diego Bay area (section 3.5.1.1). Specifically, phytoplankton are likely dominated by diatoms and dinoflagellates; invertebrate zooplankton by polychaetes and molluscs; and ichthyoplankton (fish eggs and larvae) of deepbody anchovy (*Anchoa compressa*) and diamond turbot (*Hypsopsetta guttulata*) (McGowan 1981).

Eelgrass/*Algae*

A total of 2,529.3 square feet of eelgrass beds were documented by DON (1992a) on the north side of Pier B at depths between 11 and 18 feet MLLW. No site-specific historical information is available concerning eelgrass distribution and abundance at shallower depths (i.e., less than 11 feet MLLW) corresponding to the vicinity of the proposed mitigation site, although direct observations by NMFS suggested that eelgrass was present historically. The November 1997 survey did not locate any eelgrass along several transects through the proposed mitigation site area from 0-6 feet MLLW (Volume 3, section 3.5). As noted above for the proposed site, this may be influenced in part by naturally increased water temperatures that serve to decrease abundances of many marine plants and algae. A pre-construction survey will be conducted a minimum of six months prior to construction to determine the actual amount of eelgrass in the area. No kelp (*Macrocystis pyrifera*) has been reported from the site region.

Invertebrates

No site-specific information is available for infaunal invertebrates at the mitigation site, but it is likely that the communities are similar to those in other parts of San Diego Bay, such as noted above for the proposed site. The DON (1992a) study on the north side of Pier B observed 14 macroinvertebrate species within and outside of eelgrass beds. Common invertebrates found within the eelgrass beds included anemones, polychaetes, gastropods, mysid shrimp, lobsters, and sea cucumbers. Common invertebrates found outside eelgrass beds were sea pens, gastropods, and sea stars. Similarly, the most common species in shallow hard substrate area during the November 1997 survey (Volume 3, section 3.5) were aggregating anemones (*Anthopleura elegantissima*) and gastropods (*Acanthina paucilirata* and *Ceratostoma nutallii*), with the scaled worm snail (*Serpulorbis squamigeris*) as the most abundant (average densities of 59-170/m^2). Other species occurring in low abundance were limpets, sea slugs, crabs, sea cucumbers, sea fans, and worms.

Fishes

The DON (1992a) study on the north side of Pier B observed several fish species both within and outside of eelgrass beds. Common fish species within eelgrass beds included round stingray (*Urolophus halleri*), topsmelt (*Atherinops affinis*), gobies (Gobiidae), senorita (*Oxyjulis californica*), and California halibut (*Paralichthys californicus*). Other species, such as kelp bass (*Paralabrax clathratus*), blacksmith (*Chromis punctipinnis*), rock wrasse (*Halichoeres semicinctus*), and giant kelpfish (*Heterostichus rostratus*) were observed on the sand bottom near rip-rap areas. Kelp bass, senoritas, and hornyhead turbot (*Pleuronichthys verticalis*) were observed in deeper areas outside eelgrass beds. Similar species were observed during the November 1997 survey (Volume 3, section 3.5). Dominant species from 1997 included kelp bass, blacksmith, opaleye, rock wrasse, giant kelpfish, senoritas, and black surfperch.

Birds

Shoreline structures and the immediate nearshore area are likely to be used with medium to very high frequency for roosting and foraging, respectively, by waterbirds, including various gull species, California brown pelican, and California least tern (DON 1994a). Large numbers of surf scoters were also observed in November 1997 "rafting" in the immediately adjacent BRAC mitigation site area (personal observations, A. Lissner, T. Mulroy 1997).

Marine Mammals

Although no site-specific information is available for marine mammals at the mitigation site, species will be similar to other northern parts of San Diego Bay. As described in section 3.5.1.1, occasional sightings of California sea lions and harbor seals have been made throughout San Diego Bay, although sea lions in particular are commonly observed using marker buoys as haul-out areas. Bottlenose dolphins have been observed in the northern part of the bay, and California gray whales also occasionally wander into the Bay. These latter two species would likely be observed infrequently in the vicinity of the mitigation site.

Threatened and Endangered Species

The structures and adjacent shallow-water habitat at the mitigation site may support a relatively high level of use by California brown pelicans (DON 1994a). Shallow-water habitat adjacent to Pier B also supported medium levels of use by California least terns during 1993 surveys (DON 1994a). The site is within the least tern foraging area as identified in the USFWS and DON (1993) memorandum of understanding. Transient occurrence of western snowy plovers along adjacent shoreline areas, and by widely foraging American peregrine falcons, is possible at the site.

A variety of waterbirds that are state and federal species of concern are likely to forage and rest in the vicinity of the mitigation site, including the same species mentioned above in connection with the homeporting site.

No site-specific information is available for turtles at the mitigation site. As described in section 3.5.1.1, however, green sea turtles, a federally threatened species, are year-round residents in San Diego Bay, typically in South Bay near the SDG&E plant. However, this species moves throughout the bay in summer during periods of higher water temperatures. Due to increased movements in the summer, it is possible that this species could be observed near the mitigation site.

3.5.1.3 *NAB Habitat Enhancement Area*

The habitats in the enhancement area are subtidal, gently sloping, and principally characterized by fine sand (section 3.4).

Plankton

Plankton communities (phytoplankton, zooplankton, and ichthyoplankton) near the NAB Habitat Enhancement Area would be the same as those described above for the Homeporting Alternative Site.

Marine Plants

Two species of flowering plants occur within the NAB Habitat Enhancement Area: eelgrass (*Zostera marina*) and widgeon grass (*Ruppia maritima*). Many soft bottom habitats that occur throughout the bay, including the alternative sites, may be covered with extensive mats of various algal species. Some areas contain masses of red algae such as *Gracilaria verrucosa* (DON 1992a). Other species, including the green alga *Ulva* spp., *Chaetomorpha* spp., *Cladophora* spp., and *Enteromorpha* spp., are components of the mat communities in some nearshore locations (SDUPD 1990).

The most abundant species of marine plant within the bay is eelgrass. Because of its high productivity and stability, diverse microhabitat features, and cover provided for many marine organisms, eelgrass beds are considered one of the most important habitat types in the bay (SDUPD 1990). Eelgrass areas provide important nursery habitats for fish and invertebrates and foraging habitat for the California least tern. Furthermore, these sites are noted for their overall higher diversity relative to unvegetated bay bottom habitat (Hoffman 1986). Results of eelgrass habitat mapping throughout San Diego Bay showed that approximately 11.4 percent of the bay (approximately 1,260 acres [510 hectares] out of 11,000 acres [4,452 hectares]) is vegetated with eelgrass (DON 1994a). Eelgrass densities in the vicinity of the NAB Enhancement Area range between 50-75 percent cover (primarily shallow adjacent areas of the site). Eelgrass in the general enhancement area occurs between 0 to -6 feet MLLW (DON 1994b).

Infaunal Community

The infaunal community in the vicinity of the NAB Enhancement Area was documented based on site-specific surveys conducted in 1994 (SAIC 1995). The community was dominated by polychaete (capitellid, spionid, and syllid) and oligochaete worms. Crustaceans (amphipods) were second in overall abundance, followed by molluscs and miscellaneous species (sponges, cnidarians, platyhelminthes, nemerteans, sipunculids, phoronids, echinoderms, and urochordates). Crustacean species of greatest abundances included *Acuminodeutopus heteruropus, Rudilemboides stenopropodus,* and *Parasterope barnesi*. Predominant molluscs included *Musculista senhousii*. The polychaetes *Mediomastus californienesis* and *Exogene louri* had some of the highest mean abundances at this site (16,090 ± 751 individuals/m^2 and 8,000 ± 434 individuals/m^2, respectively). These species and common polychaete families (and genera) including Opheliidae (*Armandia*), Cirratulidae, Phyllodocidae (*Eteone*), Sabellidae (*Fabricia*), Syllidae (*Exogone*), Glyceridae (*Glycera*), Lumbrineridae (*Lumbrineris*), Eunicidae (*Marphysa*), Neriidae (*Neanthes*) are typical of soft bottom habitats of San Diego Bay (e.g., documented by SDUPD 1990, Ford and Chambers 1974, and Lockheed 1981).

Biomass results from infaunal sampling at the NAB Enhancement Area (SAIC 1995) indicated a general dominance by molluscs, with a mean of 61.5g/m^2. Shannon-Weiner diversity (H') averaged 2.40 at this site, while evenness (J') had a mean of 0.77. These results are similar to other studies in the same general bay region (SDUPD 1990, Ford and Chambers 1974, and Lockheed 1981).

Epifaunal Community

Scuba surveys in April 1994 and trawl collections in April/May and September/October 1994 were performed at the NAB Habitat Enhancement Area (SAIC 1995). These investigations, together with previous studies by SDUPD (1990), Ford (1986), Ford and Chambers (1974), and Lockheed (1981), characterize the common epifauna within the bay (including the NAB region).

The epifaunal community of the NAB Enhancement Area is dominated by *Zoobotryon* and a brick red basket sponge (SAIC 1995). Other common epifauna includes the tunicate, *Styela clava*, the introduced Japanese mussel, *Musculista senhousii*, and the California bubble snail (*Bulla gouldiana*). These species are common in both San Diego and Mission bays and in other areas to the north such as Agua Hedionda Lagoon.

Epifaunal communities within San Diego Bay are generally sparse in abundance, with the most common taxonomic groups (sponges, tunicates, coelenterates, crustaceans, molluscs, and echinoderms) being typical of most soft bottom areas of the bay, including the NAB region (SAIC 1995, SDUPD 1990, Ford and Chambers 1974, and Lockheed 1981).

Fish Community

Species composition at the NAB Enhancement Area is generally similar to other areas of the middle and south parts of the bay. However, species diversity within each site may differ substantially according to bottom type. For example, diversity varies significantly between eelgrass beds, mudflats, and deep soft-bottom habitats. Also, species composition may vary due to the type of sampling gear used. A variety of pelagic species, such as jacksmelt (*Atherinopsis californiensis*), Pacific mackerel (*Scomber japonicus*), and Pacific sardine (*Sardinops sagax*) typically dominate gill net catches in the bay (Lockheed Ocean Sciences 1983; WESTEC 1986) and are likely at the NAB Habitat Enhancement Area. Common demersal fish species collected in gill nets include yellowfin croaker (*Umbrina roncador*), barred sandbass (*Paralabrax nebulifer*), gray smoothhound (*Mustelus californicus*), and black croaker (*Cheilotrema saturnum*) (WESTEC 1986). However, when sampling with purse seines, beam and otter trawls, and beach seines, slough anchovy (*Anchoa delicatissima*), topsmelt (*Atherinops affinis*), and northern anchovy (*Engraulis mordax*) were the most abundant fish species collected in the south central part of the bay (Allen 1996, 1997). Slough anchovy and topsmelt also were the most abundant fish species collected by the Allen study in the south bay. In contrast, round stingrays (*Urolophus halleri*) dominated catches in terms of biomass.

A total of 14 fish species were collected during the April/May 1994 survey of the NAB Enhancement Area. Sampling was done using a beam trawl with either a 1.0-cm or 0.25-cm liner.

All 1.0-cm lined-trawls were dominated by round stingrays and spotted sand bass; shiner surfperch dominated 0.25-cm lined-trawls. The highest diversity (H') and evenness value (J') occurred in eelgrass habitat, while the mud and sand habitat had the lowest values. Species diversity tended to be higher, and biomass lower, when the smaller mesh size was used.

Similar to results from the April/May 1994 survey, otter trawl surveys conducted by Lockheed Ocean Sciences (1983) and WESTEC (1986) in San Diego Bay were dominated by demersal fish species such as specklefin midshipman (*Porichthys myriaster*), barred sandbass, arrow goby (*Clevelandia ios*), and California halibut (*Paralichthys californicus*). Specklefin and plainfin midshipman (*Porichthys myriaster* and *P. notatus*, respectively) also were dominant in terms of biomass during the WESTEC study. In comparison, SDUPD (1990) collected a total of 44 fish species from various locations within the bay. Dominant pelagic fish species in terms of abundance were the deepbody anchovy (*Anchoa compressa*) and topsmelt (*Atherinops affinis*). Demersal fish species such as round stingray (*Urolophus halleri*), yellowfin croaker (*Umbrina roncador*), arrow goby, longjaw mudsucker (*Gillichthys mirabalis*), gray smoothhound, California halibut, and staghorn sculpin (*Leptocottus armatus*) were dominant in trawl and seine catches between 1988 and 1989 (SDUPD 1990).

Commercial gill netting and trawling is presently not permitted in the bay (personal communication, R. Read 1998). Species having commercial or recreational importance within the south bay and in the general vicinity of NAB include anchovies, striped mullet, spotted and barred sand bass, and California halibut. These species likely occur in similar abundance at the proposed alternative sites as other parts of San Diego Bay.

Marine Birds

Raw data from Navy bird surveys conducted at monthly intervals during 1993 and weekly through August 1994 indicate that the heaviest use of the waters surrounding the NAB Enhancement Area region is during late fall through winter, when large numbers of surf scoters, buffleheads, greater and/or lesser scaups, and eared grebes are likely to be present. Brown pelicans occasionally forage in the vicinity and rest on buoys or other structures. California least terns nest along the Delta Beach shoreline directly inshore (west) of the NAB Habitat Enhancement Area, with more than 60 birds present during 1994. Least terns commonly forage in the adjacent nearshore waters, including the NAB Habitat Enhancement Area, during late spring and summer months. Other sensitive species occasionally recorded included common loon, elegant tern, and Clark's grebe.

Marine Mammals

Marine mammals near the NAB Enhancement Area would be the same as described above for the Homeporting Alternative Site.

Threatened, Endangered, and Special Status Marine Species

As noted above, the NAB Enhancement Area is adjacent to the least tern nesting colony at Delta Beach and overlaps foraging habitat for this species. Consultation with the USFWS will be required if the construction period for the enhancement area overlaps with the least tern nesting season. Western snowy plovers also nest on Delta Beach and forage along the shoreline. Other marine species near NAB Habitat Enhancement Area that have special status according to state and/or federal regulations, including green sea turtles, would be similar in occurrence as described above for the Homeporting Alternative Site.

3.5.2 Environmental Consequences and Mitigation Measures

The impacts on marine biology associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, where the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

Significant impacts would occur if the project results in the following:

- There would be a substantial adverse effect on a threatened or endangered species, including state and federally listed or proposed species. A substantial adverse effect would include destruction or adverse modification of critical habitat or reductions in the abundance or long-term viability of the species. Such an effect may result from direct harm to individuals, or through effects on the competitors, predators, prey, or habitat of the species that could result in increased mortality or reduced reproductive success. Consideration would also be given to "species of concern" that could meet criteria for listing.

- The impact would violate applicable federal or state laws with respect to the protection of biological resources. Consideration would be given to impacts involving the loss or long-term degradation of sensitive habitat, defined as habitat that (1) provides essential resources that are otherwise limited on a regional scale; (2) serves as a concentrated breeding, nursery, or foraging area; or (3) supports substantial concentrations of one or more sensitive species.

- Consideration would also be given to effects resulting from interference with the movement of resident or migratory fish and wildlife, to the extent that substantial adverse impacts threatened the survival or reproductive success of a population.

3.5.2.1 *Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new projects.

Homeporting Alternative Site

PLANKTON

Under this action, no construction or dredging activities would be required. Therefore, no impacts would occur to plankton communities.

EELGRASS AND ALGAE

Because this action would not involve construction or dredging activities, no impacts would occur to eelgrass or algae.

INVERTEBRATES

Because this action would not involve construction or dredging activities, no impacts would occur to infauna and epifauna communities.

FISHES

Because this action would not involve construction or dredging activities, no impacts would occur to fish communities.

BIRDS

Because this action would not involve construction or dredging activities, no impacts would occur to birds in San Diego Bay.

MARINE MAMMALS

Because this would not involve construction or dredging activities, no impacts would occur to marine mammals.

THREATENED AND ENDANGERED SPECIES

Because this action would not involve construction or dredging activities, no impacts would occur to threatened and endangered species.

Mitigation site

A mitigation site is not applicable under this action, so no impacts to marine resources would occur.

Ocean Disposal Site (LA-5)

An ocean disposal site is not applicable under this action, since no dredging or disposal would occur. Therefore, there would be no impacts to marine resources.

NAB Habitat Enhancement Area

Disposal at the NAB Habitat Enhancement Area is not applicable under this action, since no dredging or disposal would occur. Therefore, there would be no impacts to marine resources.

Facility Improvements

Facility improvements would not be required for this action, so no impacts would occur to marine resources.

Operations

The decommissioning of one CV would slightly reduce the overall operational use of the North Island area by Navy vessels. Therefore, this action would result in a slight reduction of effects to marine resources.

3.5.2.2 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of construction of a CVN berthing wharf, construction of a mitigation site, and dredging.

Homeporting Alternative Site

PLANKTON

As a result of the proposed dredging in the Pier J/K area associated with providing the capacity to homeport one additional CVN, temporary increases in suspended particles would occur in the vicinity of the home port area. Associated effects would include somewhat reduced light penetration and dissolved oxygen concentrations in the water column, and possible release of contaminants from suspended sediments. As a result of reduced light in the water column, potential impacts to plankton communities may include a localized decrease in primary productivity due to reduced photosynthesis and clogging of gills and feeding appendages of zooplankton, possibly reducing survival, growth and biomass. However, the increased turbidity conditions would be temporary, localized, and short term, occurring only during dredging. Further, most plankton would be transported past the project area by ocean currents so their residence and exposure time to any impacts would be temporary. Therefore, impacts to the plankton community would be less than significant.

EELGRASS AND ALGAE

Dredging of the berth and navigational channel to provide the capacity to homeport one additional CVN could potentially impact eelgrass beds and shallow benthic habitat in the project vicinity due to increased sedimentation of particulates. Filling activities would impact eelgrass in the fill area on the northwest side of Pier J/K. These impacts will be significant, but mitigable by applying the loss against the credit (9 acres) from the Navy's North and North-Central Eelgrass Mitigation Bank, and in accordance with the Southern California Eelgrass Mitigation Policy replacement ratio of 1.2:1 if applied concurrent with the project (NMFS 1992) (see below). Sedimentation impacts to eelgrass in the project vicinity would be temporary and avoided or minimized by following permit conditions intended to protect water quality (section 3.3.2.2).

Invertebrates

Dredging and construction activities in the berth and navigational channel areas to provide the capacity to homeport one additional CVN would temporarily impact the benthic community resource by disturbing and removing some species. However, recolonization of would occur by larval recruitment or immigration of organisms from nearby unaffected areas that are common throughout San Diego Bay. Recolonization of the invertebrate community would be expected to be relatively rapid (within a year) following completion of dredging and construction (DON 1994a). Therefore, these impacts would be short term and less than significant. In contrast, impacts to the community and habitat in the fill area would be permanent and therefore significant. However, impacts to these resources would be mitigated by construction of a mitigation site in accordance with requirements for United States waters replacement of the Clean Water Act (see below).

In addition to direct removal or burial of organisms in the dredge area, the increased suspended solids resulting from dredging activities may affect benthic organisms in the vicinity of the dredge site, particularly filter or suspension feeding organisms. The suspended solids could clog gills and feeding appendages, reducing the organisms ability to feed, and consequently reducing the survival, growth, and biomass of the organisms. The bivalves *Tapes japonica, Mytilus edulis,* and *Mytilus californianus* showed variable responses when exposed to 100,000 mg/L kaolin clay for 10 days. The three species demonstrated little significant mortality (*T. japonica*), 10 percent mortality (*M. edulis*), and 50 percent mortality (*M. californianus*) during this study (Peddicord et al. 1975, cited in O'Connor 1991). However, as described in section 3.3.2.2, total suspended solids levels during dredging operations are expected to be much lower than those used in the study (generally less than a few hundred mg/L). The adverse biological impacts tend to occur at much higher levels of suspended solids. Therefore, impacts on the benthic infauna associated with increased suspended solids in the water column would be less than significant.

Fishes

Dredging and construction activities to provide the capacity to homeport one additional CVN in the home port area would temporarily impact juvenile and adult fishes. Types of effects noted by other studies can range from decreased visibility for foraging activities to impaired oxygen exchange due to clogged gills (EPA 1993). Impacts would be greatest on fish eggs, larvae, and juveniles (COE 1992). Peddicord et al. (1975) and Morgan et al. (1973) measured biological effects of suspended sediments for fishes. Delayed development of white perch and striped bass eggs was noted for concentrations of suspended sediment greater than 1,500 mg/L. Hatching of demersal white perch eggs was delayed by one day at suspended sediment concentrations of 4,000 mg/L. Egg mortality occurred for striped bass at 3,400 mg/L and for whiter perch at 3,600 mg/L (Morgan et al. 1973, cited in O'Connor 1991). These studies demonstrate direct biological effects of suspended sediment caused by extremely high concentrations extending for long periods of time. However, as described in section 3.3.2.2, increased TSS levels from dredging would be well below concentrations indicated above that have significant adverse biological effects on fish.

Shock waves from pier pile driving during demolition and construction of the new wharf could also impact some resident fishes by causing them to temporarily leave the project area. Other schooling fishes that are typically transient in the project area could be affected by shock waves by being temporarily dispersed from their schools. Since pile driving would occur for sections of the wharf for periods of several weeks to a few months, these impacts would be localized and temporary and therefore insignificant. Further, most fish, particularly highly mobile, pelagic schooling species, would be able to avoid the area during construction periods. Therefore, these species would not be significantly affected by dredging and construction activities.

Demersal fishes common in the project area are similar to other parts of San Diego Bay and include round stingray, spotted sand bass, barred sand bass, yellowfin goby, arrow goby, bay goby, diamond turbot, and California halibut. With the exception of gobies, which burrow in the soft sediments, other demersal fishes would be able to move out of the project area and therefore would not be significantly impacted by dredging and construction activities. Although most fishes would be able to avoid the area of disturbance during operations, some mortality would potentially occur if caught in dredging equipment. Gobies would recolonize the dredged areas by recruitment from the plankton and migration from areas of similar habitat common throughout San Diego Bay. Therefore, any impacts would be short term and localized and therefore insignificant. Short-term positive benefits sometimes occur as a result of increased prey availability in material that is resuspended during dredging (personal communication/ observation, M. Perdue, 1999).

BIRDS

Increased turbidity, noise, and activity associated with dredging activities would temporarily disrupt waterbird resting and foraging in the home port vicinity. However, foraging opportunities may actually be enhanced in the dredged area as food items such as small fishes and infauna are released into the water column along with suspended material. In any case, given the limited area and duration of these effects in relation to the availability of similar habitat in surrounding areas, any impacts (positive or negative) would be less than significant, except for the endangered California least tern (see below).

MARINE MAMMALS

Impacts on marine mammals occurring in the vicinity of the project site would be localized, temporary, and less than significant. Temporary impacts would potentially result primarily from turbidity caused by the dredging and construction operations, disturbance from operation of dredging and construction equipment, and effects on food resources such as fish and invertebrates. In the home port area, marine mammals such as California sea lions, harbor seals, bottlenose dolphins, and gray whales are highly mobile species that would avoid the home port area during dredging and construction operations. Any potential adverse effects to marine mammals would be mitigable during dredging operations (see section 3.5.2.5).

THREATENED AND ENDANGERED SPECIES

Disruption to endangered California least terns foraging during the nesting season could potentially affect reproductive success and would be considered a significant short-term impact. However, proposed mitigation measures (section 3.5.2.5) would avoid significant impacts, in accordance with the USFWS and DON (1993) memorandum of understanding regarding least terns in San Diego Bay.

Short-term impacts on brown pelican foraging and roosting would be less than significant because this species does not nest in the vicinity, and because suitable foraging and roosting habitat for these wide-ranging birds are available throughout much of the San Diego Bay and in coastal waters to the north and south. Impacts on other listed species (western snowy plover and peregrine falcon) would be insignificant because the affected area is used only on a transient basis and does not provide critical resources for these species.

Potential impacts to sea turtles at the home port site would be localized and temporary. Principal effects could include disruption of swimming pathways by dredging and construction equipment, and disturbance of food resources. As noted above, green sea turtles are year-round residents in San Diego Bay and move throughout the bay, potentially including the home port area, most commonly in summer. However, any potential impacts to green turtles would be mitigable during dredging operations (see section 3.5.2.5).

Mitigation Site

PLANKTON

As a result of the construction of the mitigation site, temporary increases in suspended particles would occur, causing reduced light penetration, as well as reduced dissolved oxygen concentrations, and possible release of contaminants into the water column. However, due to the transient nature of plankton, any effects would be temporary and localized, as was described for the dredging site, so impacts to these communities would be less than significant.

EELGRASS AND ALGAE

Historical data indicate that eelgrass beds in the vicinity of Pier B have included high-density shallow beds and patchy low- to very-low-density deeper beds (DON 1992a). However, a November 1997 survey in the proposed mitigation site area did not detect any eelgrass (see section 3.5.1.1). Notwithstanding, a pre-construction survey would be conducted to further verify this finding. Any eelgrass that would be impacted in the construction area would be mitigated by applying the loss against the Navy's Eelgrass Mitigation Bank credit (9 acres).

INVERTEBRATES

Impacts to invertebrates from construction activities at the mitigation site would be localized to the construction area. Some local populations and habitat of benthic infauna and epifauna, including polychaetes, molluscs, and bivalves, occurring commonly in many adjacent areas of San Diego Bay, would be disturbed or removed during construction activities. However, recolonization and recovery at this site should be complete and relatively rapid as noted for other study areas (EPA 1993). Therefore, direct impacts to the benthic invertebrates (infauna and epifauna) would be temporary, localized, and less than significant.

FISHES

Construction activities at the mitigation site would have little effect on fishes. Pelagic fishes such as topsmelt, anchovy, and chub mackerel that occur at the mitigation site and most other areas of San Diego Bay would temporarily leave the area, but would return after construction is complete. No significant impacts would occur for most bottom fishes. Highly motile species such as sanddabs and turbots would temporarily leave the area during mitigation site construction. Some goby species would probably be removed during construction, but would recolonize the site shortly after construction is completed. Therefore, impacts to these populations would be localized, short term, and less than significant.

BIRDS

Construction of the mitigation site would temporarily disrupt roosting and foraging activities by waterbirds and would modify the existing shoreline. For birds other than threatened and endangered species (see below), the overall impact is considered adverse but less than significant given its temporary nature and the expanded area of habitat that would be created by the construction of the mitigation site.

MARINE MAMMALS

Impacts on marine mammals occurring in the vicinity of the mitigation site would be localized, temporary, and less than significant. Impacts would result primarily from turbidity caused by construction equipment, but likely would not significantly affect food resources such as fish and invertebrates because of the extensive other bay areas that would be unaffected by site construction activities. Any adverse impacts would be limited to temporary reductions in feeding efficiency due to increased turbidity during dredging and construction. Marine mammals such as California sea lions, harbor seals, bottlenose dolphins, and gray whales that could occur near the site are highly mobile species that would be capable of avoiding the area during construction operations. Any potential effects to marine mammals would be mitigable during mitigation site construction, so impacts would be less than significant (see section 3.5.2.5).

THREATENED AND ENDANGERED SPECIES

As described above under *Birds*, short-term construction impacts are generally adverse but not significant given the habitat creation that would occur at the mitigation site and construction of the NAB Enhancement Area. For California least tern, the disruption of foraging in this area would be a significant short-term impact that would be mitigated through the incorporation of measures to control turbidity (see section 3.5.2.5) during site construction, and conformance with the USFWS and DON (1993) memorandum of understanding regarding least terns in San Diego Bay. Further, coordination with USFWS (15 April 1999) determined that although avoidance of construction activities during nesting season is desirable, it will be more important to complete the mitigation site as expeditiously as possible, even if construction extends into the nesting period.

Short-term impacts on brown pelican foraging and roosting would be less than significant because this species does not nest in the vicinity, and because suitable foraging and roosting habitat for these wide-ranging birds are available throughout much of the San Diego Bay and in coastal waters to the north and south. Impacts on other listed species (western snowy plover and peregrine falcon) would be insignificant because the affected area is used only on a transient basis and would not provide critical resources for these species.

Potential impacts to sea turtles at the mitigation site would be localized and temporary if they move through the site during construction. As noted above, green sea turtles are year-round residents in San Diego Bay, and move throughout the bay, potentially including the mitigation site, most commonly in summer. However, any potential impacts would be mitigable during dredging operations and would be less than significant (see section 3.5.2.5).

Ocean Disposal Site

Any disposal of dredged material at the LA-5 site would be in accordance with permit requirements from the Army Corps of Engineers and EPA (Section 103 of the Marine Protection, Research, and Sanctuaries Act), and would only include acceptable material that has passed applicable criteria (i.e., "Green Book" protocols [EPA and COE 1991]) for ocean disposal. Therefore, no toxic affects to biological organisms would occur. Impacts to organisms would be limited to increased turbidity and burial within site boundaries. EPA management and monitoring programs would ensure that significant adverse impacts would not occur.

NAB Enhancement Area

PLANKTON

During a disposal event, impacts to plankton communities within the NAB Enhancement Area areas would be less than significant as described for the dredge sites above. Impacts would be primarily from temporary increases in water column turbidity, and suspended solids concentrations, reduction in light levels, slightly reduced dissolved oxygen concentrations, and possible releases of some organics and trace metal contaminants. Results of these impacts could be somewhat reduced productivity and feeding due to clogging of feeding structures (e.g., zooplankton). However, the localized and short-term nature of these effects would reduce potential impacts to less than significant.

MARINE PLANTS

Moderate to high densities (25-75 percent cover) of eelgrass are found in shallower areas a minimum of 100 meters away from, but not within the NAB Enhancement Area (DON Eelgrass Mapping Survey, 1994b). The precise locations and densities of eelgrass requiring mitigation would be based on a pre-construction survey. However, construction disposal will include a 100-meter buffer from existing eelgrass, and silt curtains will be used to avoid any potential impacts due turbidity (light reduction) and sedimentation. Therefore, there will no significant impacts to eelgrass as a result of construction of the enhancement area.

INFAUNAL COMMUNITY

As discussed above, the infaunal community within the NAB Enhancement Area site consists primarily of annelid worms (polychaetes and oligochaetes) and molluscs that are typical of many areas of the bay. The majority of infaunal organisms residing at the site would be buried under depths of dredged material exceeding a few meters. Due to the thickness of these deposits, few infaunal organisms are likely to survive, with the exception of those organisms residing along the outer edge of the deposit site. However, because these species are common throughout many areas of San Diego Bay, and due to recolonization that would occur from adjacent undisturbed areas and larval recruitment, long-term effects would be less than significant. Additionally, any effects would be offset by the creation of shallower intertidal and subtidal habitat amenable to colonization by eelgrass and more diverse biological communities.

Following deposition of dredged material, recolonization by some infauna could begin within a few days. The mode of colonization is highly dependent on the thickness of the deposit (Germano and Rhoads 1984; Scott et al. 1987). Along the outer edges of the disposal area, where material is spread thinly to depths of less than 10 cm, buried adults would likely respond by burrowing upward. Survivorship is based on the ability of each species to reestablish its natural vertical depth position within the new sediments. Larval recruitment by pioneering species over heavily deposited regions is relatively rapid, occurring within a few days to weeks, and is attributed to the abundance of competition-free space in the newly created environment. Initially, species diversity is low, although those pioneering species present would likely be numerically abundant.

Disposal operations also would produce localized but transient increases in turbidity and suspended solids concentrations. These increases could result in reduced feeding efficiency, particularly by filter-feeding organisms, due to clogging of feeding structures. Resuspension of finer-grained dredged materials also would increase some contaminant concentrations in the water column. However, since these effects would be localized and short-term, any impacts would be less than significant.

EPIFAUNAL COMMUNITY

During a disposal event, resident epifaunal organisms potentially would experience direct and indirect impacts due to burial by sediments, increased turbidity that could cause clogging of feeding structures, reduced water quality, and destruction of habitat. However, because of the transient nature of water column effects, no significant impacts to epifauna would occur. Motile epifaunal species and some species of crustacean such as crabs (*Cancer* spp.) would experience temporary displacement, but would be able to migrate from affected areas, thereby escaping burial. In contrast, sessile epifauna such as sponges would be buried and suffer high mortality within the disposal site areas. Notwithstanding, the epifauna present within the NAB Enhancement Area are represented by only a few species in relatively low numbers and are typical of many areas of the bay.

Similar to the potential impacts noted for infauna, recovery and recolonization of an impacted area would depend on the frequency and severity of the disturbance and the species involved. Thus, recolonization is expected by individuals that are able to escape burial, larval recruitment, and immigration from adjacent, undisturbed areas (e.g., SAIC 1989). Based on uncertainties and variability in the timing of these events, some recovery could occur within hours to days, but full recovery could require a few years. However, since accumulation of dredged material would be localized within a site, and since there are no known epifaunal species of limited geographic distribution within the bay or the NAB Enhancement Area, overall impacts would be less than significant. Effects would be offset by the creation of enhanced habitat, as noted above for infauna.

FISH

Information on direct impacts of dredged material disposal on marine fishes is extremely limited. Some studies on the effects of dredging and dredged material disposal on fish communities have focused on larvae and eggs in estuarine environments (Auld and Schubel 1978; Johnston and Wildish 1981). However, abundance and diversity of these sensitive life stages and adult fish at the NAB Habitat Enhancement Area site would be similar to many other areas of the bay. During a disposal event, pelagic fish species could experience increased turbidity and suspended sediments, and reduced water quality from some chemical contaminants. These changes could cause temporary avoidance of the disposal area; however, these impacts would be localized and transient. Impacts would be less than significant.

Most of the demersal fishes collected at the NAB Enhancement Area are mobile and would be able to avoid burial from sediments during a disposal event. Other more sedentary, burrowing demersal fish species, such as gobies, would not be able to avoid burial from rapidly accumulating sediments. As noted for pelagic species, some impacts to demersal fish are expected from reduction of foraging habitat, increased turbidity, suspended sediments, and reduced water quality. Following disposal operations, some foraging habitat would be lost for some demersal species, such as California halibut and diamond turbot, which prey on benthic infauna. However, these impacts would be localized to the disposal site and would not affect the extensive areas of available habitat in the rest of the bay. Following some period of recovery, fish should return to impacted areas. Fish that experience reduced water quality conditions would likely leave the area until conditions return to normal. Therefore, potential water quality impacts to demersal fish species would be localized, temporary, and less than significant.

Few commercial fish species are collected within the vicinity of NAB Enhancement Area. Some spotted sand bass, barred sand bass, and California halibut are found in the general region, but they are not taken commercially or recreationally in any substantial numbers from these areas. As noted above, impacts of dredged material disposal such as reduction of foraging habitat, increased turbidity, and decreases in water quality would have some impact on commercial/recreational fish species. However, because these impacts would be localized and/or transient, and due to the highly mobile nature of these species, potential impacts of dredged material disposal on commercial/recreational fisheries would be less than significant.

MARINE BIRDS

Impacts to marine birds from proposed dredged material disposal includes the potential for disturbance due to noise from operation of disposal equipment, localized loss of prey due to bottom habitat disruption and fish avoidance of the area, and temporary disruption of foraging areas due to increased water column turbidity. Dredged material disposal activities at the NAB Enhancement Area would produce temporary and localized increases in noise levels due to operation of hydraulic pipelines during sediment placement.

Many pelagic prey organisms, primarily fish, would likely exhibit various avoidance behaviors in response to dredged material disposal. During site disposal events the immediate area could contain temporarily reduced populations of some pelagic fish species, including topsmelt, surfperch, and anchovies that are important prey items for local marine birds. Therefore, foraging success of marine birds could be reduced temporarily following disposal activities. However, because these prey species characteristically are patchy in their distribution, localized reductions in prey densities would not significantly affect feeding success of marine birds in the region and impacts would be less than significant.

The NAB Enhancement Area provides foraging habitat for a variety of marine bird species. Development of the site would lead to the temporary loss of some foraging habitat and/or food resources until disposal is completed and fishes and invertebrates recolonize the area. Reductions in water clarity following disposal operations could temporarily inhibit feeding activities of marine birds that forage, such as by visual location and pursuit of fish prey, in near-surface waters (DON 1992a). However, these potential impacts would be localized and/or temporary in duration, such that impacts on breeding, feeding, or passage of marine birds within the region would be less than significant. Overall, creation of approximately 10 acres of intertidal habitat in the enhancement area will produce a net gain in this type of habitat for use by birds.

MARINE MAMMALS

Impacts to marine mammals in the vicinity of the NAB Enhancement Area would be short term and less than significant, as described above for the Homeporting Alternative Site.

THREATENED, ENDANGERED, SPECIAL STATUS SPECIES

As discussed above, construction of the NAB Enhancement Area would temporarily disrupt foraging by marine birds, including special status species that may use the area, but in general this impact would be less than significant because of its short duration and the availability of similar habitats elsewhere in the bay. All project activities would conform with the specifications in the USFWS and DON (1993) memorandum of understanding regarding least terns in San Diego Bay. Species that use the beach, such as the threatened western snowy plover, are unlikely to be affected by noise and activity in the water offshore, since such activity is routine throughout the bay.

In the case of the endangered California least tern, in-water activities during the nesting season could adversely affect the foraging and nesting success of birds at the Delta Beach colony adjacent to NAB Habitat Enhancement Area. This potential impact would be significant if nesting birds were forced to fly farther and/or to forage in less productive habitats. However, the habitat creation in the enhancement area will produce a net gain in the type of habitat used by these birds for foraging. Therefore, no significant long-term impacts would occur.

Potential impacts on green sea turtles would be as described previously, and would be mitigable to less than significant.

Facility Improvements

No impacts are expected to marine biological communities as a result of on-land facility improvements to provide the capacity to homeport one additional CVN. In-water improvements would include demolition of existing Pier J/K and the ferry/flag landing and construction of the new wharf (Chapter 2). Potential impacts from these activities would be most likely for eelgrass/algae, invertebrates, and fish, but all would be mitigable or less than significant, as discussed below. Principal effects would be caused by disruption of bottom habitat during removal of Pier J/K and the ferry/flag landing and installation of pilings for the new wharf.

PLANKTON

Potential impacts to plankton would be similar to those discussed for the dredging operations, and could include increases in suspended particulates, reduced water clarity and light, somewhat reduced oxygen in the water column, and possible release of contaminants. However, these effects would be localized and temporary and most plankton would be transient in the project area. Therefore, no significant impacts to plankton communities would occur.

EELGRASS AND ALGAE

Assessment of the extent of all construction and facility impacts to eelgrass in the project area would be based on pre- and post-construction monitoring surveys as suggested by U.S. Fish and Wildlife Serves (USFWS) and National Marine Fisheries Service (NMFS) during informal coordination and discussions. Significant impacts will be mitigated by applying the loss against the Navy's Eelgrass Mitigation Bank credit (9 acres), and in accordance with the Southern California Eelgrass Mitigation Policy replacement ratio of 1.2:1 if applied concurrent with project construction (NMFS 1992). Any algae attached to Pier J/K and the ferry/flag landing would be eliminated during removal of the wharf, but would recolonize on the pilings of the new wharf. Therefore, impacts to algae would be temporary and less than significant since they would be mitigated on site by natural recolonization processes.

INVERTEBRATES

Impacts to infaunal and epifaunal invertebrates from demolition of Pier J/K and the landing, and construction of the new wharf and landing to provide the capacity to homeport one additional CVN would be similar to those discussed for dredging. These communities would be disturbed or lost within the immediate project area, but impacts would be temporary and not significant since natural recolonization would occur from source populations common throughout many areas of San Diego Bay. This would include the soft-bottom habitat and organisms attached to pier/wharf pilings. Shading effects to the benthic community would not be significant based on Navy studies conducted in February 1999 at Pier 13, Naval Station, San Diego (see Volume 3, Section 3.5). This pier is comparable in size and shading to the proposed CVN wharf, and results indicated no impacts (reductions) in community diversity, abundance, or biomass in the shaded areas. In fact, a slight increase in these measures was observed with increased shading under the pier.

FISHES

Disruption to fishes during demolition of Pier J/K and the landing, and construction of the wharf and landing to provide the capacity to homeport one additional CVN would be localized, temporary and not significant since these species are mobile and generally can avoid these activities by moving to comparable, adjacent areas common throughout San Diego Bay.

Fish species occurring at the site are typical of other areas of the bay and there is no indication that the project vicinity represents a unique habitat or concentrating area for fish (DON 1995a; Volume 3, section 3.5 survey results from November 1997). As noted above for invertebrates, a February 1999 study indicated no decreases, and in fact noted some increases, in benthic community measures in shaded areas under a pier of comparable size as the proposed wharf. Thus, it does not appear that significant impacts to bottom-feeding fish would occur as a result food limitations in shaded areas. Fish studies to evaluate any differences in diversity and abundance during the February 1999 survey were inconclusive due to the very low natural abundances during winter. Therefore, potential effects will be addressed by pre- and post-construction monitoring surveys. If significant impacts are suggested by these results, mitigation would be accomplished at the mitigation site by techniques such as construction of fish attraction structures, such as can be accomplished by addition of rock piles (see below).

BIRDS

The temporary loss of shallow-water foraging and resting habitat caused by the construction of a new wharf and landing to provide the capacity to homeport one additional CVN would be an adverse but less than significant impact on waterbirds, with the exception of the California least tern and California brown pelican (discussed below). For other waterbirds, impacts would be less than significant because of the low-to-moderate intensity of use, and the non-endangered status of the affected species (DON 1994a). For all waterbirds, significant impacts would be mitigated by creation of new habitat at a mitigation site near Pier B along the NASNI shoreline (see below).

Shoreline structures (e.g., Pier J/K and the ferry/flag landing) that currently provide resting sites for gulls, California brown pelicans, and other waterbirds would be removed, but such features are abundant throughout the bay and construction and operation of the new facilities would provide structures likely to serve similar functions. Therefore, these impacts would be less than significant.

MARINE MAMMALS

Potential impacts to marine mammals from in-water facility improvements to provide the capacity to homeport one additional CVN would not be significant since these activities would be localized and temporary. This is because these organisms are highly mobile and would be able to avoid the project area. Any potential effects would be mitigable during construction (see below).

THREATENED AND ENDANGERED SPECIES

Loss of shallow-water habitat to provide the capacity to homeport one additional CVN is considered a significant impact for California brown pelican and California least tern. This is because of the temporary loss of resting habitat for the pelicans, and foraging habitat subject to medium to high use by both species (DON 1994a). The loss of habitat at the proposed homeporting site is made more significant by the loss of adjacent habitat that occurred in conjunction with homeporting of the USS STENNIS (DON 1994a). Habitat loss includes the filling of existing shoreline/nearshore waters of the United States habitat. The impact would be mitigated by the reconstruction of new habitat at the mitigation site (see below).

The noise, activity, and turbidity associated with the demolition of Pier J/K and construction of new facilities to provide the capacity to homeport one additional CVN could, depending on when demolition/construction occurs, affect foraging in the area by California least terns. These impacts, however, would be concentrated within the area already accounted for as habitat loss, described above. Therefore, these impacts are considered temporary and less than significant Further, coordination with USFWS (15 April 1999) determined that although avoidance of construction activities at the mitigation site during nesting season is desirable, it will be more important to complete the mitigation site as expeditiously as possible, even if construction extends into the nesting period.

Potential impacts to sea turtles from in-water facility improvements to provide the capacity to homeport one additional CVN would be less than significant. This is because these activities would be localized and temporary, and the organisms are highly mobile and would be able to avoid the project area. Any potential effects would be mitigable during construction activities (see below).

Operations

Providing the capacity to homeport one additional CVN would not significantly change (increase or decrease) operational disturbances (e.g., propeller wash) to biological resources. This is because these conditions are typical of harbor areas so no significant changes would occur to marine biological communities.

The radiological controls discussed in section 3.3.2 would continue. Therefore, there would be no significant impacts on marine biological resources due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at North Island.

3.5.2.3 *Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)*

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Homeporting Alternative Site

Impacts on marine biological resources associated with providing the capacity to homeport a second additional CVN at NASNI would be similar to those associated with providing the capacity to homeport one additional CVN, since no additional dredging would be required beyond that discussed in section 3.5.2.2. Providing the capacity to homeport a second additional CVN would result in a total of three carriers homeported at NASNI, equivalent to the site's historical homeporting capacity. Therefore, potential impacts to plankton, invertebrates, fishes, birds, marine mammals, turtles, and threatened and endangered species would be less than significant. This is because all of the impacts would be either temporary and localized or mitigable to insignificance.

Mitigation Site

No additional impacts to marine biological resources would occur beyond those associated with providing the capacity to homeport one additional CVN, since no additional dredging or disposal would occur under this alternative.

Ocean Disposal Site

No additional impacts to marine biological resources would occur beyond those associated with providing the capacity to homeport one additional CVN, since no additional dredging or disposal would occur under this alternative.

NAB Enhancement Area

No additional impacts to marine biological resources would occur beyond those associated with providing the capacity to homeport one additional CVN, since no additional dredging or disposal would occur under this alternative.

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Minor additional utility and fencing upgrades would be minimal when compared to facilities and infrastructure previously created to provide the historical three-carrier homeporting capacity. No additional impacts to marine biological resources would occur beyond those associated with providing the capacity to homeport one additional CVN.

Operations

Providing the capacity to homeport a second additional CVN and relocation of the ferry/flag landing would not change (increase or decrease) operational disturbances (e.g., propeller wash) to benthic habitats. During the transiting associated with the 13 days per year when three CVNs would be in port simultaneously, increases in operational disturbances would be very minor, intermittent, short-term, and less than significant. This is because the conditions characterized by this propeller wash activity are typical of harbor areas and would not significantly impact marine biological communities in the home port area.

The radiological controls discussed in section 3.3.2 would continue. Therefore, there would be no significant impacts on marine biology due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at North Island.

3.5.2.4 *No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new improvements.

Homeporting Alternative Site

No dredging, filling, or dredge sediment disposal activities would be accomplished under this alternative. Therefore, no significant impacts to marine biological resources would occur. Potential impacts would be associated with normal vessel activity and increased probability of oil spillage and other potential discharges. However, potential impacts would not exceed historical levels from homeporting three carriers at NASNI and would be minimized by existing spillage prevention, control, and countermeasure plans and procedures.

Mitigation Site

No dredging, filling, or dredge sediment disposal activities would be accomplished under this alternative. Therefore, no mitigation site would be required and no impacts to marine biological resources at this site would occur.

NAB Enhancement Area

No dredging, filling, or dredge sediment disposal activities would be accomplished. Therefore, no impacts to marine biological resources would occur in this area

Facility Improvements

No facility improvements would occur under this action, so no impacts to marine resources would occur.

Operations

Although no construction would occur under this action, the addition of one CVN would potentially increase the amount of localized disturbance to benthic habitats from propeller wash. However since this activity would still be typical of harbor areas and within the range of historic home port vessel activity at NASNI. There would be no significant impacts to marine biological resources.

The radiological controls discussed in section 3.3.2 would continue. Therefore, there would be no significant impacts on marine biological resources due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at North Island.

3.5.2.5 *Mitigation Measures*

With the mitigation site construction and other mitigation measures described below, there would be no significant impacts to marine biological resources from any of the homeporting actions.

A mitigation site would be constructed in the Pier B area as discussed in section 3.5.1.2. This would mitigate potential impacts to marine habitats and associated organisms as specified below. Excess dredged sediments from mitigation site construction would be disposed in accordance with permit requirements, but would include augmentation of endangered bird species habitat at NASNI.

Marine Habitat, Fish, and Invertebrates

Impacts from the filling of 1.5 acres in the Pier J/K area would be mitigated by construction of an equivalent number of acres near Pier B. The new habitat design would be reflect one of two options to be determined by the agencies during permitting: intertidal from +4 to +1 feet MLLW, or intertidal/subtidal from +2 to -4 feet MLLW. These design options were coordinated with USFWS, NMFS, and COE (15 April 1999). The intertidal option would create 2.1 acres, representing an excess (credit) of 0.2 acres when balanced against the loss due to fill for the wharf (1.5 acres) plus the loss due to construction of the mitigation site (0.4 acres). The intertidal/subtidal option would create 2.5 acres, representing an excess (credit) of 0.1 acres when balanced against the loss due to fill for the wharf (1.5 acres) plus the loss due to construction of the mitigation site (0.9 acres).

Habitat design at the NAB Habitat Enhancement Area will target about 30 acres, of which 6-8 acres would be intertidal mudflat. The shallowest depth would be about +2.5 feet MLLW, sloping at about 20:1 to existing depths of about -10 to -12 feet MLLW. Light planting of eelgrass would be conducted, with periodic monitoring to evaluate physical performance/stability of the site and general species occurrence.

Potential effects due to coverage/shading by the new wharf (123,700 square feet) would be partly offset by the removal of existing Pier J/K (63,000 square feet) and the ferry/flag landing (2,472 square feet). Potential effects to fish and eelgrass from the additional coverage of the new wharf (58,228) would be evaluated based on pre- and post construction surveys. Any impacts would be mitigated at the Pier B mitigation site and by using credits from the Navy Eelgrass Mitigation Bank, respectively. Construction of the Pier B mitigation site, the NAB Enhancement Area, and enhancement of western snowy plover habitat at NASNI will ensure that no net effects occur to birds, including threatened and endangered species, as a result of the project. No impacts to invertebrates were indicated based on study results summarized in Volume III, section 3.5.

Eelgrass

Mitigation for eelgrass impacted as part of new wharf construction would be credited from the banking agreement that established an eelgrass credit of approximately 9 acres from construction and planting of eelgrass at the USS STENNIS mitigation site (documented in Eelgrass Survey and Mitigation Implementation Plan, submitted to D. Zoutendyk, COE, by M. Perdue, DON, in support of Military Construction Projects P-549 and 700). Eelgrass has been documented historically in both the Pier B and STENNIS mitigation site areas (personal communication, R. Hoffman National Marine Fisheries Service 1995a). Monitoring the success of habitat mitigation is a standard part of permitting conditions. The amount of eelgrass impacted during dredging and filling activities in the project, mitigation site, and habitat enhancement areas would be determined based on pre-construction surveys. The total acreage impacted would be mitigated by applying part of the credits noted above, using a ratio of 1.2:1, as specified in the Southern California Eelgrass Mitigation Policy (NMFS 1992).

Water Clarity/Turbidity

During mitigation site construction, it is likely that without the use of turbidity abatement suspended sediments would move into the existing BRAC mitigation site area. Other potential impacts to eelgrass could occur from dredging and construction activities in the project area. BMPs such as silt curtains shall be used for turbidity abatement.

Threatened and Endangered Species

Additional mitigation measures for the temporary disruption of California least tern foraging in the nearshore area during project construction are based on DON (1995a) and input from the USFWS as follows:

Losses of California least tern and brown pelican foraging habitat due to fill (1.5 acres) would be mitigated by the construction of an equivalent area of habitat near Pier B. Mitigation site design will be determined by the agencies during permitting, but would represent one of two options: intertidal or intertidal/subtidal, as described above under *Marine Habitat, Fish, and Invertebrates* and section 3.5.1.2.

Dredging and in-water demolition and construction activities would be scheduled to occur outside of the California least tern breeding season (April 1 to September 15) to the maximum extent feasible. Dredging at the mitigation site would be accomplished at the start of the project to provide additional least tern foraging area and therefore offset other potential adverse impacts. However, if construction at the mitigation site cannot be avoided during the nesting season, coordination with USFWS (15 April 1999) has determined that it will be more important to complete the mitigation site as expeditiously as possible, even if construction extends into the nesting period.

Engineering measures would be implemented to minimize the turbidity plume associated with in-water construction and dredging. If it is not feasible to avoid in-water construction during the nesting season, in areas ranked as high or very high value to foraging California least terns (DON 1994a), or identified as important in ongoing least tern foraging studies, best management practices (BMPs) such as use of silt curtains would be used at the mitigation site to limit the spread of turbidity. Surface turbidity would be monitored at the start of the activity and weekly thereafter. If in-water activities result in a surface plume exceeding 1,000 feet in length or width that persists longer than 1 hour, and that is in or adjacent to a foraging area of high to very high value to foraging least terns during the breeding season, the activities would be suspended until turbidity diminishes. The construction contract would include the foregoing stipulations on turbidity limits, and a requirement for a biological monitor who would document the extent of turbidity and foraging activities by least terns and other birds in the vicinity of construction. The monitor would report to the Navy for corrective action any exceedance of the acceptable limits on turbidity. All activities would be performed in accordance with permit conditions and agency requirements.

Clean sand resulting from dredging and shoreline excavation activities associated with the project could be used to enhance nesting areas of threatened and endangered species at NASNI. This proposed use of sand is based on coordination with USFWS (15 April 1999). The Navy will coordinate with USFWS regarding specific locations, volumes and methods of placement for this material.

Marine Mammals and Turtles

Marine mammals and turtles may pass through the dredging and construction areas on a very infrequent basis, if at all. However, to avoid or minimize potential effects, construction staff would be informed in writing of the possibility of such occurrences and the general appearance of these species, to include whales (especially gray whales), dolphins, seals/sea lions, and green turtles, and instructed to temporarily suspend activities until the animal(s) move out of the active construction area of ongoing construction.

3.6 TERRESTRIAL BIOLOGY

3.6.1 Affected Environment

This section addresses terrestrial biology at the homeporting alternative site and a mitigation site.

3.6.1.1 Homeporting Site

Plants and Animals

NASNI consists of land that has been developed in support of military and related civilian uses, beginning in the early part of this century (DON 1991). The San Diego Bay shoreline of NASNI consists of graded, artificial fill that has been extensively built on and is stabilized at the water's edge by riprap, retaining walls, and piers. Pier J/K extends offshore.

Vegetation is limited to ornamental plantings along roadsides and adjacent to buildings, and patches of disturbed coastal strand vegetation. The latter includes a few native species such as beach primrose (*Camissonia cheiranthifolia*), and beach bur (*Ambrosia chamissonis*), but tends to be dominated by sea rocket (*Cakile maritima*), iceplant (*Carpobrotus edulis*), Australian saltbush (*Atriplex semibaccata*), and other exotics.

Terrestrial mammals likely to occur in the vicinity of the Pier J/K project area include house mouse (*Mus musculus*), cottontail (*Sylvilagus auduboni*), San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), California ground squirrel (*Spermophilus beechyi*), pocket gopher (*Thomomys bottae*), and Virginia opossum (*Didelphis virginiana*) (DON 1992b, 1995). Bird use of the project site is discussed in more detail below. Reptiles that are likely to occur include the common western fence lizard (*Sceloporus occidentalis*) and side-blotched lizard (*Uta stansburiana*). No amphibians are known or expected in the area because of the lack of freshwater aquatic habitats.

Numerous common landbirds are likely to occur as residents or on a transient basis along the developed NASNI shoreline. These include mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), house finch (*Carpodacus mexicanus*), European house sparrow (*Passer domesticus*), mockingbird (*Mimus polyglottos*), and Eurasian starling (*Sturnus vulgaris*) (DON 1992b, 1995). Great blue herons (*Ardea herodias*), black-crowned night herons (*Nycticorax nycticorax*) and snowy egrets (*Egretta thula*) nest and roost in planted trees (eucalyptus, fig, and torrey pine) at the southeastern edge of the proposed onshore facilities, adjacent to the road accessing Pier J/K.

The Navy, as part of previous homeporting projects at NASNI, and in cooperation with The United States Department of the Interior, Fish and Wildlife Service, developed a North Island heron/egret rookery mitigation plan. The service documented concurrence with this plan in their letter of 25 November 1997.

This "heron park" has since been established with various eucalyptus, ficus and Torrey pine trees and innovative artificial nesting towers adjacent to the road accessing Pier J/K. The boundary of the heron mitigation park was later modified to include four eucalyptus trees located at the southwest corner of the intersection of Roe Street and Wright Avenue.

Individual trees outside the heron mitigation park identified to be removed in this proposed project will not be removed prior to fiscal year 2000 (October 1, 1999) and removal is prohibited between the months of January through August. This is outside of established migratory bird nesting season. The Navy in their cooperation with regulatory agencies will continue to strive to reduce adverse impacts on migratory birds in the course of planning for and engaging in activities. Due to these actions, no new impacts would occur to the rookery as a result of this homeporting project. No new impacts would occur to the rookery as a result of this homeporting project.

Piers and other artificial structures along the northeast shoreline of North Island are heavily used for resting by waterbirds (DON 1994; 1995). Waterbird use of the nearshore marine habitat is discussed in section 3.5. Volume 3, section 3.5, lists waterbirds found in the vicinity of the BRAC CVN Homeporting Site that are expected to similarly occur at the project site considered in this analysis.

Threatened and Endangered Species

Threatened and endangered species and associated issues in the project vicinity have been discussed informally with USFWS, NMFS, and CDFG as part of the EIS scoping process. These informal consultations will continue as required by the agencies.

Volume 3, section 3.6, Table 3.6-1 lists threatened, endangered, and other special status species that are likely to occur in San Diego Bay and adjacent areas. No listed, proposed, or candidate threatened or endangered species are expected on the terrestrial portion of the homeporting site (DON 1995). The piers, other manmade structures, and shallow-water habitat of the nearshore marine environment are used by the California brown pelican and California least tern, both of which are state- and federally listed endangered species, as discussed under section 3.5.

3.6.1.2 *Mitigation Site*

Plants and Animals

The shallow-water mitigation site is located at the western end of North Island just north of Pier B, adjacent to the south side of the BRAC mitigation site (DON 1995). The area consists of nearly level sandy fill material bounded on the water side by rip-rap. This habitat would be excavated and replaced by shallow-water marine habitat to accomplish the mitigation. The site is isolated from other terrestrial habitat by paved and graded areas that lack vegetation. Based on a November 1997 site visit, vegetation of the site is sparse and low-growing and consists of a combination of introduced species and widespread native species capable of colonizing disturbed sites. A few large golden wattle shrubs (*Acacia* cf. *longifolia]*) are located at the edge of the rip-rap. Otherwise the site is vegetated by a sparse cover of iceplant (*Carpobrotus edulis*), a mat-forming introduced succulent, interspersed with low-growing native and introduced shrubs and herbs that have established on the site. In addition to iceplant, the dominant perennial species include deerweed (*Lotus scoparius*), a low shrub; and two perennial herbs, beach primrose (*Camissonia cheiranthifolia*), and wild heliotrope (*Heliotropium curassavicum*). Tree tobacco (*Nicotiana glauca*) was fairly abundant along the riprap and a single large shrub of desert broom (*Baccharis sarothroides*) was also present.

Two sensitive (though non-listed) plant species — Nuttall's lotus (*Lotus nuttallianus*) and coast woolly heads (*Nemacaulis denudata*) — occur in adjacent areas (DON 1995) and are possible at the mitigation site. No evidence of these or other sensitive plant species was observed during the November 1997 on-site reconnaissance. Given the timing of the reconnaissance, the potential for seed dispersal from adjacent areas, and year-to-year variation in most annual plant populations, the occurrence of these species on the site remains a possibility.

Wildlife value of the mitigation site is low for most native terrestrial wildlife species, given the small size and isolation of the site from other terrestrial habitat, and the sparseness and low stature of the vegetation. Signs (e.g., dust baths) of jackrabbit (*Lepus californicus bennettii*) were abundant and two individuals were observed during the November 1997 site visit. A few burrows of California ground squirrels (*Spermophilus beecheyi*) were observed on the site. These are commonly used by burrowing owls (a state and federal species of concern) in adjacent areas (DON 1995), but no evidence of burrowing owl occupation was observed during the November 1997 site visit.

Threatened and Endangered Species

Shoreline structures are used for roosting by endangered California brown pelicans and other waterbirds (section 3.5).

3.6.1.3 Sediment Disposal Sites

It is assumed that, depending on sediment testing results, dredged sediment as well as material excavated from the mitigation site, could be disposed of in several ways, including as fill in the Pier J/K project area, for subtidal habitat creation, at the LA-5 ocean disposal site, at a permitted landfill, or at any other receiver site for which sediment disposal as required for this project has been reviewed and permitted under NEPA. Otherwise, use of existing permitted (at the time of project implementation) receiver sites does not require further analysis for terrestrial biology. Additional review under NEPA would be required for a site that did not meet these assumptions.

3.6.2 Environmental Consequences and Mitigation Measures

The impacts on terrestrial biology associated with the capacity to homeport three aircraft carriers at NASNI would be from the construction of facilities and infrastructure (e.g., new piers, electrical transformers, utility pipes, etc.). Impacts derived from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental changes to the capacity previously created for the CV that would be replaced by the CVN. Facilities for the first CVN would be developed by 2002, and facilities for the second CVN by 2005.

Significance Criteria

Significant impacts would occur if the project results in the following:

- There would be a substantial adverse effect on a threatened or endangered species, including state and federally listed or proposed species. A substantial adverse effect would include destruction or adverse modification of critical habitat or reductions in the abundance or long-term viability of the species. Such an effect may result from direct harm to individuals, or through effects on the competitors, predators, prey, or habitat of the species that could result in increased mortality or reduced reproductive success. Consideration would also be given to "species of concern" that could meet criteria for listing.

- The impact would violate applicable federal or state laws with respect to the protection of biological resources. Consideration would be given to impacts involving the loss or long-term degradation of sensitive habitat, defined as habitat that (1) provides essential resources that are otherwise limited on a regional scale; (2) serves as a concentrated breeding, nursery, or foraging area; or (3) supports substantial concentrations of one or more sensitive species.

- Consideration would also be given to effects resulting from interference with the movement of resident or migratory fish and wildlife, to the extent that substantial adverse impacts threatened the survival or reproductive success of a population.

3.6.2.1 *Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new projects.

Dredging and Disposal Sites

There would be no dredging or land disturbance associated with this action so there would be no impact on terrestrial biological resources.

Facility Improvements

There would be no construction or other land disturbance associated with this action, so there would be no impact on terrestrial biological resources.

Operations

The decommissioning of the remaining CV would have no impact on terrestrial biological resources.

3.6.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging and Disposal Sites

An area of the bay adjacent to the berthing facility would be dredged to provide the capacity to homeport one additional CVN to allow CVN access. Sediment disposal would occur at either the NAB Enhancement Site or LA-5. No impacts on terrestrial species would result.

Two unlisted but sensitive annual plant species, Nuttall's lotus and coast woolly heads, could occur at the mitigation site. The potential impact on these species is considered less than significant because they are not recognized or proposed for listing as threatened or endangered species by state and federal agencies, nor are they under active consideration as candidates for listing. In addition, the small area of potential impact is not likely to jeopardize either species. However, measures to reduce losses of either species are identified in section 3.6.2.5.

North Island supports a thriving population of burrowing owls, which are not threatened or endangered. Ground squirrel burrows on the mitigation site could be used for nesting by burrowing owls in the future. The loss of these potential nest sites would be less than significant. However, measures to avoid the loss of individuals are included in section 3.6.2.5.

Facility Improvements

Construction of the homeporting facilities to provide the capacity to homeport one additional CVN would include the demolition of Pier J/K and the filling of existing shoreline and shallow-water habitat to allow the construction of new facilities along the waterfront.

As mentioned previously (section 3.6.1.1), the heron rookery in the Pier J/K area is being relocated by the Navy as part of a road-widening project, so no impacts are anticipated to result from new construction.

Operations

Terrestrial biological resources in the affected shoreline area are limited to the weedy and ornamental plants, and to common species of wildlife that are tolerant of human activity. Therefore, the development of support facilities in this area to provide the capacity to homeport one additional CVN would cause less than significant impacts.

3.6.2.3 *Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)*

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging and Disposal Sites

Environmental consequences and mitigation measures associated with providing the capacity to homeport a second additional CVN would not change from those to provide the capacity to homeport one additional CVN, and are considered less than significant.

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN discussed in section 3.6.2.2. Minor additional utility and fencing upgrades would be minimal when compared to facilities and infrastructure previously created to provide the historical three-carrier homeporting capacity. Impacts on terrestrial biological resources are considered less than significant.

Operations

Operational impacts on terrestrial biological resources associated with providing the capacity to homeport a second additional CVN would not change from those to provide the capacity to homeport one additional CVN as discussed in section 3.6.2.2, and are considered less than significant.

3.6.2.4 No Additional Facilities for One Additional CVN: No Capacity for Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging and Disposal Sites

No dredging would occur, so no impacts would result. Further, a mitigation site would not be needed since one additional CVN would use existing facilities at the transient pier. Therefore, no significant impacts to terrestrial biological resources would result.

Facility Improvements

No facility improvements would occur, so no construction impacts would result.

Operations

The addition of one CVN coupled with the removal of one CV, would not produce significant differences in operational activity that would affect terrestrial biological resources.

3.6.2.5 Mitigation Measures

The following mitigation measures would be conducted:

Rare but Non-Listed Plants

- Presence or absence of Nuttall's lotus and coast woolly heads would be confirmed by a qualified botanist during the spring-summer flowering season prior to excavation of the mitigation site. If these species are found, the area within 1 m would be delineated for salvage and translocation.

- Salvage and translocation would occur at the end of the growing season (i.e., late summer to fall). Plants and the upper 2 to 5 cm of topsoil from the delineated area would be removed and transported to locations immediately adjacent to known populations of these species. Salvaged material would be raked into the soil at the new location.

- An annual census of sensitive plant populations would be conducted at any transplant location, and at other known localities on Navy property to assist state and federal agencies in assessing the status of these species and reducing threats to their survival.

Burrowing Owls

- Nesting would be precluded by excavating or covering potentially usable burrows at the mitigation site, prior to the nesting season. The absence of nesting owls from the site would be confirmed by a qualified biologist prior to site construction.

3.7 LAND USE

3.7.1 Affected Environment

This section describes existing land uses and land use plans for NASNI, the City of Coronado, and the region.

3.7.1.1 *Naval Air Station North Island*

NASNI is the largest Naval aviation industrial complex on the West Coast (DON 1991). Its boundaries encompass 2,397 acres of land and 406 acres of water (DON 1991). Most of the land area of NASNI (about 90 percent) lies within the limits of the City of Coronado. The remainder, which includes the shoreline areas along the western and southern portions of the island, is within the limits of the City of San Diego. Although it is located within the city limits of Coronado and San Diego, the local governments do not have any jurisdictional authority over land use on NASNI because it is a federal military facility.

NASNI is a major aviation, industrial, and seaport complex and supports anti-submarine aircraft, helicopters, and aircraft carriers of the Pacific Fleet. It hosts the Commander, Naval Air Force, Pacific Fleet and other major tenants including the Fleet Aviation Specialized Operational Training Group, the Naval Computer and Telecommunications Station, the Naval Air Maintenance Training Group Detachments North Island, the Naval Air Reserve San Diego, the Naval Aviation Depot, the Navy Resale and Services Support Office, the Naval Supply Center, and the Public Works Center (DON 1991).

Reflecting the primary mission at NASNI, aircraft operations occupy a major portion of its land area. Safety clearances increase the land area committed to aircraft operations beyond actual runways, taxiways, and aircraft parking areas. In addition, supporting facilities such as hangars and maintenance shops occupy large land areas. Other types of land use at NASNI include training, maintenance, supply, weapons, medical, administration, housing, recreation/community support, utilities, and open space (DON 1991).

Shipberthing is the other major activity and land use at NASNI. For many years, three aircraft carrier berths have been maintained along the quaywall at the northeast end of NASNI. One of the berths (Berth L/M) historically has supported a lightly loaded transient CVN, with the remaining berths suitable only for CVs or smaller ships.

In accordance with BRAC directives, construction was completed in 1998 to provide a CVN home port berth with adequate water depths at the berth, turning basin, inner channel, and outer channel. The CVN berth is in the vicinity of ramps 1 through 4 along Bay Drive. Other berthing facilities are provided at Pier J/K, which is used to berth auxiliary command, rescue, and other deep draft ships.

An area immediately west of the new CVN berth is part of the NAS San Diego Historic District. Buildings along Bay Drive within this district (as well as farther north and south) are used by the Naval Aviation Depot (NADEP) for production and storage (refer to section 3.13 for further discussion of the historic district).

Explosives handling operations are authorized at berths L through P. The Explosive Safety Quantity Distance (ESQD) arcs extend 750 feet over the water and 1250 feet over land. A waiver has been issued to allow the use of ten inhabited buildings located within the arc.

A shallow-water mitigation site has been designated in the southwest corner of NASNI in the vicinity of Pier B to mitigate impacts on eelgrass habitat that would be destroyed during dredging for development of an additional CVN home port site. The mitigation site is directly inshore of Pier B, contiguous with the BRAC CVN mitigation site. This area is designated in the NASNI Master Plan (DON 1991) as a weapons compound that serves as the major ordnance distribution point for the entire San Diego Naval Complex.

The *Naval Air Station North Island Master Plan* (DON 1991) provides an overview of existing land uses at NASNI and presents concepts and recommendations for NASNI's future development based on the assumption that NASNI can support up to three carriers. The plan establishes the reutilization and conversion of existing facilities as a high priority, in keeping with the existing limited military construction environment.

The NASNI Master Plan (DON 1991) also incorporates the recommended land use compatibility guidelines of the *1984 Air Installation Compatible Use Zone (AICUZ) Study Update* (DON 1984). The AICUZ program was established by the Department of Defense to identify noise and safety impacts and to work with local governments to foster compatible land uses around military air facilities. As a result of the 1984 AICUZ Study Update, the Master Plan recommends a number of measures to improve land use compatibility on and around the Station.

NASNI operations are affected by surrounding community land uses, especially those in proximity to the arrival/departure zones of NASNI runways. These community land uses include recreation, commercial, and residential areas to the southeast in the City of Coronado; recreation, commercial, and transportation (Lindbergh Field) to the north in the City of San Diego; and recreation and residential areas to the northwest, also in the City of San Diego. In accordance with the AICUZ program, adjustments to the NASNI flight patterns have been made so that air operations are conducted primarily over the ocean and San Diego Bay to minimize noise and accident potential.

3.7.1.2 City of Coronado

The City of Coronado, a residential and resort community, lies adjacent to the southeast boundary of NASNI. Most of Coronado has been developed for low-density residential uses. A wide sandy beach, used primarily for recreation, extends along Coronado's southern boundary. The Hotel del Coronado complex, the Civic Center complex, and commercial motel properties along Orange Avenue make up most of the city's commercial area. Condominiums and apartments exist along Orange Avenue as well as in other central areas of the city and in the northeast adjacent to the tidelands. The entire city has a building height limit of 40 feet and new development is regulated by the California Coastal Commission as well as the City of Coronado.

The *City of Coronado General Plan, Land Use Element* (1987) designates the portions of NASNI that are within the city limits as "Military." The Land Use Element defines this category as "those properties within the city under federal control and available exclusively for military operations, housing, personnel recreation, and similar ancillary facilities, or for environmental habitat preservation" (City of Coronado 1987). The city has zoned this same area of NASNI as "Military

Zone" in keeping with its General Plan designation. The city's Land Use Element clarifies that NASNI is not under the land use jurisdiction of the city, but rather that the city's designations are "*advisory* land use designations." Lands within the city and adjacent to NASNI's southeastern boundary are designated and zoned by the city primarily for varying densities of residential development. (City of Coronado 1987)

3.7.1.3 *Regional Land Use*

Major land uses in the vicinity of NASNI and Coronado (see Figure 3.7-1) include other federal military installations; commercial and residential development in San Diego; industrial and recreational development along the shores of San Diego Bay; and the San Diego International Airport (Lindbergh Field).

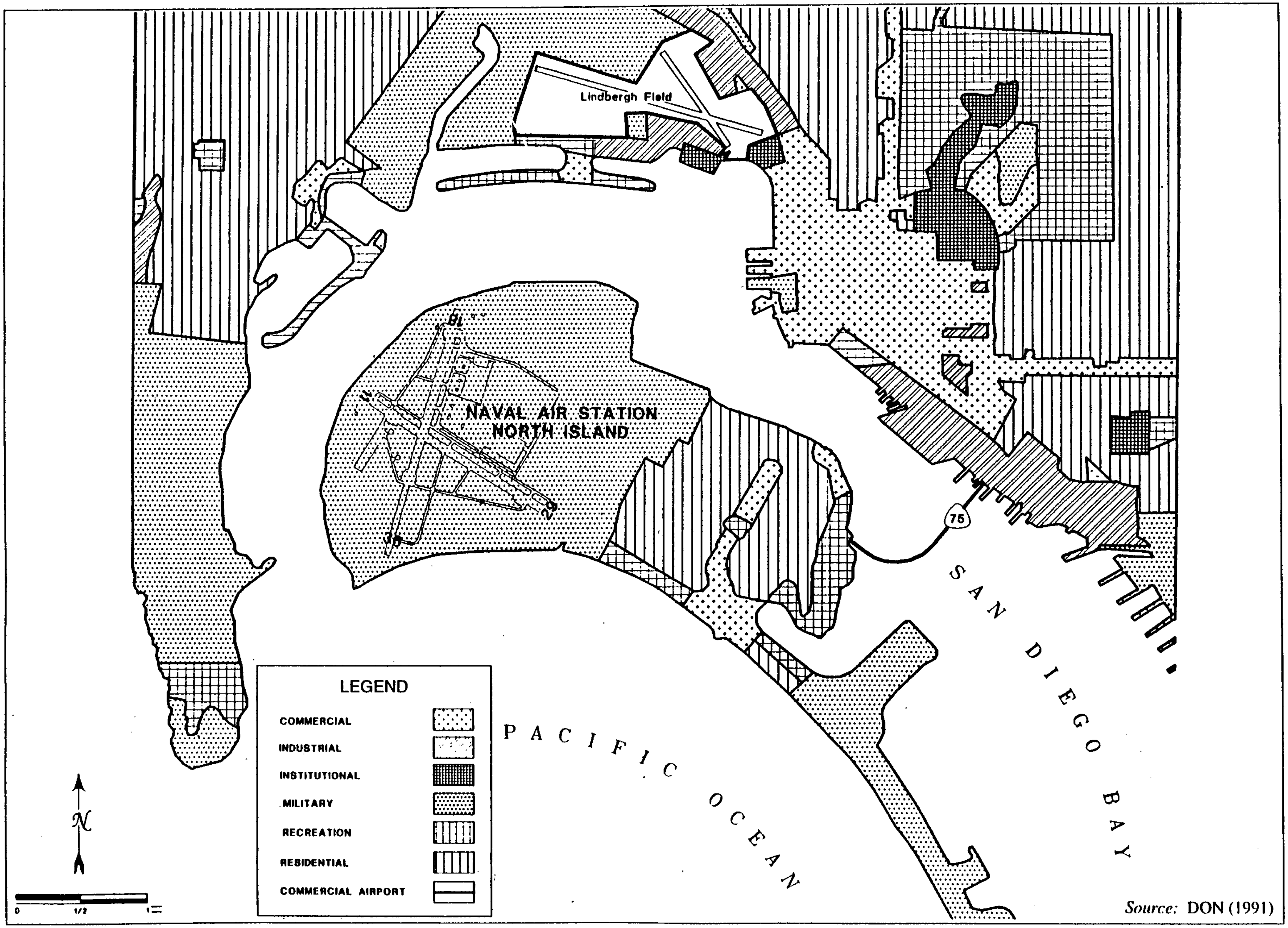
Across San Diego Bay are several communities within the City of San Diego. To the northwest is the community of Point Loma; to the northeast is the San Diego downtown financial and government district.

Any federal activity that affects the coastal zone is subject to the requirements of the federal *Coastal Zone Management Act of 1972* (CZMA). The CZMA requires, that "Any federal agency which shall undertake any development project in the coastal zone of a state shall insure that the project is, to the maximum extent practicable, consistent with the enforceable policies of approved State management programs." (Chapter 33 Title 16, U.S.C. Section 1456(c)) The *California Coastal Act of 1976* (CCA) established the goals of protecting and enhancing the quality of the coastal environment, assuring orderly utilization, maximizing public access, and assuring priority for coastal-dependent development (P.R.C. §3000 *et seq*.). In accordance with the CCA, the City of Coronado adopted a *Local Coastal Program* (LCP) in 1983. The LCP includes goals, policies, and regulations relating to development in all shoreline areas within the City's jurisdiction. In 1987 as part of their General Plan, the City adopted a "Local Coastal Element" that notes in summary form the types of issues that the LCP addresses.

Federal actions on federal lands are exempt from state or local permitting requirements. The U.S. Navy, however, ensures that all actions at NASNI are consistent with the State management program to the maximum extent practicable. To document the degree of consistency, preparation of a Coastal Consistency Determination (CCD) is required when a federal project could have an effect on the coastal zone. A CCD provides a description of the proposed action, identifies each relevant policy of the State management program, discusses the proposed action's consistency with each of those policies, and, where applicable, describes measures, which when implemented would result in project consistency with the policies. CCDs prepared by the U.S. Navy for projects at NASNI are submitted to the California Coastal Commission for review.

3.7.2 Environmental Consequences and Mitigation Measures

The impacts on land use associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, where the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is



Source: DON (1991)

Figure 3.7-1. Land Use in the NASNI Vicinity

essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

A land use impact is significant if one or more of the following result:

- Inconsistency and/or conflict with the environmental goals, objectives, or guidelines of the *NASNI Master Plan* or AICUZ;
- Incompatibility with existing land uses on site; or
- Incompatibility with surrounding land uses.

3.7.2.1 *Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new projects.

Dredging/Mitigation Site

No dredging would be required, thus a mitigation site would not be needed. Therefore, no dredging-related land use impacts would occur.

Facility Improvements

No new construction would be required. Therefore, no construction-related land use impacts would occur.

Operations

Decommissioning of the remaining CV would not affect the historic capacity to homeport three carriers at NASNI. Therefore, no land use compatibility impacts would occur.

3.7.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four would include construction of a CVN berthing wharf and dredging.

Dredging/Mitigation Site

Providing the capacity to homeport one additional CVN would require approximately 582,000 cy of dredging. Sediment disposal would occur either at an in-bay disposal site south of NAB or at the LA-5 designated ocean disposal site. Both sites are submerged disposal locations, hence land use impacts would not occur at either site.

Development of a shallow-water mitigation site in the southwest corner of NASNI in the vicinity of Pier B would be required to mitigate impacts on eelgrass habitat that would be destroyed during dredging. Development of the mitigation site would require excavation of approximately 2.5 acres of artificial fill to create intertidal and subtidal habitat that also would be suitable for transplanting eelgrass (see section 3.5). The artificial fill was placed along the shoreline of North Island in the 1930s during a major dredging operation in San Diego Bay, which deposited 16 million cy and increased the size of the island by 620 acres (DON 1991). Although the mitigation site itself is vacant, the existing land use designation in this general area of NASNI is "Weapons," the primary activity being ordnance storage. Creation of the mitigation site would restore a small portion of artificially filled, vacant upland to a condition more similar to its prehistoric natural state. This would be considered a beneficial land use impact.

Facility Improvements

Providing the capacity to homeport one additional CVN would require construction of new facilities, including a new CVN berthing wharf to replace the existing Pier J/K, a CVN warehouse, a fleet support building, and an equipment laydown building. These new facilities would be similar to existing nearby facilities and would be consistent with the land use designations in the NASNI Master Plan (DON 1991). Therefore, no significant land use compatibility impacts or inconsistency with land use plans would occur as a result of construction.

Operations

Providing the capacity to homeport one additional CVN would not introduce new or different land uses at NASNI. The additional CVN would be berthed at the new wharf that would replace the existing Pier J/K. Providing the capacity to homeport one additional CVN would not result in any incompatibility with existing land uses. Therefore, no significant impacts on existing land uses would occur.

3.7.2.3 *Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)*

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site

Providing the capacity to homeport one additional CVN would require approximately 582,000 cy of dredging and creation of a shallow-water mitigation site. No additional dredging or mitigation site area would be required to provide the capacity to homeport the second additional CVN. Creation of the mitigation site would return a small portion of the filled area to a condition more similar to its natural state. This would be considered a beneficial land use impact, and it would be compatible with surrounding uses.

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Minor additional utility and fencing upgrades would be similar to existing nearby facilities and would be consistent with the land use designations in the NASNI Master Plan (DON 1991). Changes to the facilities and infrastructure would be minimal when compared to facilities and infrastructure previously created to provide historical carrier homeporting capacity. Therefore, no significant land use compatibility impacts or inconsistency with land use plans would occur as a result of providing the capacity to homeport the second additional CVN.

Operations

Providing the capacity to homeport the second additional CVN would not introduce new or different land uses at NASNI. Providing the capacity to homeport the first additional CVN would be located at the new wharf that would replace the existing Pier J/K, which is currently used for shipberthing. The second additional CVN home port would be located along the quay wall in the location that is currently used as a transient CVN berth. Operations would not significantly alter any existing land uses or result in any incompatibility with existing land uses. Therefore, no significant impacts on existing land uses would occur.

3.7.2.4 No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site

No dredging would be required, because existing facilities at the transient CVN berth would be used. Therefore, no dredging-related land use impacts would occur.

Facility Improvements

No construction would be required. Therefore, no construction-related land use impacts would occur.

Operations

Homeporting one additional CVN would not introduce new or different land uses at NASNI, because the additional CVN would be accommodated along the quay wall in the location currently used as a transient CVN berth. Furthermore, existing land uses would not be significantly altered, the mitigation site would not be required, and incompatibility with existing land uses or inconsistency with existing land use plans would not result. Therefore, no significant land use impacts would occur.

3.7.2.5 *Mitigation Measures*

Because land use impacts would be less than significant, no mitigation is provided.

3.8 SOCIOECONOMICS

This section describes existing socioeconomic conditions and potential effects associated with the various project actions at NASNI.

3.8.1 Affected Environment

The socioeconomic environment potentially affected by NASNI operations extends throughout all of San Diego County, which has a current population of about 2.6 million, an increase of 31,700 over 1996. NASNI lies within the county as well as within the City of Coronado and the City of San Diego. The county is projected to grow to 3.6 million people by the year 2010.

The City of San Diego has a population of 1.2 million people, is the largest city in the county, and is the seventh largest city in the United States.

The City of Coronado is a resort and residential city. NASNI is located adjacent to Coronado on the northern section of Coronado Island. The city is residential in nature, with a 1995 population of 28,850.

About 46 percent of the region's residents reside in the City of San Diego. The other 18 incorporated cities within the county make up 37 percent of the region's residents, with the remaining 17 percent of the population residing in unincorporated areas of the county.

Local Economy

San Diego has the highest military and civilian payroll in the nation at $3.6 billion. Companies in the San Diego area received nearly $2.8 billion in defense procurement contracts in 1997. By itself, the Navy's activities in the San Diego area are a major component of the area's economy. The region's economy is based primarily on the services sector, followed by wholesale/retail trade, government, and manufacturing. The military presence in the area declined during the 1980s. However, the defense-industry activities contributed $9.6 billion to the San Diego economy in 1996.

Of total non-farm employment in San Diego County, the share contributed by military personnel has fallen consistently over the period 1970 through 1995. In 1970, military personnel comprised 24.8 percent of the total county employment. This share fell to 14.6 percent in 1980, 10.0 percent in 1990 and 7.9 percent in 1995. The contribution made to total employment by federal civilian employment also fell over this same time period: 5.8 percent in 1970, 4.3 percent in 1980, 3.4 percent in 1990, and 3.1 percent in 1995.

Regional employment is projected to increase by 41 percent between 1990 and 2015. The south suburban area of the county is projected to have the largest growth in employment between 1995 and 2000. In the year 2000, the economy of the county will continue to be dominated by services, retail trade, government, and the manufacturing sectors (DON 1991).

Housing

In selecting the location of military facilities, the availability of affordable housing is an important consideration. In 1993, San Diego County had 980,000 housing units within its market area, comprised of 58 percent single-family units and 37 percent multi-family units. The median housing value in 1990 was $186,000 (U.S. Bureau of the Census 1992). With the decline in the economy, the demand for housing declined, resulting in a leveling of housing prices. The rental vacancies increased during that time as well. With the economy now stabilizing in terms of earnings and job growth, the vacancy rates for the metropolitan areas fell to 6 percent in 1996.

Government-owned family housing assets for personnel stationed at Naval Complex San Diego numbered 7,216 military family housing (MFH) units in 1996. Of these units, 561 were designated officer housing with the remaining 6,655 designated for enlisted personnel. Of the 7,216 units, 2,484 were one- and two-bedroom units, 2,891 were three-bedroom units and the remaining 1,841 were four-bedroom units.

The military family housing deficit stood at 5,075 units in 1996 and is anticipated to decline to 4,105 by the year 2001.

Schools

The U.S. Department of Education provides federal impact aid in the form of basic support payments for school districts where there are at least 400 federally connected students or where 3 percent of the average daily attendance is federally connected. Basic support payments are made for dependents living either with military or civilian employees who are working for or assigned to federal military installations. The minimum eligibility requirement for funding off-base civilian students is 1,000 students and at least 10 percent of average daily attendance.

This section addresses enrollments, facility capacity, growth rates, and federal impact aid (P.L. 103-382, Title VIII) for school districts in the vicinity of the proposed NASNI homeporting site. The Coronado Unified School District (USD) and the San Diego USD would experience the majority of any enrollments effects associated with changes in activities at NASNI. Table 3.8-1 presents total fall enrollments for 1995-1997 for the two school districts, along with the number of Navy dependent students enrolled in 1996 and the school district's federal impact aid funding for the 1996-1997 school year. The amount of federal impact aid reported in the table below represents aid related to all categories of federally connected students, such as those associated with federal military installations and students living in federally owned low-rent housing.

Table 3.8-1. Fall Enrollments and Federal Impact Aid for School Districts

School District	*Enrollment 1995*	*Enrollment 1996*	*Enrollment 1997*	*Navy Dependents* [1]	*Federal Impact Aid Funding*
Coronado USD	2,622	2,709	2,744	1,077	$453,820
San Diego USD	130,623	133,726	136,215	15,934	$5,003,568

Note: Navy dependents are reported for 1996.

Coronado USD has two elementary schools, one middle school, and one high school. Total enrollment in autumn 1997 was 2,744 students. Annual enrollments have increased an average of 3.4 percent per year over the past 5 years. The district is currently operating its elementary, middle, and senior high schools near capacity. Navy dependents comprised 1,077 students or 39.8 percent of total enrollments at Coronado USD in 1996. Federal impact aid was $453,820.

San Diego USD has 120 elementary schools, 22 middle schools, and 16 high schools. Total enrollment in autumn 1997 was 136,215 students. The school district anticipates that enrollments will increase by 1.2 percent annually over the next 5 years. The district's elementary schools are currently operating over their capacity, and the middle and senior high schools are operating at capacity. Navy dependents comprised 15,934 students or 11.9 percent of total enrollments in 1996. Federal impact aid was $5,003,568 in the 1996-1997 school year.

3.8.2 Environmental Consequences and Mitigation Measures

Unlike most other impacts analyzed in this EIS, the impacts on socioeconomic conditions associated with the capacity to homeport three nuclear-powered aircraft carriers at NASNI derive from the factors directly tied to the number of aircraft carriers homeported at NASNI (e.g., crew size, number of military dependants requiring housing on the local economy, number of dependant children in local schools, money entering the local economy, etc.). As stated in section 3.0, impacts on socioeconomic conditions derived from the number of aircraft carriers homeported at NASNI are measured in terms of the incremental changes from CV to CVN and the incremental change from the existing condition of two homeported carriers (1 CVN and 1 CV) to three homeported carriers (3 CVNs).

Potential consequences in the areas of employment, population, housing, and public schools are addressed below.

Significance Criteria

Socioeconomic impacts would be significant if one or more of the following occur as a result of project implementation:

- Direct and indirect civilian jobs created by the action cannot be filled by the current population and cause a major in-migration of new residents.
- Changes in demand in the housing market are substantial enough to cause dislocation in the market, reflected by accelerated price increase or decrease and vacancy rates above or below historic levels.
- Educational resources are burdened to the point that the overall quality of these services declines, reflected by factors such as school facility capacity.

3.8.2.1 Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)

Alternative Five would not require any new projects.

Dredging/Mitigation Site

EMPLOYMENT, POPULATION, AND HOUSING

No effects on employment, population, or housing would occur since there are no dredging activities.

SCHOOLS

No dredging or site construction would be required. No increase in school enrollments or impacts on schools would occur.

Facility Improvements

EMPLOYMENT, POPULATION, AND HOUSING

Because no improvements to facilities are required, no effects on employment, population, or housing would occur.

SCHOOLS

There would be no new facilities or infrastructure and no increase in school enrollments or impacts on schools would occur.

Operations

EMPLOYMENT

No additional vessels would be homeported at NASNI. Projected conditions reflect the decommissioning and departure of one CV and 3,115 military personnel.

Permanent personnel in the San Diego area numbered 67,274 in 1996. A net future decrease of 3,115 personnel would represent 4.6 percent of the total personnel and only 0.2 percent of the total full- and part-time employment in 1995 in San Diego County. However, from 1990 through 1995, employment in the county has increased by only 695 jobs per year. Thus, this net future reduction of 3,115 direct workers represents about 4 years' worth of employment growth. With the addition of losses of secondary jobs that would accompany the direct jobs, this net future reduction would represent an adverse, though not significant, impact.

POPULATION

The decrease in the number of assigned military personnel (3,115 persons) associated with the decommissioned CV would also result in an associated decrease in accompanying dependents. It is estimated that this decrease would number 2,962 persons, resulting in a direct population loss of 6,077 persons.

The departure of 6,077 military personnel and their dependents would represent less than 1 percent of the estimated population of San Diego County in 1996 or the combined populations of the cities of San Diego and Coronado. Further, such a reduction represents 19 percent of the annual population growth that has occurred in San Diego County between 1990 and 1996. The potential impacts to regional population would be less than significant.

HOUSING

With a potential net future decrease in the number of both accompanied and unaccompanied personnel, both government-owned and civilian housing units would be vacated. The departure of unaccompanied personnel would result in a lower occupancy rate in Bachelor Officer Quarters

(BOQ) and Bachelor Enlisted Quarters (BEQ) facilities and apartment structures in surrounding communities.

Accompanied military personnel occupy both military family housing and civilian housing in surrounding communities. A decrease in the number of accompanied military personnel would decrease the demand for family housing by 1,371 units. Vacant military family housing units would be occupied by personnel who currently reside in civilian housing in surrounding communities and who prefer to live in military family housing. Should this potential shift be inadequate to fill all military family housing vacancies, additional personnel currently residing in civilian housing would potentially be assigned to government housing. Thus, the major effect of the reduction in housing demand would be experienced in the private housing market.

Assuming that the entire future reduction in demand for housing would be concentrated in the civilian housing market, the vacating of 1,371 units would increase the 1996 vacancy rate in the region from 5.9 percent to 6.0 percent. This potential increase would be a less than significant change and impact. From 1990 through 1996, the number of housing units in San Diego County increased annually by an average of 8,927 units. The net future availability of 1,371 housing units would reduce the necessity for new construction, but not substantially. Adverse impacts on the regional housing market are not considered significant.

SCHOOLS

Table 3.8-2 presents potential enrollment effects from the various homeporting actions at NASNI. Future enrollments would be reduced by approximately 717 students. Assuming that all enrollment reductions would occur at either Coronado USD or San Diego USD, Coronado USD would lose approximately 43 students and San Diego USD would lose approximately 674 students. This enrollment reduction would reduce demand for school district resources. This would be a beneficial effect, especially for San Diego USD, where elementary schools are and would be operating over capacity, and other schools are at capacity.

3.8.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging/Mitigation Site

EMPLOYMENT

The dredging and disposal of approximately 582,000 cy of sediments to provide the capacity to homeport one additional CVN would occur over 1 year and would involve an estimated 50-person workforce. These workers would be drawn from the existing local labor market. Impacts on regional employment would therefore be less than significant.

POPULATION

Labor requirements to provide the capacity to homeport one additional CVN would be drawn from the existing local labor market and would not involve in-migration of additional workers. Thus, no change in regional population would occur and no adverse impact on regional population levels would result.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional housing market.

SCHOOLS

Dredging, disposal, and mitigation site construction to provide the capacity to homeport one additional CVN would be temporary. Local labor would be used for this activity, so no increase in school enrollments or impacts on schools would occur.

Facility Improvements

EMPLOYMENT

Construction and upgrading of existing facilities to provide the capacity to homeport one additional CVN would include the demolition and replacement of existing Pier J/K, the relocation of a ferry/flag landing, construction of a CVN warehouse, fleet support building and equipment layout building, and upgrades to electrical systems. This construction activity would employ approximately 100 workers over 18 to 24 months. The workers would be drawn from the existing local labor market. Impacts on regional employment would be less than significant.

POPULATION

Construction labor requirements to provide the capacity to homeport one additional CVN would be drawn from the existing local labor market and would not involve in-migration of additional workers. Thus, no change in regional population would occur and no adverse impact on regional population levels would result.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional housing market.

SCHOOLS

Dredging and mitigation site construction to provide the capacity to homeport one additional CVN would be temporary. Local labor would be used for this activity, so no increase in school enrollments or impacts to schools would occur.

Operations

EMPLOYMENT

Homeporting one additional CVN would result in 102 additional military personnel.

Permanent military personnel in the San Diego area numbered 67,274 in 1996. A net future increase of 102 personnel would represent 0.16 percent of the total personnel and only 0.006 percent of the total full- and part-time employment in 1995 in San Diego County. This slight increase in employment would not be significant.

POPULATION

The net increase in the number of assigned military personnel (102 persons) associated with providing the capacity to homeport one additional CVN would have an associated increase of 194 accompanying dependents, resulting in a total direct population increase of 296 persons.

The increase of 296 military personnel and their dependents associated with providing the capacity to homeport one additional CVN would represent far less than 1 percent of the estimated population of San Diego County in 1996 or the combined populations of the cities of San Diego and Coronado. Further, such a increase represents only 0.9 percent of the annual population growth that occurred in San Diego County between 1990 and 1996. The potential impacts to regional population would be less than significant.

HOUSING

Accompanied military personnel occupy both military family housing and civilian housing in surrounding communities. An increase in the number of accompanied military personnel would increase the demand for family housing by 90 units. The effect of the increase in housing demand would be experienced in the private housing market.

The increased demand would insignificantly change the 1996 vacancy rate in the region of 5.9 percent. From 1990 through 1996, the number of housing units in San Diego County increased annually by an average of 8,927 units. Adverse impacts on the regional housing market would be less than significant.

SCHOOLS

Table 3.8-2 presents potential enrollment effects from the various homeporting actions at NASNI.

Table 3.8-2. Projected Enrollment Changes by School District

Action	*Coronado USD*	*San Diego USD*	*Total Change*
No Additional CVN	(43)	(674)	(717)
One Additional CVN	3	44	47
Two Additional CVNs	47	739	786
No Action Alternative: One Additional CVN	3	44	47

Note: Parentheses indicate a net future reduction of students.

Homeporting one additional CVN would increase total enrollments by an estimated 47 students, which includes an increase of 3 students to Coronado USD and an increase of 44 students for San Diego USD. Assuming average annual growth rates of 3.4 percent and 1.2 percent, respectively, the net future enrollment increases would have non-significant impacts.

3.8.2.3 Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site

EMPLOYMENT

Effects associated with providing the capacity to homeport two additional CVNs would not be significant and would be identical to those associated with providing the capacity to homeport one additional CVN.

POPULATION

Labor requirements associated with providing the capacity to homeport two additional CVNs would be drawn from the existing local labor market and would not involve in-migration of additional workers. Thus, no change in regional population is anticipated and impacts on regional population levels would not be significant.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no effects associated with providing the capacity to homeport two additional CVNs on the regional housing market.

SCHOOLS

Dredging and mitigation site construction associated with providing the capacity to homeport two additional CVNs would be temporary. Local labor would be used for this activity, so no increase in school enrollments or impacts to schools would occur.

Facility Improvements

EMPLOYMENT

Effects associated with providing the capacity to homeport two additional CVNs would not be significant and would be virtually identical to those associated with the addition of one CVN.

POPULATION

Labor requirements associated with providing the capacity to homeport two additional CVNs would be drawn from the existing local labor market and would not involve in-migration of additional workers. Thus, no change in regional population is anticipated and impacts on regional population levels would not be significant.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no effects on the regional housing market associated with providing the capacity to homeport two additional CVNs.

SCHOOLS

Facility improvements construction associated with providing the capacity to homeport two additional CVNs would be temporary. Local labor would be used for this activity, so no increase in school enrollments or impacts to schools would occur.

Operations

EMPLOYMENT

Homeporting two additional CVNs would effectively result in 3,319 (102+3,217) additional military personnel (see Section 3.0 and Table 3-1). The second additional CVN (for homeporting a total of 3 CVNs) would add 3,217 military personnel for an average of 13 days per year based on the historical homeporting of 3 carriers at NASNI since 1975. The 102 additional military personnel represents the additional number of personnel associated with the second CVN over the existing CV at NASNI that will be decommissioned.

Permanent personnel in the San Diego area numbered 67,274 in 1996. A net future increase of 3,319 military personnel would represent 4.9 percent of the total personnel and 0.2 percent of the total full- and part-time employment in San Diego County in 1995. From 1990 through 1995, an average of 695 jobs have been added to the economy of the county. The net future addition of 102 direct workers represents approximately 5 year's worth of employment growth and is not significant impact.

POPULATION

The effective net increase in the number of assigned military personnel (3,319 persons) associated with homeporting two additional CVNs would also bring about an associated increase in accompanying dependents. It is estimated that this increase would number 3,253 persons, resulting in a direct population gain of 6,572 persons. Recall that the baseline for comparison for the gain in military personnel is 3,319 (see Section 3.0). The gain in military dependents reflects the addition of both CVNs as dependent presence is independent of the second additional carrier being in port.

The addition of 6,572 military personnel and their dependents would represent less than 1 percent of the estimated population resident in San Diego County in 1996 or the combined populations of the cities of San Diego and Coronado. Further, such an addition represents only 19 percent of the annual population growth that occurred in San Diego County between 1990 and 1996. The potential impacts to regional population would not be significant.

HOUSING

With a potential increase in the number of both accompanied and unaccompanied personnel associated with homeporting two additional CVNs, it is assumed that the demand for both government-owned and civilian housing units would increase. The arrival of unaccompanied personnel would result in higher occupancy rates in BOQ and BEQ facilities and especially apartment structures in surrounding communities.

Accompanied military personnel would likely desire to occupy both military family housing and housing in surrounding communities. It is estimated that the demand for family housing would increase by 1,501 units. This would further increase the demand for military family housing and lengthen waiting lists for these assets. Given the short supply of military family housing compared to the current demand, the major effect of the increased demand would be experienced in the housing market in surrounding communities.

Assuming that the entire net future increase in demand for housing of 1,501 units is concentrated in the civilian housing market of surrounding communities, a change of this potential magnitude would not measurably affect the civilian housing vacancy rate. From 1990 through 1996, the number of housing units in San Diego County increased annually by an average of 8,927 units. The net future demand for 1,501 housing units could be provided by the construction industry. There would be a small beneficial impact on the residential construction industry, but the added demand is not so great as to cause substantial increases in home prices or rental amounts in the regional housing market. Impacts on the housing market would be less than significant.

During an aircraft carrier's 2-year operating cycle, 6 months are spent in a PIA, during which major repairs are accomplished. Approximately 450 workers from a nuclear capable shipyard must relocate for a period of about 6 months to the carrier homeport. Such a temporary increase in personnel could increase the occupancy rate of hotel and motel accommodations and decrease the vacancy rate for short-term rental accommodations. Given the size of the rental housing market and large number of hotel and motel rooms built to accommodate a sizable tourist sector, such changes could be adverse, but would not be significant.

SCHOOLS

Homeporting two additional CVNs in association with projected baseline conditions (removal of one CV) would increase Coronado USD enrollments by 47 students and San Diego USD enrollments by 739 students. These net future increases constitute 1.7 percent of the 1997 enrollment at Coronado USD, which is 2,744 students, and 0.5 percent of the 1997 enrollment at San Diego USD, which is 136,215 students. Compared to existing enrollment growth rates, the affect on Coronado USD would be small. At San Diego USD, a 739 student increase would comprise about 46 percent of the projected annual baseline increase, which is approximately 1,600 students per year. This impact would be accommodated and the impact would be less than significant.

Military families moving into the area are expected to live in one of three housing types: (1) existing vacant private-sector housing, in which case a new student would likely replace an existing student, the district would likely receive a federal impact aid payment for students, and the district may have received a development impact fee in the past; (2) new private-sector housing, for which the two school districts receive $1.84 per square foot in development impact fees for new single-family and multi-family housing and could receive impact aid payments for students, generally less than $100 per student; and (3) existing federally owned military family housing, the category for which school districts receive the highest federal impact aid payments for students (approximately $700 per student). No military family housing is proposed as part of the homeporting action. Impacts at Coronado USD are considered to be less than significant given the change in enrollments, and adverse but less than significant at San Diego USD.

3.8.2.4 No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

Because there would be no dredging, no impacts on employment, population, housing, and schools would result.

Facility Improvements

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

Because no improvements to facilities are required, no effects on employment, population, housing, and schools are anticipated.

Operations

EMPLOYMENT

Homeporting one additional CVN berthed at the transient pier would result in a net future increase of 102 in the number of military personnel.

The potential effects on each of the resources employment, population, housing, and schools associated with this increase in military personnel (as well as their dependants and other civilian workers) would be identical to those described in section 3.8.2.2.

3.8.2.5 Mitigation Measures

Employment

Because impacts on employment would be less than significant, no mitigation measures are required.

Population and Housing

Because impacts on population and housing would be less than significant, no mitigation measures are required.

Schools

Because impacts on schools would be either beneficial or less than significant, no mitigation measures are required.

3.9 TRANSPORTATION

3.9.1 Ground Transportation

The following subsections describe the ground transportation system that provides access to NASNI. Because any substantial change in population or activity at the base would result in an increase in the number of commuters and the number of deliveries, there would be a corresponding increase in the volume of traffic (automobiles and trucks) traveling to and from the base. The primary objective of the ground transportation analysis is to quantify the change in traffic levels that would occur as a result of the proposed homeporting activities and evaluate the ability of the street and roadway network to accommodate the projected traffic volumes.

3.9.1.1 Affected Environment

The ground transportation system includes the local street and regional highway network in and around Coronado that provides access to NASNI. The existing conditions relative to this roadway network are described below, and the key streets and highways are illustrated on Figure 3.9-1.

Roadways

Regional access to Coronado and NASNI is provided by two routes: the San Diego-Coronado Bay Bridge, which spans the bay and serves as a link between the two cities; and Silver Strand Boulevard, which extends south from Coronado along the peninsula to Imperial Beach. Both of these facilities are designated as State Route (SR) 75. The San Diego-Coronado Bay Bridge is a toll facility with tolls collected in the westbound direction only. The bridge currently experiences traffic congestion during the morning and afternoon peak periods associated with the high number of commuters that traverse the bridge while traveling between home and work.

Local access is provided by the street network within the City of Coronado, which is generally arranged in a grid pattern. The key east-west streets that serve as access routes to and from NASNI are First Street, Third Street, Fourth Street, and Ocean Boulevard. First Street runs along the north side of Coronado parallel to the shoreline of the San Diego Bay. Third and Fourth Streets comprise a one-way couplet, with Third Street being one-way westbound and Fourth Street being one-way eastbound. This couplet, designated SR 75 east of Orange Avenue and SR 282 west of Orange Avenue, is the primary travel link between the San Diego-Coronado Bay Bridge and NASNI. Pomona Avenue serves as a one-way connector between Fourth and Third streets at the east end of the couplet. Ocean Boulevard runs along the south side of Coronado parallel to the Pacific Ocean beachfront.

The key north-south streets in Coronado are Alameda Boulevard and Orange Avenue. Alameda Boulevard runs along the eastern boundary of NASNI, while Orange Avenue (SR 75) is the primary travel route through the Coronado central business district.

Parking is allowed along the curb on most of the city streets, although there are some parking restrictions on the heavily traveled routes to enhance traffic flow. A permit parking program is in place on the residential streets in the immediate vicinity of NASNI.

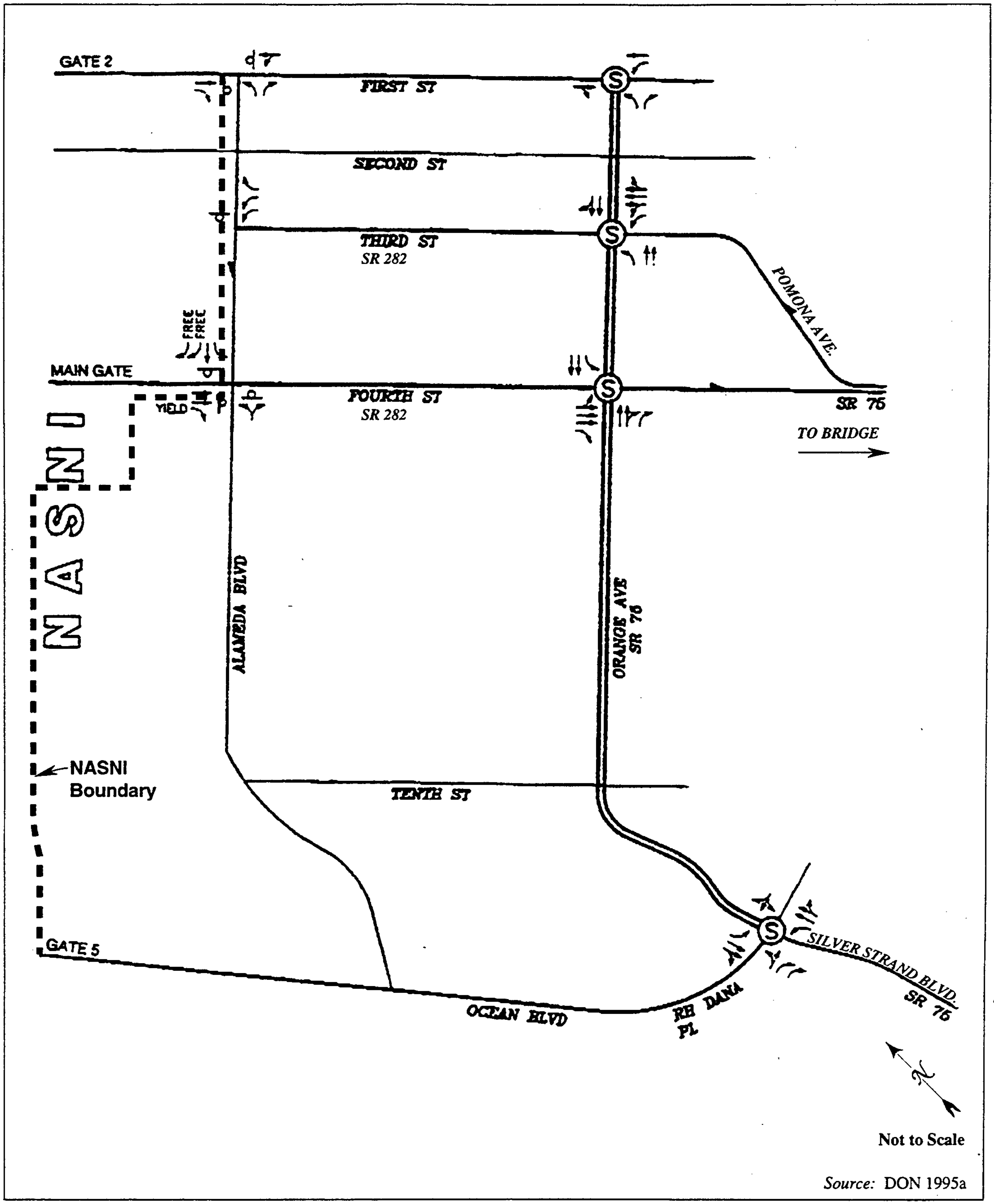


Figure 3.9-1. NASNI Coronado Gound Transportation Network

Table 3.9-1. Existing Roadway Conditions

Roadway/Location	*Classification*	*Number of Lanes*	*Daily Traffic Volume*
Coronado Bay Bridge	Freeway	5	71,000
Silver Strand Blvd.	Principal Arterial	4	38,000
First Street			
Orange to Alameda	Collector	2	6,300
Third Street (one-way)			
C to Orange	Principal Arterial	3	26,600
Orange to H	Principal Arterial	3	18,200
H to Alameda	Principal Arterial	3	16,400
Fourth Street (one-way)			
Pomona to C	Principal Arterial	3	33,000
C to Orange	Principal Arterial	3	33,500
Orange to H	Principal Arterial	3	18,200
H to Alameda	Principal Arterial	3	17,400
Pomona Avenue (one-way)			
Fourth to Third	Principal Arterial	3	28,000
Ocean Boulevard			
Orange to Alameda	Minor Arterial	2	11,140
Alameda to Gate 5	Minor Arterial	2	7,820
Orange Avenue			
First to Third	Collector	4	11,020
Third to Fourth	Principal Arterial	4	30,000
Fourth to Eighth	Principal Arterial	4	35,500
Eighth to Tenth	Principal Arterial	4	28,500
Tenth to Pomona	Principal Arterial	4	31,000
Alameda Boulevard			
First to Third	Collector	2	3,940
Third to Fourth (1-way)	Principal Arterial	3	20,000
Fourth to Sixth	Minor Arterial	2	9,490
Sixth to Ocean	Minor Arterial	2	4,650

Note: Based on 1996 traffic counts.

The functional classification, existing number of travel lanes, and existing daily traffic volumes for each street in the study area are shown in Table 3.9-1. Roadway classifications are from the Coronado General Plan. The numbers of lanes were observed during field reconnaissance, and the daily traffic volumes were assembled in 1998 using inputs from Caltrans, the San Diego Association of Governments (SANDAG), and the City of Coronado. The daily traffic volumes obtained from the 1998 SANDAG report "San Diego-Coronado Bridge Toll Removal Impact Study," represent the annual average weekday volumes on the roadways in the study area. These data reflect a period of time when two carriers were homeported at NASNI.

In addition to the annual average weekday traffic volumes presented in Table 3.9-1, a 5-day count of Coronado Bridge traffic of 80,000 vehicles was taken during the peak summer season of 1996 (Linscott, Law, and Greenspan 1997) when two carriers were in port. This is considered a worst-case condition reflecting higher-than-average traffic volumes during peak tourist activity in Coronado. Since the 80,000 vehicle count is not indicative of average weekday year-round traffic flows on the bridge (as compared to the annual average of 71,000 obtained from the SANDAG report), it is not used in this analysis.

Traffic Conditions

Six potentially affected local intersections were analyzed to determine their operating conditions during the morning and afternoon peak periods on a typical weekday, as summarized in Table 3.9-2. Based on peak hour traffic volumes, turning movement counts, and the existing number of lanes at each intersection, the average vehicular delay, V/C ratios, and LOS were determined for each intersection using the methodology outlined in the *Highway Capacity Manual* (Transportation Research Board 1994) for signalized intersections.

The local intersection conditions shown on Table 3.9-2 are based on traffic counts that were taken in August 1996 for a study prepared for the City of Coronado titled "Traffic Impact Analysis NASNI Third Street Gate" (Linscott, Law and Greenspan, February 1997). These traffic counts represent local intersection conditions during the peak summer tourist/recreational season when there were two aircraft carriers in port. Follow-up counts taken in the fall of 1998 (SANDAG 1998) resulted in traffic volumes at intersections that were lower than the August 1996 volumes. It was determined, therefore, that it would be appropriate to use the August 1996 data to represent existing local intersection conditions as the counts reflect higher-than-average traffic volumes. This conclusion is consistent with the findings of an October 1998 draft report prepared by SANDAG titled "San Diego-Coronado Bridge Toll Removal Impact Study," which also used the August 1996 data to represent existing local intersection conditions.

LOS is a qualitative indicator of an intersection's operating conditions as represented by congestion, delay, and volume-to-capacity ratio. It is measured from LOS A (excellent conditions, little or no delay) to LOS F (extreme congestion and delay) with LOS D typically considered to be the threshold of acceptability. Table 3.9-2 indicates that all intersections except Orange Avenue and Fourth Street operate at an acceptable LOS (A through D) during either the A.M. or P.M. peak hour.

NASNI currently has four access gates. Main Gate is at Alameda Boulevard and Fourth Street; Gate 2 is at Alameda and First Street; Gate 3 is at Alameda and Second Street; and Gate 5 is at the end of Ocean Boulevard. Based on traffic counts obtained from NASNI Security Department, the base generates approximately 16,000 inbound vehicle trips per day (32,000 total, in and out). This is divided among the four gates as follows: Main Gate — 7,500; Gate 2 — 3,500; Gate 3 — 2,500; and Gate 5 — 2,500. The Navy has completed a study of the Main Gate so that the entrance would be aligned with 3rd Street at Alameda Boulevard and the exit aligned with 4th Street. This project has been submitted to be included in the military construction program. This configuration would greatly improve traffic operations at the gate and reduce the level of congestion on the streets in the vicinity of the base.

3.9.1.2 Environmental Consequences and Mitigation Measures

The impacts on ground traffic associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, where the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Table 3.9-2. Existing Intersection Levels of Service				
	AM PEAK HOUR		PM PEAK HOUR	
Intersection	*Delay (sec) & V/C Ratio*	*LOS*	*Delay (sec) & V/C Ratio*	*LOS*
Orange/First	10.4 - 0.586	B	8.3 - 0.521	B
Orange/Third	28.4 - 1.001	D	19.4 - 0.572	C
Orange/Fourth	24.4 - 0.591	C	64.4 - 1.107	F
Orange/R.H. Dana	25.4 - 0.720	D	32.8 - 0.855	D
Alameda/Third	28.0 - 0.971	D	16.3 - 0.472	C
Alameda/Fourth	28.8 - 0.480	D	38.6 - 1.018	D

Note: Based on traffic counts taken in August 1996.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

The project's impacts to the ground transportation system would be considered significant if one or more of the following impacts occur:

- Additional traffic generated by the homeporting activities would result in average daily traffic volumes that are above the planned capacity of a roadway segment.
- Additional traffic generated by the homeporting activities would result in an increase of 0.02 or greater in the volume/capacity ratio of an intersection that is projected to operate at LOS E or F.
- Homeporting activities would result in a substantial traffic or parking intrusion.
- Homeporting activities would generate a demand for public transit services that could not be accommodated by the existing or planned transit system.

Impact Methodology

A traffic impact analysis has been conducted to quantify the impacts of the facilities and infrastructure needed to support CVN homeporting on traffic conditions in the vicinity of NASNI. Because there are various actions regarding the distribution of the homeported CVNs among the four home port locations addressed in this EIS, the traffic analysis considers the various actions that would occur at NASNI relative to the number and type of homeported ships, the associated number of personnel, and the resulting level of traffic that would be generated.

The approach for the traffic impact analysis was to quantify the change (increase or decrease) in site-generated traffic volumes that would occur as a result of each action, then analyze the corresponding impacts on traffic conditions on the roadway network that provides access to the base. The controlling factor used to estimate the increase or decrease in site-generated traffic is the number of personnel associated with each action. Traffic counts at NASNI gates indicate that the base, as a whole, generates an average of 1.47 trips per person. The daily trip generation rate has been used for the NASNI traffic analysis. A peak hour rate of 0.265 trips per person was assumed, with 91 percent of the traffic entering and 9 percent exiting during the morning peak hour and with 9 percent entering and 91 percent exiting during the afternoon peak hour. These peak hour rates were developed for the Puget Sound homeporting analysis (DON 1995b). The trip generation rates represent all vehicle trips entering and leaving the base, including commute trips, truck deliveries, and visitors.

The personnel loading for each action is presented in Table 3.9-3, which shows that one out of the four actions would result in a decrease in the number of personnel at NASNI. The action that provides for homeporting one additional CVN would result in an increase of additional 102 people, and the action that provides for homeporting two additional CVNs would result in an increase of 3,319 for those 13 days a year when all three homeported carriers are in port at the same time.

In addition to the personnel shown on Table 3.9-3, there would be a periodic increase in personnel at NASNI associated with the PIA maintenance activities for the CVNs. As described in Chapter

Table 3.9-3. Personnel Loading — NASNI Coronado

Action	*CV*	*CVN*	*Total*	*Change from Existing*
Existing Vessels Homeported				
Ships	1	1	2	0
Personnel	3,115	3,217	6,332	0
Facilities for No Additional CVN (Alternative Five)				
Ships	0	1	1	- 1
Personnel	0	3,217	3,217	– 3,115
Facilities for One Additional CVN (Alternative Four)				
Ships	0	2	2	0
Personnel	0	6,434	6,434	+102
Facilities for Two Additional CVNs (Alts One, Two, Three) [1,2]				
Ships	0	2	2	0
Personnel	0	6,434	6,434	+102
No Additional Facilities for One Additional CVN (Alternative Six: No Action)				
Ships	0	2	2	0
Personnel	0	6,434	6,434	+102

1. This condition reflects 96 percent of the time during which two carriers or fewer are predicted to be in port at the same time.
2. During the 13 intermittent days when three CVNs are predicted to be in port simultaneously, an estimated 9,651 personnel would be in port, and the net change from existing conditions would be 3,319 personnel.

2, these routine maintenance activities have a 6-month duration and occur two times over 6 years for each CVN. Approximately 450 workers from a nuclear-capable shipyard must relocate for a period of about 6 months. These personnel were included in the EIS analysis for the CVN previously approved for NASNI (DON 1995a).

The BRAC EIS traffic study indicated that the additional personnel associated with the PIA activities would be offset by the planned decrease in personnel at other NASNI operations and that there would be no increase in commuter traffic volumes. The addition of one or two CVNs proposed at NASNI would not require any additional personnel for the PIA activities, but would increase the number of months during each cycle that the PIA personnel would be on base. For example, if there were three homeported CVNs at NASNI, then PIA activities would occur for approximately 36 months out of every 6-year period. This averages to one 6-month PIA per year. The BRAC EIS (DON 1995a) evaluated the traffic impact of DMF workers based on a one PIA in one year concept. The EIS determined that there would be no impact because of overall decreases in base population at NASNI. For example, NASNI has already experienced a decrease of about 2,500 personnel since the BRAC EIS was prepared in 1995 (see Volume 3, Table 2-1). While the BRAC EIS analyzed a lesser frequency of PIAs (two every six years), it did analyze what the impact of one PIA in one year would be, thus bounding the condition of this EIS where an average of one PIA each year would be conducted. Thus, the conclusion of no impact stated in the BRAC EIS is still valid for this EIS.

In addition, the 1995 BRAC EIS had several conservative aspects built into the analysis. The 1995 BRAC EIS estimated the average DMF workforce at 750 personnel and assessed the impacts at this level. The Navy overestimated this workforce because there had been no actual experience in conducting a CVN PIA. Now that the Navy has conducted several PIAs, the average workforce number at NASNI has been lowered to 450 personnel. Also, the analysis in the 1995 BRAC EIS did not account for the fact that DMF workers average 2.5 persons per vehicle. The 1995 BRAC EIS assessed these workers as all single vehicle operators. Therefore the 1995 BRAC EIS conservatively assessed the number of DMF workers and bounded the impacts of one PIA per year in its analysis.

It should also be pointed out that the PIA is a maintenance activity for the CVNs that would essentially replace maintenance overhaul activities that are currently performed on the CVs. The CV maintenance activities are conducted periodically by the Navy and contract personnel that must commute to NASNI during the maintenance periods. The amount of work for CVs and CVNs is similar in size; therefore, it is not expected that CVN PIA activities at NASNI would vary greatly from past CV maintenance activities at NASNI or result in traffic increases in Coronado.

3.9.1.2.1 Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)

Alternative Five would not require any new improvements.

DREDGING/MITIGATION SITE

Because no dredging would take place, no traffic impacts would occur.

FACILITY IMPROVEMENTS

Because no construction would take place, no traffic impacts would occur.

OPERATIONS

The change in site-generated traffic is shown on Table 3.9-4. This development action would result in a net future decrease in traffic of 4,579 trips per day and 825 trips during the peak hour. As there would be a net future decrease in site-generated traffic, there would be no adverse traffic impacts.

Table 3.9-4. Traffic Generation Estimates — NASNI Coronado

Action	*Personnel Change*	*Peak Hour Traffic*	*Average Daily Traffic*
Trip Rate (per person)	N.A.	0.265	1.47
No Additional CVN (Alternative Five)	-3,115	-825	-4,579
One Additional CVN (Alternative Four)	+102	+27	+150
Two Additional CVNs (Alternative One, Two, Three)[1, 2]	+102[1]	+27[1]	+150[1]
No Additional Facilities for One Additional CVN (Alternative Six: No Action)	+102	+27	+150

1. This condition reflects 96 percent of the time during which two carriers or fewer are predicted to be in port at the same time.
2. During the 13 intermittent days when three CVNs are predicted to be in port simultaneously, an estimated 879 peak hour trips and 4,879 daily trips would occur.

3.9.1.2.2 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of construction of a CVN berthing wharf, ferry/flag landing, and dredging.

DREDGING/MITIGATION SITE

The dredging operations associated with providing the capacity to homeport one additional CVN would result in little or no increase in vehicular traffic as the dredged material would be transported by barge to the disposal site(s) and/or by truck within the base perimeter.

FACILITY IMPROVEMENTS

During construction of the various facilities that would be associated with providing the capacity to homeport one additional CVN, there would be a short-term increase in traffic associated with workers driving to/from NASNI and trucks delivering materials to NASNI. Construction activities would generate an estimated 200 additional trips per day for light-duty vehicles and up to 100 truck trips per day (50 round trips). When compared to the existing volume of 32,000 total trips per day and 850 truck trips per day generated by the base, the additional short-term construction traffic would be less than significant, particularly since it is temporary. The construction traffic would primarily use 1st Street and 3rd Street as the access route to the base and 1st Street and 4th Street as the egress route from the base. Orange Avenue between 1st and 3rd Streets and Alameda Boulevard between 1st and 4th Streets would also be used as travel routes for construction traffic.

As an effort to minimize the impacts of construction traffic, the Navy plans to control the shift times and the truck delivery times to minimize impacts during peak periods, to impose measures to reduce the number of construction worker trips, and to continue working cooperatively with the City of Coronado to avoid particular times and routes that are problematic from a traffic perspective. The possibility of using barges for transporting construction materials was considered, but was determined to be infeasible for most deliveries because of scheduling constraints and costs. The Navy is planning to use barges for major deliveries to the extent possible where scheduling and logistical constraints can be overcome.

OPERATIONS

The net future change in site-generated traffic associated with providing the capacity to homeport one additional CVN is shown on Table 3.9-4. This development action, in association with projected decommissioning of one CV, would result in a net future increase in traffic of 150 trips per day and 27 trips during the peak hour. These trips would not result in a change in the Level of Service on any local roadway or intersection, and would represent a small, less than significant impact. Table 3.9-5 in section 3.9 of Volume 3 shows the estimated increase in daily traffic volumes on each home port area roadway segment and the before-and-after volume/capacity ratios. Table 3.9-6 in section 3.9 of Volume 3 shows the impacts of the additional traffic on peak hour levels of service at the study area intersections.

3.9.1.2.3 Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

DREDGING/MITIGATION SITE

The dredging operations associated with providing the capacity to homeport two additional CVNs would result in little or no increase in vehicular traffic as the dredged material would be transported by barge to the disposal site(s) and/or by truck within the base perimeter.

FACILITY IMPROVEMENTS

During construction of minor additional utility and fencing upgrades that would be developed associated with providing the capacity to homeport two additional CVNs, there would be a short-term increase in traffic associated with workers driving to/from NASNI and trucks delivering materials to NASNI. Construction activities would generate an estimated 200 additional trips per day for light-duty vehicles and up to 100 truck trips per day (50 round trips). When compared to the existing volume of 32,000 total trips per day and 850 truck trips per day generated by the base, the additional short-term construction traffic would be less than significant, particularly since it is temporary. The construction traffic would primarily use 1st Street and 3rd Street as the access route to the base and 1st Street and 4th Street as the egress route from the base. Orange Avenue between 1st and 3rd Streets and Alameda Boulevard between 1st and 4th Streets would also be used as travel routes for construction traffic.

As an effort to minimize the impacts of construction traffic, the Navy plans to control the shift times and the truck delivery times to minimize impacts during peak periods, to impose measures to reduce the number of construction worker trips, and to continue working cooperatively with the City of Coronado to avoid particular times and routes that are problematic from a traffic perspective. The possibility of using barges for transporting construction materials was considered, but was determined to be infeasible for most deliveries because of scheduling constraints and costs. The Navy is planning to use barges for major deliveries to the extent possible where scheduling and logistical constraints can be overcome.

OPERATIONS

As discussed in section 3.0 (see Table 3-0), it is predicted that when three aircraft carriers are homeported at NASNI, no more than two carriers would be in port simultaneously 96 percent of the time. Traffic volumes related to this condition are equivalent to the alternative discussed in section 3.9.2.2 for one additional CVN (total of two CVNs). These trips would not result in a change in the Level of Service on any local roadway or intersection, and would represent a small, less than significant impact (see Table 3.9-5 in section 3.9 of Volume 3 for details of the estimated increase and effects on daily traffic volumes on Coronado roadway segments, and Table 3.9-6 for effects on peak hour levels of service at the study area intersections). The future traffic volumes without the project were extracted from a draft report prepared by SANDAG entitled "San Diego-Coronado Bridge Toll Removal Impact Study" (October 1998). The traffic forecasts represent future conditions taking into account projections of population and employment growth in Coronado and the San Diego region. Although the SANDAG forecasts represent the year 2015 and are higher than what would be expected for the year 2005 when a third CVN would be homeported at NASNI, this scenario has been used to represent future conditions to ensure that the level of anticipated growth and the cumulative traffic increases in Coronado have been considered. It has been assumed for the CVN traffic analysis that the bridge tolls would continue to be charged through the year 2005 (Scenario 2 from the SANDAG report). If the toll charges at the bridge were to be eliminated, the traffic forecasts would substantially change, as documented in the SANDAG report.

The analysis of when no more than two CVNs would be in port simultaneously (96 percent of the time) indicates that a minor increase in net future transit ridership would occur resulting from the 102 personnel increase. The level of service at area intersections and roadways would not be changed. This future traffic impact would be less than significant. There would also be an increase in net future parking demand, which would be accommodated at NASNI. The Navy plans to construct additional parking lots on base to accommodate the increased parking demands generated by the CVN homeporting project as well as other activities at the base. Impacts on parking demand would be less than significant.

It is predicted that all three homeported carriers would be in port at the same time only 13 days (an average of 12 affected weekdays) per year, or approximately 4 percent of the time (see Section 3.0 Table 3-0). As shown in the footnote to Table 3.9-4, during these days an intermittent, short-term increase of 4,879 trips per day and 879 trips during the peak hours would occur. The number of truck deliveries would not significantly increase. While the impact on transportation would be substantial on these days, it would be intermittent and short-term, and therefore less than significant. The short-term impacts on peak hour traffic would be minimized by staggering the starting and ending times of the daytime duty for one of the CVNs by at least one hour as compared to the other two CVNs in port.

3.9.1.2.4 No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new improvements.

DREDGING/MITIGATION SITE

Because no dredging would take place, no traffic impacts would occur.

FACILITY IMPROVEMENTS

Because no construction would take place, no traffic impacts would occur.

OPERATIONS

The change in site-generated traffic is shown on Table 3.9-4. This action would result in a net future increase in traffic of 150 trips per day (from 102 military personnel) and 27 trips during the peak hour. These trips would not result in a change in the Level of Service on any local roadway or intersection, and would represent a small, less than significant impact.

3.9.1.2.5 Mitigation Measures

Because all of the long-term impacts resulting from proposed action alternative would result in less than significant impacts on traffic, no traffic-related mitigation measures are needed.

Although the proposed action addressed in this EIS would not result in a significant traffic impact and would not require any traffic-related mitigation measures, the Navy is committed to working cooperatively with the City of Coronado in efforts to reduce traffic congestion. Ongoing Navy strategies designed to reduce the level of traffic generated by NASNI include a ferry system, carpool/vanpool programs, installation of bicycle racks on buses and throughout the air station, a guaranteed ride home program (for rideshare users with a mid-day emergency), and an educational program to promote these strategies. The Navy has completed a study of the Main Gate so that the entrance would be aligned with 3rd Street at Alameda Boulevard and the exit aligned with 4th Street. This project has been submitted to be included in the military construction program. Furthermore, on those rare occasions when all three "homeported" carriers might be in port simultaneously, one carrier would start its work day either earlier or later than the others to lessen the impact on peak hour traffic. Commander Naval Air Force U.S. Pacific Fleet will direct this procedure.

3.9.2 Vessel Transportation

3.9.2.1 Affected Environment

Access to the major piers and berthing areas in San Diego Bay is via the main channel, which is clearly buoyed and charted. While there is relatively little major commercial shipping traffic (when compared to the Port of Long Beach or Los Angeles), there is a large amount of recreational boating traffic. There is no formal control of the channel by the Port of San Diego; however, there is a harbor common radio channel that is voluntarily used by large ships and the Navy. The Navy has a traffic monitor stationed atop the Commander, Naval Base San Diego building near the Navy pier at the Broadway complex. This monitor is used by all Navy ships while in the harbor, providing locational data and proposed vessel navigational routes. Navy ships are berthed at NAVSTA San Diego, Naval Amphibious Base Coronado, Naval Submarine Base San Diego, and NASNI. Occasionally, Navy ships berth at the Navy pier near the Broadway complex.

Key elements of the water navigation system include the open bay, marine terminal, ship navigation corridor, main ship channel, Navy shipberthing/anchorage, restricted areas, boat navigation corridor, recreational craft berthing, commercial fishing berthing, and small craft anchorage/mooring. A ship navigation corridor extends from the mouth of the bay to the National City limit. The navigation corridor provides access to marine terminals, marine-related industrial areas, and military bases. The purpose of the ship navigation channel is to provide adequate draft for ship maneuverability, safe transit, and access to marine terminals, marine related industrial areas, and military bases. Pursuant to the Port Master Plan (SDUPD, amended in 1993), ship corridors are maintained at adequate depths and widths to eliminate hazardous conflicts in the harbor among ships, small craft, and structures. Further, aquatic activities incompatible with vessel traffic in marked ship and boat channels and restricted areas are prohibited.

Marine vessel circulation in the bay is regulated by the U.S. Coast Guard navigational standards and other general navigational standards, which are enforced by the San Diego Harbor Police. Compliance with the International Rules of the Road for lighting and day markers is also required. These are general standards, however, and do not comprise a formal marine traffic system for large vessels.

Navigation in San Diego Bay is shown in Figure 3.9-2, Volume 3, section 3.9. The main ship channel, which is maintained by the U.S. Army Corps of Engineers, will provide a depth of 47 feet MLLW and a width that ranges from 600 to 2,000 feet from the bay's entrance to berthing areas on North Island; a 47-foot MLLW depth and varying widths from 600 to 1,900 feet to the Tenth Avenue Marine Terminal; and a 37-foot MLLW depth and a width varying from 600 to 1,350 feet down the bay to the National City Marine Terminal (SDUPD 1992). Naval vessels, including cruisers and amphibious assault ships, can sail as far south as NAVSTA San Diego. The San Diego-Coronado Bay Bridge has three major spans over the bay that affect navigation. Two of the spans are over the navigation channel and have vertical clearances of 195 feet at mean high water (MHW) and clear widths of 600 feet. The last span is located at the pierhead line and provides vertical clearance of 175 feet at MHW and a clear width of 500 feet (SDUPD 1992). Ship anchorage areas are also shown in Figure 3.9-2, Volume 3, section 3.9.

Boat navigation corridors range from 6 to 21 feet in depth and provide access to the more remote areas of the bay. Boat navigation corridors are those water areas delineated by navigational channel markers or by conventional waterborne traffic movements. Boat corridors are designated by their predominant traffic and general physical characteristics. These channels are generally too shallow and too narrow to accommodate larger ships.

The remaining areas of the open bay are quite shallow, ranging in depth from 2 to 17 feet. These areas comprise a large portion of the bay. Shallow draft sailboats and power boats use these areas for recreation and travel.

Uncontrolled boat anchorage is allowed in the open areas of the bay except where otherwise prohibited by other uses. Ship anchorage areas for ocean-going ships are located primarily in the area north of the "B" Street Pier but include all of the navigable waters of the harbor except designated channels, cable and pipeline areas, special anchorages, and Naval Restricted Areas. Vessels anchoring in portions of the harbor, other than the areas discussed above, leave a free passage for other craft and are prohibited from unreasonably obstructing vessel approaches to the wharves in the harbor.

CVNs generally handle the same as the CVs that have been homeported at NASNI for years (DON 1997a). CVNs homeported at NASNI would travel to and from the berthing piers by way of the San Diego channel, similar to the two existing CVs. They would use the Navy and harbor common radio channels for navigational assistance and would be under the control of a harbor pilot throughout journey. Because of their size, CVs are assisted to and away from their berths by tugs. Once the ship is underway, the tugs continue to accompany the ship during its channel transit for safety reasons.

The major ships using the channel, other than occasional merchantmen (20-25 per month), are the amphibious assault ships (LHDs, LPDs, and LHAs) that are homeported at NAVSTA San Diego (these ships are assisted by tugs between their berths and the San Diego-Coronado Bay Bridge and have steerage under pilot when they reach the CVN berthing areas) and cruise ships that call in San Diego once or twice weekly.

The CVN berthing areas are near the main channel and access between the two has recently been dredged specifically to provide adequate clearance. The turning basins have also recently been dredged. Several sea plane ramps extend up to 250 feet from the NASNI landform in the vicinity Pier J/K.

3.9.2.2 *Environmental Consequences and Mitigation Measures*

The impacts on vessel transportation associated with the capacity to homeport three aircraft carriers at NASNI derive from vessels used in the construction of facilities and infrastructure (e.g., barges etc.) and from the physical presence of homeported carriers in port at NASNI at any one time. As explained in section 3.0, where the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in vessel activity and marine construction at NASNI including the movement of construction materials and debris to and from the marine construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in vessel transits in and out of San Diego Bay between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

The project's impacts to the vessel transportation system would be considered significant if :

- Substantial reduction in current safety levels occurred during either proposed action construction or operation related to:
  - vessel maneuvering room;
  - vessel congestion;
  - vessel anchorages;
  - recreational boating access; or
  - commercial fishing activity.

3.9.2.2.1 Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)

Alternative Five would not require any new improvements.

DREDGING/MITIGATION SITE

No dredging or mitigation would be required. No impacts on vessel transportation would result.

FACILITY IMPROVEMENTS

No construction would be required. No impacts on vessel transportation would result.

OPERATIONS

The impact is less than significant. Ship traffic in the channel is relatively light and since one remaining CV will be decommissioned, a net decrease in vessel traffic would occur. Only beneficial impacts on vessel transportation would result.

3.9.2.2.2 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of construction of a CVN berthing wharf, relocated ferry/flag landing, and dredging.

DREDGING/MITIGATION SITE

The dredging, disposal, and mitigation site construction would not impact ship movements. The impact would be less than significant.

FACILITY IMPROVEMENTS

The short-term construction activity on land would not impact ship movements. Relocation of the ferry/flag landing would be in relatively shallow water (approximately 15 feet deep) adjacent to NASNI and outside of the bay ship navigation corridor and existing Naval Restricted Area. Although it would extend 300 feet from the NASNI landform, impacts to recreational boating would be extremely localized and would not preclude access to the bay mouth. The impact on vessels would be less than significant.

OPERATIONS

The newly dredged channel and turning basins provide ample room for berthing and maneuvering in and around the carrier piers at NASNI. Ship traffic in the channel is relatively light. Providing the capacity to homeport one additional CVN would be offset by the decommissioning of one CV, resulting in no net future change in vessel traffic in the harbor. No impacts on vessel traffic would occur. The relocated ferry/flag landing would conceptually be relocated from within 150 west of Pier J/K to within the footprint of an existing small boat pier facility directly south of Berth K. The structure would incorporate all warning lighting required by the ACOE and U.S. Coast Guard. No impacts would result.

3.9.2.2.3 *Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)*

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

DREDGING/MITIGATION SITE

No additional dredging or mitigation site development would be required to provide the capacity to homeport a second additional CVN, beyond that previously addressed to provide the capacity to homeport one additional CVN. Therefore, no impacts on vessel traffic would occur.

FACILITY IMPROVEMENTS

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Minor additional utility and fencing upgrades would be minimal when compared to facilities and infrastructure previously created to provide historical carrier homeporting capacity. The minor construction required to provide the capacity to homeport a second additional CVN would not impact ship movements beyond that previously addressed to provide the capacity to homeport one additional CVN, so no additional impacts on vessel traffic would occur.

OPERATIONS

The newly dredged channel and turning basin provide ample room for berthing and maneuvering in and around the carrier piers at NASNI. Ship traffic in the channel is relatively light. The first additional CVN would replace the capacity associated with the decommissioned CV, so no net future increase in traffic would be added to the harbor. With creating the capacity to homeport a second additional CVN, it is predicted that three CVNs would be in port simultaneously only 16 days per year. During those days, the channel and turning basin would provide adequate room for the maneuvering of the second additional CVN. The impact would be less than significant. No impact would result from relocation of the ferry/flag landing, as discussed in section 3.9.2.2.2, above.

3.9.2.2.4 No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new improvements.

DREDGING/MITIGATION SITE

No dredging or mitigation would occur so no impacts on vessel traffic would result.

FACILITY IMPROVEMENTS

No facility improvements would occur so no impacts on vessel traffic would result.

OPERATIONS

The newly dredged channel and turning basin provide ample room for maneuvering in and around the carrier piers at NASNI. Berthing an additional CVN without a new pier would be difficult because it would need to be berthed at Berths L/M, the existing and still required transient CVN berth. Ship traffic in the channel is relatively light and because this CVN would replace a decommissioned CV, there would be no net increase in aircraft carrier traffic on the Bay. The impact would be less than significant.

3.9.2.2.5 Mitigation Measures

None of the dredging, facilities, and infrastructure required to support additional CVNs at NASNI would result in significant impacts on vessel transportation; therefore, no mitigation measures are proposed.

3.10 AIR QUALITY

Air quality in the NASNI home port area and surrounding region would be affected by emissions from construction and operation of the proposed actions. This section describes the existing air quality resource, predicted impacts of the proposed actions, and mitigations that would lessen significant project impacts.

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing it to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards are established by the EPA and termed the National Ambient Air Quality Standards (NAAQS). The NAAQS are defined as the maximum acceptable ground-level 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. The national and state ambient air quality standards are shown in Volume 3, section 3.10, Table 3.10-1.

The main pollutants of concern considered in this air quality analysis include volatile organic compounds (VOCs), ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO_x), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter less than 10 microns in diameter (PM_{10}). Although there are no ambient standards for VOCs or NO_x, they are important as precursors to O_3 formation.

3.10.1 Affected Environment

Region of Influence

The area affected by project emission sources would mainly include the San Diego Bay region. Specifically identifying the region of influence (ROI) for air quality requires knowledge of the pollutant type, source emission rates, the proximity of project emission sources to other emission sources, and local and regional meteorology. For inert pollutants (other than O_3 and its precursors), the ROI is generally limited to a few miles downwind from a source. The ROI for O_3 may extend much farther downwind than for inert pollutants. Ozone is formed in the atmosphere by photochemical reactions of previously emitted pollutants called precursors. Ozone precursors are mainly NO_x and photochemically reactive hydrocarbons (VOCs). In the presence of solar radiation, the maximum effect of precursor emissions on ozone levels usually occurs several hours after they are emitted and therefore many miles from the source. Ozone and its precursors transported from other regions can also combine with local emissions to produce high local O_3 concentrations. Therefore, depending on the wind conditions, the ROI for O_3 could include much of the San Diego Air Basin (SDAB), which includes all of San Diego County.

Baseline Air Quality and Emissions

Air Quality

The EPA designates all areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. The criteria for nonattainment designation varies by pollutant: (1) an area is in nonattainment for O_3 if its NAAQS has been exceeded more than three discontinuous times in 3 years, and (2) an area is in nonattainment for any other pollutant if its NAAQS has been exceeded more than once per year. Pollutants in an area are often designated as unclassified when there is a lack of data for the EPA to form a basis of attainment status. Presently, the SDAB is in attainment of the NAAQS for all pollutants except O_3. The western portion of the county (the portion of the County generally west of the interior desert region) was historically in nonattainment of the NAAQS for CO. The main sources of CO emissions were on-road vehicles. Due to a reduction in emissions caused by national emission standards for new vehicles and a state vehicle emissions testing program, the region has attained the CO standards since 1991. As a result, the EPA in June 1998 redesignated the region to attainment of the CO NAAQS. Consequently, the region is now considered a maintenance area for CO. The EPA considers the SDAB to be a serious O_3 nonattainment area.

The SDAB recorded nine exceedances of the national O_3 standard in 1998, although the transport of O_3 precursor emissions from the Los Angeles metropolitan area contributed to seven of the exceedance days. Due to its serious nonattainment rating, the SDAB must attain the O_3 standard by November 1999, although the Clean Air Act Amendments of 1990(1990 CAA) allows for two one-year extensions beyond the final compliance date (through 2001). If the SDAB fails to attain the O_3 standard, the San Diego County Air Pollution Control District (SDCAPCD) will have to develop a new O_3 State Implementation Plan (SIP), outlining how additional emission control measures would bring the region into attainment. In regard to CO, monitoring data have shown that the region has attained the national CO standards since 1990. The SDCAPCD has therefore requested the EPA to redesignate the region to attainment for these standards (SDCAPCD 1996).

The ARB designates areas of the state that are in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if its CAAQS has been exceeded more than once in three years. Presently, the SDAB is in attainment of the CAAQS for all air pollutants except O_3 and PM_{10}. The county is considered a severe ozone nonattainment area by the ARB. The severe designation is given to an area if the fourth highest pollutant concentration recorded in a 3-year period ranges between 0.16 and 0.20 ppm.

Ozone concentrations are generally the highest during the summer months and coincide with the period of maximum insolation. Maximum O_3 concentrations tend to be regionally distributed, since precursor emissions become homogeneously dispersed in the atmosphere. Inert pollutants, such as CO, tend to have the highest concentrations during the colder months of the year, when light winds and nighttime/early morning surface-based temperature inversions inhibit atmospheric dispersion. Maximum inert pollutant concentrations are usually found near an emission source.

NASNI Emissions

The 1998 emissions for existing conditions at NASNI include the presence of two homeported carriers averaged over the annual period: one conventionally powered carrier (CV) for the entire year, one CV for six months of the year, and one nuclear-powered carrier (CVN) for six months of the year. Sources of emissions associated with the operation of each vessel type include various vessel engines and equipment, maintenance activities, and vehicular traffic. Vessel sources include power plant boilers, emergency diesel generators (EDGs), aircraft support equipment, and forklift equipment. The CVs are operated by fuel oil-fired boilers and are equipped with multiple EDGs that are sources of combustive emissions. The CVN does not have emissions associated with boilers, since it is nuclear-powered, but it is equipped with multiple EDGs. Emissions for the CVs and CVN are based on estimates provided by the DON (1995a).

Volume 3, section 3.10, Table 3.10-2 presents a summary of the 1998 existing criteria pollutant emissions associated with homeported carriers at NASNI. Volume 3, section 3.10, Table 3.10-3 summarizes hazardous air pollutants (HAPs) emissions that occurred from NASNI as a whole in 1997. The main sources of HAPs at NASNI include painting operations, degreasers, and gasoline storage and transfer operations. Since 1993, emissions of HAPs have decreased from NASNI, especially in regard to the reduction of hexavalent chromium from painting operations. As a result, the public health risk from NASNI has decreased since 1993.

Radiological Air Emissions

Naval nuclear reactors and their support facilities are designed to ensure there are no significant discharges of radioactivity in airborne exhausts. Radiological controls are exercised in support facilities to preclude exposure of working personnel to airborne radioactivity exceeding one-tenth of the limits specified in 10 CFR 20. These controls include containment for radioactive materials and provide a barrier to prevent significant radioactivity from becoming airborne. Further, all air exhausted from these facilities is passed through High Efficiency Particulate Air (HEPA) filters and monitored during discharge. Comparison of sensitive airborne radioactivity measurements in shipyards demonstrates that air exhausted from facilities actually contained a smaller amount of particulate radioactivity than air drawn in from the environment into the facilities. There were no discharges of airborne radioactivity above concentrations normally present in the atmosphere from these facilities (NNPP 1997).

Regional Climate

The climate of San Diego County is classified as Mediterranean, characterized by dry summers and wet winters. The major influences on the regional climate are the Eastern Pacific high pressure system, topography, and the moderating effects of the Pacific Ocean. Seasonal variations in the position and strength of the high pressure system are a key factor in area weather changes. Additional information on regional climate is provided in Volume 3, section 3.10.

Precipitation

Precipitation within most of the project area occurs as rainfall. However, snowfalls do occur in the higher elevations of the Laguna and Cuyamaca Mountains to the east. Over 90 percent of the total annual precipitation in the project area occurs from November through April. Annual precipitation increases from about 10 inches per year along the coast to as much as 40 inches in the highest mountain ranges.

Although most of the regional precipitation in the project area is produced by winter storm systems from the north Pacific, summer rainfall can occur. This precipitation occurs from the influx of tropical moisture from Mexico into the region. Thunderstorms and rainshowers from these tropical air masses are infrequent and usually occur in the interior mountain and desert regions.

Temperature

Due to the moderating effect of the Pacific Ocean and lower elevation, temperatures are less extreme along the coastal sections of the project area compared to more inland locations. Maximum temperatures during the summer months average in the 70s (degrees Fahrenheit) along the coast to the low 90s in the interior foothills. Minimum summer temperatures average in the low 60s over most of the project area. Maximum temperatures during winter months average in the 60s. Minimum winter temperatures are usually in the upper 40s along the coast to the low 30s in the inland foothills.

Prevailing Winds

Concurrent with the presence of the Eastern Pacific High west of California, a thermal low pressure system persists in the interior desert region due to intense insolation. The resulting pressure gradient between these two systems produces a westerly, onshore airflow in San Diego County for most of the year. Sea breezes usually occur during the daytime and disperse air pollutants towards the interior regions. During the evening hours and colder months of the year, sea breezes are often replaced by land breezes that blow in the opposite direction toward the offshore areas. These weak offshore flows may continue until daytime heating reverses the flow back onshore.

During the colder months, the Eastern Pacific High often combines with high pressure over the continent to produce extended periods of light winds and low-level inversion conditions in the region. These atmospheric conditions can produce adverse air quality. Excessive build-up of high pressure over the continent can produce a "Santa Ana" condition, characterized by warm, dry, northeast winds. Santa Ana winds help to ventilate the air basin of locally generated emissions. However, Santa Ana conditions can also transport air pollutants from the Los Angeles metropolitan area into the region. When stagnant atmospheric conditions occur during a Santa Ana, local emissions, combined with pollutants transported from the Los Angeles metropolitan area, can lead to significant O_3 impacts in the project area.

Applicable Regulations and Standards

Air quality regulations were first promulgated by the EPA with the implementation of the federal Clean Air Act (CAA) in 1969. This act established the NAAQS and delegated the regulation of air pollution control to the states. The *CAA Amendments of 1977* established air quality planning processes and required areas in nonattainment of a NAAQS to develop a SIP that demonstrates attainment of the NAAQS. A summary of the federal, state, and local air quality rules and regulations that apply to the NASNI project region is provided in Volume 2, Appendix A.

Federal Regulations

The *CAA Amendments of 1990* (1990 CAA) established new federal nonattainment classifications, new emission control requirements, and new compliance dates for nonattainment areas. The nonattainment classifications are based on a design day value, which is the fourth highest pollutant concentration recorded in the nonattainment area during a 3-year period. The requirements and compliance dates are based on the severity of the nonattainment classification.

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, interim emission reduction, or other milestone. Based on the present attainment status of the SDAB, the proposed action would conform to the most recent EPA-approved SIP if its annual construction or operational emissions would not exceed 100 tons of CO or 50 tons of NO_x or VOCs. The project conformity applicability analysis is provided in Volume 2, Appendix K.

The impact on visibility from air pollutant emission sources is an issue relating to federally mandated Class I areas, such as national parks and wilderness areas, where any deterioration in air quality is considered significant. Visibility impairment is defined as (1) a reduction in regional visual range and (2) atmospheric discoloration or plume blight. Criteria to determine significant impacts on visibility within Class I areas usually pertain to stationary emission sources, as mobile sources are generally exempt from permit review by regulatory agencies. However, Section 169A of the CAA, as amended in 1977, states that it is a national goal to prevent any further impairment of visibility within Class I areas from manmade sources of air pollution. The nearest Class I area to NASNI is the Agua Tibia Wilderness Area, about 43 miles to the northwest. The potential for visibility impacts to occur from project alternatives is addressed in section 3.10.2.

Local Regulations

San Diego County Air Pollution Control District (SDCAPCD) Rules and Regulations (1999). The SDCAPCD is responsible for achieving and maintaining the state and national ambient air quality standards within the San Diego Air Basin (SDAB) (San Diego County). This responsibility is performed by the regulation of stationary sources of air pollution. The *SDCAPCD Rules and Regulations* establish emission limitations and control requirements for stationary sources, based upon their source type and magnitude of emissions. Pursuant to Rule 10, persons that propose to operate a new or modified major emission source must first obtain an Authority to Construct (ATC) from the SDCAPCD prior to construction. Final approval to operate is provided in the form of a Permit to Operate (PTO). SDCAPCD Rule 20, Standards for Granting Permits, and other New Source Review Rules (20.1 through 20.8), outline thresholds that trigger (1) the application of best available control technologies (BACT), (2) dispersion modeling analyses, and (3) emission offsets, as part of the ATC/PTO process. SDCAPCD Rule 1200, Toxic Air Contaminants - New Source Review, also states that any stationary source that requires an ATC/PTO and emits toxic air contaminants (TACs) must evaluate the potential health risks from these TACs as part of the permit process. (Note: HAPs are considered equivalent to TACs in this document.) Preliminary emission estimates show that the operation of the project dredging equipment would require an ATC/PTO.

Mitigation Site

The description of the existing air quality resource for the project site is also representative of the mitigation site, as the mitigation area is adjacent to NASNI.

3.10.2 Environmental Consequences and Mitigation Measures

The impacts on air quality associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, where the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

Criteria to determine the significance of air quality impacts are based on federal, state, and local air pollution standards and regulations. The SDCAPCD has not established criteria for assessing the significance of air quality impacts for NEPA purposes. However, SDCAPCD Rules and Regulations define a stationary source as "major" if annual emissions exceed 100 tons of CO, sulfur oxides (SOx), or PM10 or 50 tons of VOCs or NOx. For purposes of this air quality analysis, project emissions would be potentially significant if they exceed these thresholds. This is a conservative approach, as both project-related stationary and mobile emission sources would be compared to these thresholds. Impacts would also be potentially significant if (1) project emissions exceed the thresholds that trigger a conformity determination under Section 176(c) of the 1990 CAA (100 tons per year for CO or 50 tons per year of NOx or VOC), (2) project emissions of HAPs/TACs increase the risk of cancer by greater than one chance per million or exceed the chronic or acute hazard index of 1.0, as identified in SDCAPCD Rule 1200, or (3) project emissions impair visibility in the Agua Tibia Wilderness Class I area, about 43 miles north of the project area. Volume 2, Appendix K of this FEIS presents a conformity applicability analysis for actions at NASNI.

If emissions exceed a potential significance threshold described above, further analysis of the emissions and their consequences would be performed to assess whether there was likelihood of a significant impact to air. The nature and extent of such analysis would depend on the specific circumstances. The analysis could range from simply a more detailed and precise examination of the likely emitting activities and equipment, to dispersion modeling and health risk analysis procedures. If project emissions were determined to increase ambient pollutant levels from below to above a national or state ambient air quality standard or the SDCAPCD Rule 1200 thresholds, these emissions would be significant.

3.10.2.1 Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)

Alternative Five would not require any new projects.

Dredging/Mitigation Site

Since the homeporting facilities and infrastructure needed for no additional CVN would not require dredging, no air quality impacts would occur from this activity.

Facility Improvements

Since the homeporting facilities and infrastructure needed for no additional CVN would not require facility improvements, no air quality impacts would occur from this activity.

Operations

Since the homeporting facilities and infrastructure needed for no additional CVN would not produce new operational emissions, air quality impacts from this action would be insignificant. As part of the action, decommissioning of one CV would decrease criteria pollutant emissions within the NASNI project area by the amounts shown in Table 3.10-1. Consequently, the action would not exceed the emission thresholds that require a conformity determination under the 1990 CAA.

3.10.2.2 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of construction of a CVN berthing wharf and dredging. Section 3.10, Volume 3 presents data used to calculate emissions for the proposed construction activities at NASNI.

Dredging, Sediment Disposal, and Mitigation Sites

Air quality impacts from dredging the turning basin/quaywall area, the mitigation site, and associated disposal activities associated with providing the capacity to homeport one additional CVN would occur from combustive emissions due to the operation of diesel-powered tugboats, barge equipment, dredges, earth-moving equipment, and dump trucks. Equipment usage associated with these activities were based on recent dredge and disposal activities that occurred in conjunction with homeporting a BRAC CVN at NASNI (Radian International LLC 1998) and communications with West Coast dredge contractors. Section 2.3.3.1 of this FEIS describes the proposed dredge and disposal options. The following three scenarios were analyzed to determine air quality impacts:

(1) the preferred option is to dig the dike footing with a clamshell dredge (220,000 cubic yards [cy]) and dispose of this sediment by barge to the NAB Enhancement Site, then deepen the turning basin with a hydraulic dredge (314,000 cy) and pump the sediment to NAB;

(2) the same scenario as above, but sidecast the material dug by the clamshell dredge, then hydraulically dredge and pump the total volume of dredged material to NAB at a later date; and

Table 3.10-1. Annual Operational Criteria Pollutant Emissions Associated with the Homeporting Project Alternatives at NASNI

Alternative/Vessel Group/Source Type	AIR POLLUTANT EMISSIONS (TONS/YEAR)				
	VOC	*CO*	*NOx*	*SOx*	*PM10*
ALTERNATIVES 1, 2, or 3 – Year 2005					
Addition of 2 CVNs					
Vessels and Auxiliary Equipment	0.42	1.87	8.64	0.57	0.61
Onshore Infrastructure	9.54	0.01	0.05	0.00	0.01
Routine Maintenance	2.76	0.00	0.00	0.00	0.00
PIA Maintenance	15.00	0.00	0.00	0.00	3.00
On-road Vehicles	28.20	308.11	54.52	0.00	0.79
Total for 2 CVNs	**55.92**	**310.00**	**63.21**	**0.57**	**4.41**
Decommissioning of 1 CV					
Vessels and Auxiliary Equipment	(2.56)	(11.87)	(64.53)	(67.24)	(12.56)
Onshore Infrastructure	(6.46)	(0.01)	(0.02)	(0.00)	(0.00)
Routine Maintenance	(2.64)	(0.00)	(0.00)	(0.00)	(0.00)
On-road Vehicles	(17.54)	(191.75)	(33.93)	(0.00)	(0.49)
Total for 1 CV	**(29.20)**	**(203.63)**	**(98.49)**	**(67.24)**	**(13.05)**
Total Emissions – Alternatives 1, 2, or 3	**26.71**	**106.37**	**(35.28)**	**(66.67)**	**(8.64)**
ALTERNATIVES 4 or 6 – Year 2003					
Addition of 1 CVN					
Vessels and Auxiliary Equipment	0.40	1.80	8.28	0.55	0.59
Onshore Infrastructure	6.61	0.01	0.02	0.00	0.00
Routine Maintenance	2.64	0.00	0.00	0.00	0.00
PIA Maintenance	15.00	0.00	0.00	0.00	3.00
On-road Vehicles	19.30	211.45	38.18	0.00	0.51
Total for 1 CVN	**43.96**	**213.25**	**46.49**	**0.55**	**4.10**
Decommissioning of 1 CV					
Vessels and Auxiliary Equipment	(2.56)	(11.87)	(64.53)	(67.24)	(12.56)
Onshore Infrastructure	(6.46)	(0.01)	(0.02)	(0.00)	(0.00)
Routine Maintenance	(2.64)	(0.00)	(0.00)	(0.00)	(0.00)
On-road Vehicles	(18.69)	(204.71)	(36.96)	(0.00)	(0.49)
Total for 1 CV	**(30.34)**	**(216.58)**	**(101.52)**	**(67.24)**	**(13.05)**
Total Emissions – Alternatives 4 or 6	**13.62**	**(3.33)**	**(55.03)**	**(66.69)**	**(8.95)**
ALTERNATIVE 5 – Year 2003					
Decommissioning of 1 CV					
Vessels and Auxiliary Equipment	(2.56)	(11.87)	(64.53)	(67.24)	(12.56)
Onshore Infrastructure	(6.46)	(0.01)	(0.02)	(0.00)	(0.00)
Routine Maintenance	(2.64)	(0.00)	(0.00)	(0.00)	(0.00)
On-road Vehicles	(18.69)	(204.71)	(36.96)	(0.00)	(0.49)
Total for 1 CV	**(30.34)**	**(216.58)**	**(101.52)**	**(67.24)**	**(13.05)**
Total Emissions – Alternative 5	**(30.34)**	**(216.58)**	**(101.52)**	**(67.24)**	**(13.05)**

Note: () Represents a decrease in emissions.

(3) perform all dredging with a clamshell dredge, then dispose of the sediment by barge to the LA-5 offshore site.

Since electrification of a hydraulic dredge and booster pump is feasible at NASNI and electric power would be offered to prospective dredge contractors, the use of this type of equipment was also evaluated for each of the three scenarios. As part of each scenario, 48,000 cy of sediment from the Pier B mitigation site would be removed by earth-moving equipment, with 29,000 cy being trucked to Piers J/K for disposal into the dike fill area. The remaining 19,000 cy would be stockpiled or trucked to the plover enhancement site on NASNI. Dredging and disposal scenarios one and two would require about three months to complete, while scenario three would be completed in about five months. Development of the mitigation site would be completed in about 2 months. All activities would occur within the same calendar year.

Criteria Pollutant Emissions. Tables 3.10-4 through 3.10-6 in Volume 3 summarize the dredge and disposal criteria pollutant emissions associated with the addition of one CVN at NASNI. These data show that the preferred dredge and disposal activities would produce a total of 1.2 tons of VOC, 9.8 tons of CO, 32.5 tons of NO_x, and 1.2 tons of PM_{10}. Dredge and disposal scenario two would produce a total of 1.3 tons of VOC, 12.4 tons of CO, 38.1 tons of NO_x, and 1.5 tons of PM_{10}. Since the diesel-powered dredge equipment and booster pump would be subject to the SDCAPCD permitting process, the analysis assumed that NOx emissions from these equipment were reduced by 20 percent, due to the implementation of the following BACT: (1) injection timing retard and (2) engine turbocharging and aftercooling. These types of measures were required for dredge equipment that recently completed the dredging action for the BRAC CVN project at NASNI. Since emissions would not exceed the significance thresholds (100 tons per year for CO or PM_{10} and 50 tons per year for NO_x or VOC), air quality impacts from dredge and disposal scenarios one and two would be insignificant. Tables 3.10-13 and 3.10-18, Volume 3 show that use of an electric-powered hydraulic dredge and booster pump would substantially reduce emissions from either of these scenarios.

Table 3.10-6 in Volume 3 shows that emissions from the dredge and disposal scenario three would produce a total of 1.9 tons of VOC, 13.8 tons of CO, 51.4 tons of NO_x, and 1.8 tons of PM_{10}. The higher emissions associated with this scenario, versus scenarios one and two, would be due to the slower dredging rate of the clamshell and transport and disposal of sediments to the LA-5 offshore site. Since NO_x emissions would exceed the 50 tons per year emission significance threshold, air quality impacts from dredge and disposal scenario three would be significant. Since there is no known electric clamshell dredge on the West Coast, use of electricity to reduce emissions from this equipment would be infeasible.

HAP/TAC Emissions. An analysis of the health risks from sources that would require permits from the SDCAPCD (clamshell dredge, hydraulic dredge, and booster pump) was performed for the preferred dredge and disposal option (scenario one) to determine compliance with SDAPCD Rule 1200. The analysis was performed with the EPA-approved ISC3 dispersion model (EPA 1995) and the ACE2588 risk analysis model (California Air Pollution Control Officers Association [CAPCOA] and Santa Barbara County APCD 1992 and 1993), using methodology approved by CAPCOA (CAPCOA 1993). The analysis included the generation of a 70-year maximum cancer risk and maximum acute and chronic health hazard indices. Complete details of the HAP/TAC risk analysis, including development of emission rates, location of receptors, identification of health hazards, modeling methodology, and printouts of output are included in Volume 3, Section 3.10.

The results of the HAP/TAC risk analysis indicated that the cancer risk associated with 70 years of continuous exposure at the maximum impact point would be 3.58 x 10^{-6}. This equates to a maximum chance of 3.6 in a million of contracting cancer due to a continuous exposure to the permitted source emissions for 70 years. However, the preferred dredge and disposal operations would only last for about 3 months, not 70 years. Therefore, assuming as a worst case that these activities occurred for a period of one year, a more realistic estimate of risk would be 5.11 x 10^{-8} (or 0.05 chances in a million). This value is well below the significance threshold of one chance per million. The maximum risk from dredge and disposal option 2 would be essentially equivalent to the risk estimated for the preferred option. The risk from option 3 would be somewhat greater then either options 1 or 2, as exclusive use of the more inefficient clamshell dredge would require more time (5 months versus 3 months) and fuel usage and generate more emissions compared to either options 1 or 2. However, the risk of option 3 would still be less than the significance threshold and the impact would be considered less than significant.

The maximum acute and chronic hazard indices associated with the preferred dredge and disposal option were estimated to be 0.022 and 0.0014, respectively. These values are much less than the significance threshold of 1.0. As a result, the acute or chronic health impacts associated with the preferred dredge and disposal option would be insignificant. The hazard indices for option 2 would be similar to option 1, while the indices for option 3 would be slightly greater but still far less than the threshold of 1.0.

NASNI is presently regulated under the state Air Toxics Hot Spots program, or Assembly Bill (AB) 2588. The requirements of this program include generation of a TACs emissions inventory and an analysis of the public health risk associated with these emissions every four years. The AB 2588 analysis performed for TACs emitted from NASNI in 1993 determined that the facility as a whole would increase the risk of cancer to the public by a maximum of 30 cases per million (U.S. Naval Aviation Depot, North Island 1997). Since emissions of TACs have decreased from NASNI since 1993, the health risk from NASNI to the public has decreased to below these levels (Table 3.10-3, Section 3.10, Volume 3 shows the 1997 TACs emission inventory for NASNI). Consequently, adding the TACs emissions of the proposed dredging and disposal activities to existing TACs emissions at NASNI would produce a facility-wide cancer risk that would still be less than the 30 cases per million identified for the facility in 1993. The impact of TACs to the public from the proposed dredging and disposal activities would therefore be insignificant.

Facility Improvements

Air quality impacts from construction of a dike and associated berth and structures associated with providing the capacity to homeport one additional CVN would mainly occur from combustive emissions due to the operation of equipment such as diesel-powered tugboats, mobile equipment, and dump trucks. Minor amounts of fugitive dust emissions (PM_{10}) would also occur during ground-disturbing activities associated with the construction of structures. The annual emissions that would occur from construction were based on the same activities that were recently performed to homeport a BRAC CVN at NASNI (DON 1995a and personal communication, John Rogers of SWDiv 1999). The proposed facility improvements would require about 11 months to complete.

Tables 3.10-4 through 3.10-6 in Volume 3 summarize the emissions associated with the proposed construction activities at NASNI. These data show that berth construction would generate higher emissions than dike construction and would produce 2.5 tons of VOC, 16.2 tons of CO, 23.9 tons of

NO_x, and 1.5 tons of PM_{10}. Dike and berth construction activities would generate the same amount of emissions for each of the three dredge and disposal scenarios.

Peak annual construction emissions associated with the preferred dredge and disposal option and facility improvements would amount to 2.5 tons of VOC, 18.9 tons of CO, 40.8 tons of NO_x, and 1.8 tons of PM_{10}. The peak annual construction emissions associated with the dredge and disposal scenario two and facility improvements would produce a total of 2.5 tons of VOC, 21.4 tons of CO, 46.3 tons of NO_x, and 2.1 tons of PM_{10}. Since emissions would not exceed the annual thresholds, air quality impacts from each combined construction scenario would be insignificant. The data in Tables 3.10-13 and 3.10-18, Volume 3 show that use of an electric-powered hydraulic dredge and booster pump would substantially reduce emissions from either of these construction scenarios.

Table 3.10-6, Volume 3 shows that peak annual construction emissions associated with the dredge and disposal scenario three and facility improvements would produce a total of 2.9 tons of VOC, 22.9 tons of CO, 59.6 tons of NO_x, and 2.4 tons of PM_{10}. Since NO_x emissions would exceed the 50 tons per year emission significance threshold, air quality impacts from dredge and disposal scenario three would be significant.

Since the diesel-powered dredge equipment would be subject to the SDCAPCD permitting process, emissions from these equipment would be excluded from a project conformity applicability analysis. As a result, construction activities associated with any of the three dredge and disposal scenarios would not exceed the emissions thresholds that trigger a conformity determination under the 1990 CAA (100 tons of CO or 50 tons of NO_x or VOCs). As a result, each scenario would conform to the SIP and would be considered insignificant. Volume 2, Appendix K includes the Homeporting Project conformity analysis.

Operations

Operational impacts associated with providing the capacity to homeport one additional CVN were determined by comparing the net change in emissions that would occur from the addition of one CVN and decommissioning of one CV from NASNI. The estimated times when these actions would occur is early 2003. With the exception of CV power plants and CVN propulsion plant maintenance, emission sources associated with the homeporting of a CVN or CV are similar and include: (1) vessel auxiliary equipment, (2) onshore infrastructure, (3) routine shipboard maintenance, and (4) commuter vehicles. Volume 3, section 3.10 presents a summary of calculations used to estimate emission from the operation of all project alternatives at NASNI.

VESSEL EMISSION SOURCES. As stated in section 3.10.1, fuel oil-fired boilers provide the power for CVs and generate emissions of combustive air pollutants. Since the CVN is nuclear-powered, it does not have emissions associated with its power plant and consequently represents a net decrease in emissions from this source type in comparison to a CV. However, both vessels have onboard emergency diesel-powered electric generators, which are periodically tested while at berth. Other sources of auxiliary equipment include aircraft ground support equipment (would be operated occasionally for reliability checks and transit) and forklifts. Emissions of VOCs from oil water separator systems would also be included in this source category. It is assumed in this analysis that both vessel types have the same auxiliary equipment requirements, except that emergency generator capacities and resulting testing emissions associated with a CVN would be greater than for a CV (DON 1995a).

INFRASTRUCTURE SOURCES. Emissions from onshore infrastructure sources associated with the homeporting of each vessel group were estimated from the 1997 NAVSTA Everett emissions inventory (see Table 5.10-1 of Volume 5) and in consultation with DON staff. The 1997 NAVSTA Everett emissions inventory includes activities from the homeporting of one CVN. Emissions from stationary sources that would occur from providing the capacity to homeport one additional CVN, such as commuter vehicle fueling, were obtained by factoring CVN emissions data with the crew population ratio between the two vessel groups. Since off-site utility plants would provide the electrical power to generate the steam demand for each vessel, emissions from this activity are not presented in the NASNI analysis.

ROUTINE MAINTENANCE SOURCES. Shipboard routine maintenance (non-propulsion) activities occur at berth and would include painting, welding, and abrasive blasting. Navy contractors perform these operations under existing SDCAPCD operating permits (DON 1995a). Emissions of PM_{10} and VOCs from routine maintenance activities would be similar for both vessel types.

PROPULSION PLANT MAINTENANCE SOURCES. Propulsion plant maintenance associated with the bi-annual PIA cycle for a CVN includes brazing and welding, paint and abrasive blasting, fiberglass lagging, surface coating, and solvent usage. The original estimate of emissions that would occur from this activity was 25 and 5 tons per year, respectively, for VOC and PM_{10} (DON 1995a). The NASNI DMF would limit annual emissions to 15 and 3 tons per year, respectively, for VOC and PM_{10}. DMF emissions would be reduced to the lowest rate possible, with the use of VOC reduction measures, such as the dilution of the solvents (mainly acetone and isopropyl alcohol) used for hand-wiping operations or the substitution of solvents or paints with lower or no VOC content. As part of the SDCAPCD permit process, an analysis was performed to determine if TAC emissions from the DMF would comply with SDCAPCD Rule 1200. The results of the risk analysis showed that TACs from the DMF would increase the cancer risk to the public to less than one additional case per million, which would comply with Rule 1200.

VEHICULAR SOURCES. Vehicle trips derived for the transportation section 3.9 of this FEIS were used to estimate project vehicle emissions associated with providing the capacity to homeport two additional CVNs. The average daily trips (ADT) associated with a CVN and CV at NASNI would be 4,729 and 4,579, respectively. Therefore, the net difference in ADT between the two vessel groups would be +150 by the year 2003. The average vehicle trip length was assumed to be 13 miles (DON 1995a). A CVN and CV would also generate 11,050 and 10,696 ADT from dependents at off-base housing within the San Diego metropolitan region. The average distance driven by dependents was assumed to be three miles.

It is estimated that the state registration of project-related vehicles would be 70 percent for California and 30 percent for non-California states. Therefore, emissions for California and non-California registered vehicles were estimated with the EMFAC7G (ARB 1997) and the MOBILE5 (EPA 1993) models, respectively. The non-California registered vehicles were simulated with MOBILE5 to operate without any inspection/maintenance (I/M) program to minimize emissions. However, section 118(d) of the 1990 CAA requires federal employee vehicles operated on federal installations to comply with locally applicable I/M standards. As a result, vehicular emissions have been somewhat over-estimated for the proposed actions. Emission factors for the year 2003 were used to estimate vehicle emissions for the homeporting of the first additional CVN at NASNI under Alternatives Four, Five, or Six for either the proposed alternative or future no-project scenarios. Consistent with this approach, emission factors for the year 2005 were used to estimate vehicle emissions for the homeporting of the second additional CVN at NASNI under Alternatives One, Two, or Three.

Table 3.10-1 presents a summary of the annual operational emissions that would occur from providing the capacity to homeport one additional CVN and decommissioning of one CV at NASNI. These data over-estimate emissions for four out of every six years from the action, since PIA maintenance for the additional CVN would only occur two out of six years. During the third bi-annual maintenance cycle, this CVN would relocate to PSNS Bremerton for 10 months for DPIA maintenance. Table 3.10-1 shows that the decommissioning of one CV and addition of one CVN by the year 2003 would reduce annual emissions within the NASNI project region by (1) 3.3 tons of CO, (2) 55.0 tons of NO_x, (2) 66.7 tons of SO_2, and (3) 9.0 tons of PM_{10} and increase annual emissions by (1) 13.6 tons of VOC. These emission reductions would be mainly due to the elimination of the fuel oil-fired CV power plants. During years without PIA maintenance, the action would represent a slight reduction in annual VOC emissions from existing levels.

As shown in Table 3.10-1, emissions from providing the capacity to homeport one additional CVN would not exceed the SDCAPCD major source thresholds. While the decommissioning of one CV and addition of one CVN would increase VOC emissions by 13.6 tons during years when PIAs occur, these emissions would not comprise HAPs that would exceed the Title V thresholds of 10 tons per year of any HAP or 25 tons per year for any combination of HAPs. Additionally, the net increase of 150 daily vehicle trips that would occur by the project year of 2003 would not increase traffic congestion in the vicinity of NASNI to the point that would exceed any ambient air quality. Consequently, based on these criteria, air quality impacts from the alternative would be insignificant.

Project emission sources would not impair visibility within the Agua Tibia Wilderness Class I area, as emissions at NASNI would be adequately dispersed during the 43-mile transport distance to this area. Additionally, since emissions would generally decrease from baseline levels, no significant visibility impacts are expected to occur at this Class I area.

Review of the data in Table 3.10-1 shows that emissions associated with providing the capacity to homeport one additional CVN would be less than the thresholds that trigger a conformity determination under the 1990 CAA (100 tons per year for CO and 50 tons per year for NO_x and VOC). Additionally, emissions would not be regionally significant, since they would not exceed 10 percent of any air pollutant estimated in the SDAB emissions inventory. Therefore, emissions from providing the capacity to homeport one additional CVN would conform to the SIP and would be considered insignificant. Appendix K, Volume 2 presents the General Conformity Rule Record of Non-Applicability for the project alternatives at NASNI.

RADIOLOGICAL AIR EMISSIONS INFORMATION

The applicable National Emission Standards for Radionuclide Emissions from project vessels and facilities are contained in 40 CFR 61, Subpart I. Similar facilities and ships at other Navy bases are exempt from the reporting requirements of 40 CFR 61.104(a), consistent with the criteria outlined in 40 CFR 61.104(b), since their emissions result in exposures to the public that are less than 10 percent of the standards established by the EPA in 40 CFR 61.102 (NNPP 1997). Thus, since radionuclide air emissions are not expected to increase beyond the levels established at other Navy bases, there would be no significant impacts on air quality due to NNPP radioactivity from providing the capacity to homeport one additional CVN at NASNI.

3.10.2.3 Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging, Disposal, and Mitigation Sites

The same amount of dredging to provide the capacity to homeport two additional CVNs as discussed for providing the capacity to homeport one additional CVN in section 3.10.2.2 would be required. Therefore, air quality impacts associated with providing the capacity to homeport two additional CVNs would be insignificant for dredge and disposal scenarios one and two. However, NO_x emissions associated with dredge and disposal scenario three would be significant.

Facility Improvements

The peak annual construction emissions to provide the capacity to homeport two additional CVNs associated with dredge and disposal scenarios one and two would be insignificant. However, the peak annual construction emissions of NO_x from dredge and disposal option three would be significant.

Providing the capacity to homeport a second additional CVN would require minor additional utility and fencing upgrades. Since these activities would occur after completion of the construction activities for provide the capacity to homeport one additional CVN, annual emissions from this activity would be less than the significance thresholds and therefore would be insignificant.

Operations

Operational emissions associated with providing the capacity to homeport a second additional CVN, based on the presence of the vessel at NASNI by 2005, would include activities from the addition of one CVN, the decommissioning of one CV, and the addition of a second CVN in port at the same time as the other two homeported carriers at NASNI for 13 days per year.

Table 3.10-1 presents a summary of the annual operational emissions that would occur from providing the capacity to homeport two additional CVNs and decommission one CV at NASNI. These data over-estimate emissions that would occur for two out of every six years from the action, as PIA maintenance would not occur for either CVN at NASNI during these years. During the third bi-annual maintenance cycle, each CVN would relocate to PSNS Bremerton for 10 months for DPIA maintenance. While it is possible that the staggered maintenance schedules of CVNs homeported at NASNI could occasionally result in more than one PIA in a calendar year (i.e., somewhere between one and two PIAs), annual emissions from the DMF would be limited to 15/3 tons of VOC/PM_{10}. Table 3.10-1 shows that the addition of a second CVN by the year 2005 would reduce annual emissions within the NASNI project region by (1) 35.2 tons of NO_x, (2) 66.7 tons of SO_2, and (3) 8.6 tons of PM_{10} and increase annual emissions by (1) 26.7 tons of VOC and (2) 106.4 tons of CO. These emission reductions would be mainly due to the elimination of the fuel oil-fired CV power plants.

As shown in Table 3.10-1, emissions from the action would exceed the SDCAPCD major source threshold of 100 tons per year for CO. The majority of these emission increases would occur from vehicles that transport crew dependents from off-base housing to the greater San Diego metropolitan region. These emissions would be spread over a large area and would not be expected to contribute to an exceedance of an ambient air quality standard. In the year 2005, with the arrival of a second CVN, the alternative would generate an additional 4,729 additional ADT at NASNI for 13 days per year. However, since the population levels at NASNI would decrease in future years even with the addition of a second CVN (see Volume 3, Table 3-1), future traffic generated by NASNI in the year 2005 would not exceed historical levels. As a result, traffic associated with the alternative would not be expected to exceed any ambient air quality standard within roadways in proximity to NASNI and CO emissions from the action would therefore be insignificant. While the action could increase annual VOC emissions by up to 26.7 tons during years when PIAs occur, these emissions would not comprise HAPs that would exceed the Title V thresholds of 10 tons per year of any HAP or 25 tons per year for any combination of HAPs. Air quality impacts associated with the alternative would therefore be insignificant.

Emission sources associated with providing the capacity to homeport a second additional CVN would not impair visibility within the Agua Tibia Wilderness Class I area, as emissions at NASNI would be adequately dispersed during the 43-mile transport distance to this area. Additionally, since emissions would generally decrease from baseline levels, no significant visibility impacts are expected to occur at this Class I area.

Appendix K, Volume 2 presents the General Conformity Rule Record of Non-Applicability for the project alternatives at NASNI. This analysis shows that since non-federal vehicle trips would be excluded from the conformity analysis, alternatives one, two, and three would not exceed the conformity thresholds for any future years. Additionally, emissions would not be regionally significant, since they would not exceed 10 percent of any air pollutant estimated in the SDAB emissions inventory. Therefore, emissions from providing the capacity to homeport a second additional CVN would conform to the SIP and would be considered insignificant.

The radiological air emissions would not be significant, as summarized for providing the capacity to homeport one additional CVN in section 3.10.2.2.

3.10.2.4 *No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging, Disposal, and Mitigation Sites

No dredging would be required at NASNI under the no action alternative. Consequently, no air quality impacts would occur from this activity.

Facility Improvements

No facility improvements would be required at NASNI under the no action alternative. Consequently, no air quality impacts would occur from this activity.

Operations

Operational emissions associated with one additional CVN and decommissioning of one CV would be identical to those presented in section 3.10.2.2. Consequently, air quality impacts from the alternative would be insignificant. Also, emissions from the alternative would not trigger a conformity determination under the 1990 CAA and would therefore conform to the SIP.

The radiological air emissions would not be significant, as assessed for one additional CVN in section 3.10.2.2.

3.10.2.5 Mitigation Measures

Since air quality impacts from construction and operation of the project alternatives would be insignificant, no mitigation measures are proposed to reduce project emissions at NASNI. However, implementation of dredge and disposal option 3 would require measures to reduce NO_x emissions from the action to less than 50 tons per year.

3.11 NOISE

This section describes existing noise conditions and potential effects associated with the proposed actions. Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although exposure to very high noise levels can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual. Volume 2, Appendix C, provides additional background information about noise measurement and the noise terminology used in this section, as well as Navy standards and guidelines regarding noise abatement.

3.11.1 Affected Environment

NASNI is a military-industrial environment characterized by noise from aircraft operations, truck and automobile traffic, ship-loading cranes, diesel-powered equipment, and compressors. In addition, new construction of buildings and reconstruction and rehabilitation activities for streets, buildings, and ships all contribute to a military-industrial-type noise environment. Naval aircraft are the primary noise source.

The CVN homeport siting area is located at the northeast side of NASNI in an industrial setting with a variety of existing noise sources. One of the proposed CVN berths is at Pier J/K, which is presently used as a deep draft ship berth. The second CVN berth is at the west end of the quay wall (Berth L/M), which is presently used as a transient CVN berth. The primary on-site noise sources are typical of Naval installations and include vehicular traffic, ship engines, and a variety of mechanical equipment. Also along the quay wall immediately east of Berth L/M is the CV berthing area (Berths N, O, and P). The CV is scheduled to leave NASNI in 2003.

Pier J/K is located outside of AICUZ Noise Zone 2, which indicates an aircraft noise exposure level of less than 65 dBA CNEL (Community Noise Equivalent Level). Berth L/M is located at the outer edge of AICUZ Noise Zone 2, which indicates an aircraft noise exposure level of 65 dBA CNEL to about 67 dBA CNEL.

A shallow-water mitigation site is proposed in the southwestern portion of NASNI in the vicinity of Pier B to mitigate impacts on eelgrass habitat that would be significantly impacted during dredging and construction of an additional CVN homeporting berth. The mitigation site is directly inshore of Pier B, contiguous with the BRAC CVN mitigation site. This area is designated in the NASNI Master Plan (DON 1991) as a weapons compound that serves as the major ordnance distribution point for the entire San Diego Naval Complex. The primary noise sources in the vicinity are aircraft that use the nearby NASNI runway. The nearest sensitive noise receptors are residential areas in Point Loma, more than 1 mile to the northwest. The nearest residential areas in the City of Coronado are approximately 3 miles to the east.

Noise-sensitive receptors are existing land uses associated with indoor or outdoor activities that may be subject to significant interference from noise. Such receptors include residential (single- and multi-family dwellings, dormitories, barracks, and other residential uses), hospitals, convalescent homes, educational facilities, and sensitive biological species.

The closest on-base sensitive receptors are the medical and dental clinics and the child care center with its associated outdoor playground, all of which are located on the south side of Tow Way between Rogers Road and Colorado Street. These facilities are about 3,500 feet south of the first additional CVN berth and 2,000 feet south of the second additional CVN berth. The status of the heron rookery at the Pier J/K parking lot area is discussed in section 3.6.1.

The closest off-base sensitive receptors are single-family residences located in the north part of the City of Coronado near the intersection of Alameda Boulevard and First Street, which is about 4,200 feet southeast of the first additional CVN berth and 1,800 feet east of the second additional CVN berth. Aircraft noise is audible at these residences, but they are located outside AICUZ Noise Zone 2. Noise from a variety of other on-base activities can be heard at these residences as well as noise from base-related vehicular traffic along the access roads.

A two-year noise monitoring project completed in August 1998 for the U.S. Navy monitored construction activity along the quaywall and turning basin at NASNI for the BRAC CVN homeport (Investigative Science and Engineering 1998). The noise monitoring project demonstrated that the construction activities were, for the most part, inaudible at the closest NASNI-Coronado property line.

Traffic noise is an issue of considerable local concern in the City of Coronado. Existing base-related traffic contributes to existing noise levels along city streets. A series of noise measurements were taken during the summer of 1998 as part of the *City of Coronado Noise Study – 1998* (RECON 1998). Many of the measurement locations were near the off-base residences closest to the CVN homeport siting area and along the various access roads described in section 3.9.1. The noise measurements, which were taken during periods ranging in length from 1 hour to 2 weeks, are described in Volume 3, section 3.11.

The noise measurements conducted for the 1998 noise study confirm the findings of a 1993 noise study and show that ambient noise levels equal or exceed the City of Coronado General Plan Noise Element standard (65 dBA CNEL for exterior living areas of single-family residences, townhouses, and apartments) at numerous locations along NASNI access roads and other major Coronado streets. The study modeled future noise levels based on future traffic volumes as estimated by the San Diego Association of Governments for the year 2015. The study concludes, in part, "Much of the noise that the residents of Coronado will experience in the future exists today. Locations predicted to exceed noise standards in the year 2015, already exceed those standards. Residences not currently exposed to noise in excess of the General Plan standard are not predicted to exceed that standard in the future." The study further concluded, "The reduction of traffic on area roads sufficient to achieve a noticeable reduction in noise would be difficult." The noise study presented several roadway and building design recommendations that could help to reduce traffic noise levels in Coronado. Please see section 3.18.11 for additional discussion.

3.11.2 Environmental Consequences and Mitigation Measures

The impacts on noise associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, where the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

Military Regulations

The Department of Defense (DOD) has established acceptable sound level criteria for various land uses at military facilities. Where these criteria are exceeded, the noise impact would be considered significant. The criteria, which are outlined in the Naval Facility (NAVFAC) P-970 document *Planning in the Noise Environment* (DOD 1978), are presented in Table 3.11-1. In the table, the outdoor noise environment is considered in five noise "zones." For each zone, acceptability is noted by one of the following four entries: (1) a "yes"; (2) noise level reduction (NLR); (3) a "no"; or (4) one of the above with additional stipulations described in the footnotes.

Where "yes" is indicated, no special noise control restrictions are necessary, and normal construction appropriate to the activity may be used. For many land uses, higher levels of exterior noise exposure are acceptable if the proper degree of interior noise attenuation is provided. Such tradeoffs are possible for land uses where indoor activities predominate. When such tradeoffs are appropriate, the amount of noise insulation required is enumerated in the table in units of NLR, which is measured in dBA (A-weighted decibels) and is the difference between noise measured outside the building and noise measured inside the building. If land use compatibility is contingent on meeting the NLR requirements, then a site-specific interior acoustical analysis must be performed to ensure that the proposed building design will provide the required level of noise reduction. A "no" indication means that the noise environment is not suitable for the designated activity or facility, even if special building noise insulation is provided. The table footnotes indicate exceptions where special conditions apply.

Civilian Regulations

The Noise Element of the City of Coronado General Plan (City of Coronado 1987) establishes sound levels that are considered compatible with various civilian land uses in the City of Coronado. Sound levels up to 65 dBA CNEL are acceptable for exterior living areas of single-family residences, townhouses, and apartments. Operational noise levels that exceed 65 dBA CNEL at residential locations would be significant.

Construction noise levels are treated differently. Construction noise is regulated under the City of Coronado Noise Abatement and Control Ordinance (Title 41, section 41.10.040). Construction is generally permitted within city limits between the hours of 7:00 A.M. and 7:00 P.M., but this

Table 3.11-1. Acceptable Land Use and Minimum Building Sound Level Requirements at Military Facilities

Land Use	OUTDOOR NOISE ENVIRONMENT (LDN IN DBA)				
	85-89	*80-84*	*75-79*	*70-74*	*65-69*
Family Housing	No	No	No	NLR 30[4]	NLR 25[4]
Bachelor Housing	No	No	NLR 35[4]	NLR 30[4]	NLR 25[4]
Transient Lodging, Hotels, Motels, etc.	No	No	NLR 35[4]	NLR 35[4]	NLR 25[4]
Classrooms, Libraries, Churches	No	No	No	NLR 30	NLR 25
Office and Administration Buildings (Military)	NLR 40	NLR 35	NLR 30	NLR 25	Yes
Offices – Business and Professional	No	No	NLR 35	NLR 25	Yes
Hospitals and any Medical Facilities with 24-hr occupancy	No	No	No	NLR 30	NLR 25
Dental Clinics, Medical Dispensaries	No	No	NLR 30	NLR 25	Yes
Outdoor Music Shells	No	No	No	No	No
Commercial/Retail Stores, Restaurants/Cafeterias, Banks and Credit Unions, Exchanges, Theaters, EM/Officer Clubs	No	No	NLR 30	NLR 25	Yes
Flight Line Operations, Maintenance, and Training	NLR 35[5]	NLR 30[5]	Yes	Yes	Yes
Industrial, Manufacturing, and Laboratories	No	NLR 35[5]	NLR 30[5]	NLR 25[5]	Yes
Outdoor Sports Arenas, Outdoor Spectator Sports	No	No	No	Yes[1]	Yes[1]
Playgrounds, Active Sport Recreational Areas	No	No	No	Yes	Yes
Neighborhood Parks	No	No	No	Yes	Yes
Gymnasiums, Indoor Pools	No	NLR 30	NLR 25	Yes	Yes
Outdoor – Frequent Speech Communication	No[2,3]	No[2,3]	No[2]	No[2]	No[2]
Outdoor – Infrequent Speech Communication	No[2,3]	No[2,3]	Yes	Yes	Yes
Livestock Farming, Animal Breeding	No	No	No	Yes	Yes
Agricultural (except Livestock)	Yes[3]	Yes[3]	Yes	Yes	Yes

Notes: Yes - Land use compatible with noise environment. No special noise control restriction. Normal construction okay.
Ldn - day night average sound level
NLR- Appropriate noise level reduction where indoor activities predominate.
No – Land use not compatible with noise environment, even if special building noise insulation provided.
1. Land use is acceptable provided special sound reinforcement systems are installed.
2. Land use may be acceptable provided special speech communication systems are used.
3. Land use may be acceptable provided hearing protection devices are worn by personnel. Check applicable hearing damage regulations.
4. Although local conditions may require residential uses in these areas, this use is strongly discouraged in Ldn 70-74 and Ldn 75-79 and discouraged in Ldn 65-69. The absence of viable alternative development options should be determined. NLR criteria will not eliminate outdoor environment noise problems and, as a result, site planning and design should include measures to minimize this impact, particularly where the noise is from ground-level sources.
5. The NLR must only be incorporated into the design and construction of portions of these buildings where the public is received, office areas, and noise-sensitive work areas or where the normal noise level is low.

Source: *Planning in the Noise Environment.* NAVFAC P-970. (DOD 1978).

restriction would not apply to on-base construction activities. On-base construction noise levels, however, may not exceed an average of 75 dBA during any 1-hour period at city boundaries.

3.11.2.1 Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)

Alternative Five would not require any new projects.

Dredging/Mitigation Site

No dredging would be required. Therefore, the mitigation site would not be needed. Therefore, no dredging or disposal noise impacts would occur.

Facility Improvements

No new construction would be required. Therefore, no construction noise impacts would occur.

Operations

Decommissioning of the remaining CV historically homeported at NASNI would reduce the number of Navy personnel commuting to NASNI. Average daily traffic would be reduced by approximately 5,350 trips (see Table 3.9-4) with a corresponding reduction of traffic noise on the approach roads to NASNI. Therefore, a net beneficial traffic noise impact would occur.

3.11.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging/Mitigation Site

Noise associated with providing the capacity for homeporting one additional CVN would be generated during the dredging phase of this project, which would last approximately 1 year. Noise levels from a diesel clamshell dredge typically range from 75 dBA to 85 dBA at a distance of 50 feet (DON 1995a). Sediment disposal would occur either at an in-bay disposal site south of NAB or at the LA-5 designated ocean disposal site. Noise impacts from disposal operations would not be significant at either site.

The closest off-base sensitive receptors are single-family residences located in the north part of the City of Coronado near the intersection of Alameda Boulevard and First Street, which is about 4,200 feet southeast of the additional CVN berth. At this distance, dredging noise levels would be attenuated to a range of approximately 36 to 46 dBA, well below the average 75-dBA limit established by the City of Coronado. Therefore, the dredging phase would have a less than significant adverse noise impact.

Development of the mitigation site would require excavation of approximately 1.2 to 2.5 acres of artificial fill to create a shallow wetland in place of vacant upland. The construction activity would require use of backhoes, bulldozers, front-end loaders, and dump trucks. Due to the isolated nature of this site, it is not likely that the construction noise would be audible at any sensitive-receptor location. Therefore, development of the mitigation site would not have any significant adverse noise impact.

Facility Improvements

Noise associated with providing the capacity for homeporting one additional CVN would be generated during construction of new facilities, including a new CVN berthing wharf to replace existing Pier J/K, a CVN warehouse, a fleet support building, and an equipment laydown building. A variety of noise-generating equipment would be used such as pile drivers, backhoes, jack hammers, concrete mixers, and various motor vehicles. These types of construction equipment, when used at federal construction sites, are prohibited from exceeding specific noise levels (75 dBA for backhoes, jackhammers, and concrete mixers and 95 dBA for pile drivers) at 50 feet from the source (CERL 1975). Demolition and construction activities would take place during daytime hours over a 2-year period.

The closest on-base sensitive receptors are the medical and dental clinics and the child care center with its associated outdoor playground, all of which are located on the south side of Tow Way between Rogers Road and Colorado Street. These facilities are about 3,500 feet south of the additional CVN berth. At this distance, construction noise levels would be attenuated to approximately 38 to 58 dBA, well below the 65-dBA acceptable outdoor noise environment for all land uses at military facilities. Therefore, the construction phase would have a less than significant adverse noise impact at on-base sensitive receptors.

The closest off-base sensitive receptors are single-family residences located in the north part of the City of Coronado near the intersection of Alameda Boulevard and First Street, which is about 4,200 feet southeast of the additional CVN berth. At this distance, construction noise levels would be attenuated to approximately 36 to 56 dBA, well below the 1-hour average 75-dBA limit for construction noise levels at the City boundary (City of Coronado Noise Abatement and Control Ordinance, Title 41, section 41.10.040). Therefore, the construction phase would have a less than significant adverse noise impact on residents of Coronado.

Operations

Providing the capacity for homeporting one additional CVN would locate the new CVN at the new wharf that would replace existing Pier J/K. The noise analysis for the BRAC CVN (DON 1995a) found that the noise associated with CVN operations at the BRAC location would be attenuated to 45 dBA at the nearest off-base receptors, well below the 65 dBA acceptable in a residential area. The additional CVN homeporting berth would be almost 2,000 feet farther away from these same off-base receptors, which would result in even greater attenuation of noise from that CVN to approximately 42 dBA. At the nearest off-base receptors, the combined noise level from both CVNs (separated from each other by 2,000 feet) would be equal to the noise level of the closer CVN (the BRAC CVN). Therefore, the noise level at the nearest off-base receptors due to operations related to the BRAC CVN plus the additional CVN would be approximately 45 dBA. This noise level would be well below the significance threshold.

Also relevant to this noise analysis is the planned decommissioning of the remaining CV historically berthed along the quay wall. The CV berth is even closer to the nearest off-base receptors than either of the CVN berths would be. Decommissioning of the remaining CV would result in a reduction of noise levels from on-base operations as perceived at the nearest off-base receptors. Even with the BRAC CVN plus one additional CVN, the net change would be a reduction (compared to the existing situation) of noise levels from on-base operations as perceived at these off-base receptors. This would be so, because the nearest existing noise source (the CV) would be gone.

The on-base sensitive receptors would be approximately the same distance from the BRAC CVN and the additional CVN as they currently are from the remaining CV that would be leaving NASNI when the additional CVNs would arrive. Therefore, the operational noise levels at the on-base sensitive receptor locations would remain unchanged.

Providing the capacity to homeport one additional CVN and decommissioning of the remaining CV historically homeported at NASNI and would slightly increase the number of Navy personnel and civilian employees commuting to NASNI compared to the existing situation. Average daily traffic would be slightly increased by 175 average daily trips throughout Coronado (see Table 3.9-4). This is a relatively small traffic increase compared to the existing average daily traffic on the approach roads to the base (e.g., 71,000 round trips on the Coronado Bay Bridge and 16,400 to 33,500 one-way trips on Pomona Avenue, 3rd Street, and 4th Street, as shown in Table 3.9-1). This relatively small traffic increase would result in a small increase in traffic noise along the approach roads to NASNI. Even if all the additional trips were during the peak traffic hours, however, the change would not be expected to be distinguishable as an increased noise level. This is because when noise is generated by many sources of equal noise level, additional similar sources have very little effect on overall noise level (CERL 1975). Thus, a minor, but less than significant, traffic noise impact would result.

Providing the capacity to homeport one additional CVN would not result in any increase in the aviation units based at NASNI or any increase in air traffic at NASNI. Therefore, no increased aircraft noise would result. Please refer to Chapter 2 for additional information regarding aircraft operations and deployment.

3.11.2.3 Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site

Providing the capacity to homeport two additional CVNs would not require any additional dredging beyond that required to providing the capacity to homeport one additional CVN. Therefore, the dredging and disposal noise impacts for two additional CVNs would be the same as for providing the capacity to homeport one additional CVN as discussed above (i.e., a less than significant adverse noise impact).

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Minor additional utility and fencing upgrades would be minimal when compared to facilities and infrastructure previously created to provide historical carrier homeporting capacity. Construction noise impacts for development of facilities to homeport two additional CVNs would be essentially the same as for one additional CVN as discussed above (i.e., a less than significant adverse noise impact).

Operations

The noise analysis for the BRAC CVN (DON 1995a) found that the noise associated with CVN operations at the BRAC location would be attenuated to 45 dBA at the nearest off-base receptors. This would be well below the 65 dBA acceptable in a residential area. The second additional CVN berth associated with providing the capacity to homeport two additional CVNs would be located approximately 1,000 feet closer to the nearest off-base receptors. This would result in less noise attenuation from that CVN to approximately 48 dBA, still well below the 65 dBA acceptable in a residential area. The combined operational noise from all three CVNs (separated from each other by distances of 1,000 feet and 2,000 feet) simultaneously in port for 13 days per year would be equal to the noise level of the closest CVN (the second additional CVN). Hence, the noise level at the nearest off-base receptors due to operations related to the BRAC CVN plus two additional CVNs would be approximately 48 dBA. This would be slightly greater than the BRAC CVN alone, but it would still be well below the significance threshold. Noise increases from three CVNs in port simultaneously would be intermittent and short-term.

The on-base sensitive receptors would be approximately the same distance from the BRAC CVN and the two additional CVNs as they currently are from the two CV historical berths. Therefore, the operational noise levels at the on-base sensitive receptor locations would remain relatively unchanged.

Providing the capacity to homeport two additional CVNs and decommissioning of the remaining CV historically homeported at NASNI would slightly increase the number of Navy personnel and civilian employees commuting to NASNI. Average daily traffic would increase by approximately 4,879 average daily trips (see Table 3.9-4) for those 13 days per year that all three homeported carriers would be in port simultaneously. The associated noise impact would be substantial in relation to ambient noise levels. However, because this condition would occur less than 5 percent of the time, the impact is considered intermittent, short-term, and less than significant.

Providing the capacity to homeport two additional CVNs would not result in any increase in the aviation units based at NASNI nor any increase in air traffic at NASNI. Therefore, no increased aircraft noise would result. Please refer to Chapter 2 for additional information regarding aircraft operations and deployment.

3.11.2.4 No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site

No dredging would be required. Therefore, no dredging or disposal noise impacts would occur.

Facility Improvements

No construction would be required. Therefore, no construction noise impacts would occur.

Operations

Operational noise would be essentially the same as discussed in section 3.1.1.2 for providing the capacity to homeport one additional CVN. Hence, the noise level at the nearest off-base receptors due to operations related to the BRAC CVN plus the additional CVN would be approximately 45 dBA. This noise level would be well below the significance threshold.

Removal of the remaining CV historically berthed along the quay wall would result in a reduction of noise levels from on-base operations as perceived at the nearest off-base receptors. The CV berth is even closer to the nearest off-base receptors than either of the proposed CVN berths would be. Even with the BRAC CVN plus one additional CVN, the net change would be a reduction (compared to the existing situation) of noise levels from on-base operations as perceived at these off-base receptors. This would be because the nearest noise source (the CV) would be gone.

The addition of one CVN and removal of the remaining CV historically homeported at NASNI would reduce the number of Navy personnel and civilian employees commuting to NASNI.

Average daily traffic would be slightly increased by 175 average daily trips throughout Coronado(see Table 3.9-4). A minor, but less than significant, traffic noise impact would result.

The homeporting of one additional CVN homeporting would not result in any increase in the aviation units based at NASNI nor any increase in air traffic at NASNI. Therefore, no increased aircraft noise would result. Please refer to Chapter 2 for additional information regarding aircraft operations and deployment.

3.11.2.5 Mitigation Measures

Because noise impacts would be less than significant, no mitigation is provided.

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3.12 AESTHETICS

This section addresses the aesthetics, or visual resources, of various CVN homeporting actions at NASNI. Visual resources consist of topographic features such as landforms and bodies of water, and man-made features such as buildings, bridges, and recreational areas. The aesthetic quality of an area is evaluated by the extent that important visual resources are seen from view corridors (vantage points), or experienced from roadways, parks, or buildings (public and private).

3.12.1 Affected Environment

NASNI is on a prominent peninsula within the San Diego Bay. This is an important visual resource. It is particularly visible from two major roadways: Harbor Drive skirting the bay, and the Coronado Bay Bridge (SR 75). A variety of commercial and recreational uses along the bay provide view corridors of NASNI and the home port site, including the Shelter Island peninsula and Municipal Yacht Harbor, the Harbor Island peninsula and inner shoreline of the Spanish Landing Park area; the Broadway Pier, Seaport Village, the Embarcadero Marina Park north of the San Diego/Coronado Bay Bridge, and the Cabrillo National Monument at the terminus of Point Loma (see Figure 3.12-1) (SDUPD 1980). Continuous, panoramic views across the bay are visible from these locations. NASNI is also seen from some areas of Coronado Island fronting the San Diego Bay, including parkland and residences along First Avenue (DON 1995a).

The home port project site is on the northeastern edge of NASNI on the bay front. The proposed CVN berth is adjacent to Pier J/K, while the second proposed CVN berth is located adjacent to the existing quay wall, on Quay Road. The CVN now homeported at NASNI as a result of BRAC directives is between these two proposed berths. Construction of CVN infrastructure resulted in a new berth adjacent to Bay Drive, seawall upgrades dredging, and a series of storage, maintenance, and support facilities along this roadway and Roe Street (DON 1995a). Adjacent and inland to this recent development are structures within the NASNI Historic District, constructed mostly during the 1920s and 1930s (DON 1995a). The historic structures provide for administration, residential and industrial uses, and several have been remodeled over time.

The NASNI Master Plan (DON 1991) includes a Base Exterior Architecture Plan (BEAP) that provides recommendations for maintaining the aesthetic quality of the installation. The home port site is characterized as an element of the Bay Edge-Built district, an area that provides a strong aesthetic quality from view corridors on and off the station. The bayfront area includes a number of structures adjacent to the BRAC CVN berth under construction, which are the historic hangars (Buildings 1 and 2) now used for light manufacturing and a reconstructed boathouse (Building 316) used for boat repair and offices. A grove of eucalyptus trees west of Building 316 and south of the first additional CVN berth is considered a dominant landscape feature.

The BEAP characterizes the Bay Edge-Built district as a "moderate visual asset," and places it within a Historic and Scenic Area due to the presence of the NASNI historic structures. Enhancement of historic structure visual quality is recommended in the Base Exterior Architecture Comprehensive Development Plan, a component of the BEAP, by removing incompatible structural additions and improving the view corridor of the buildings as seen from the bay front (DON 1995a).

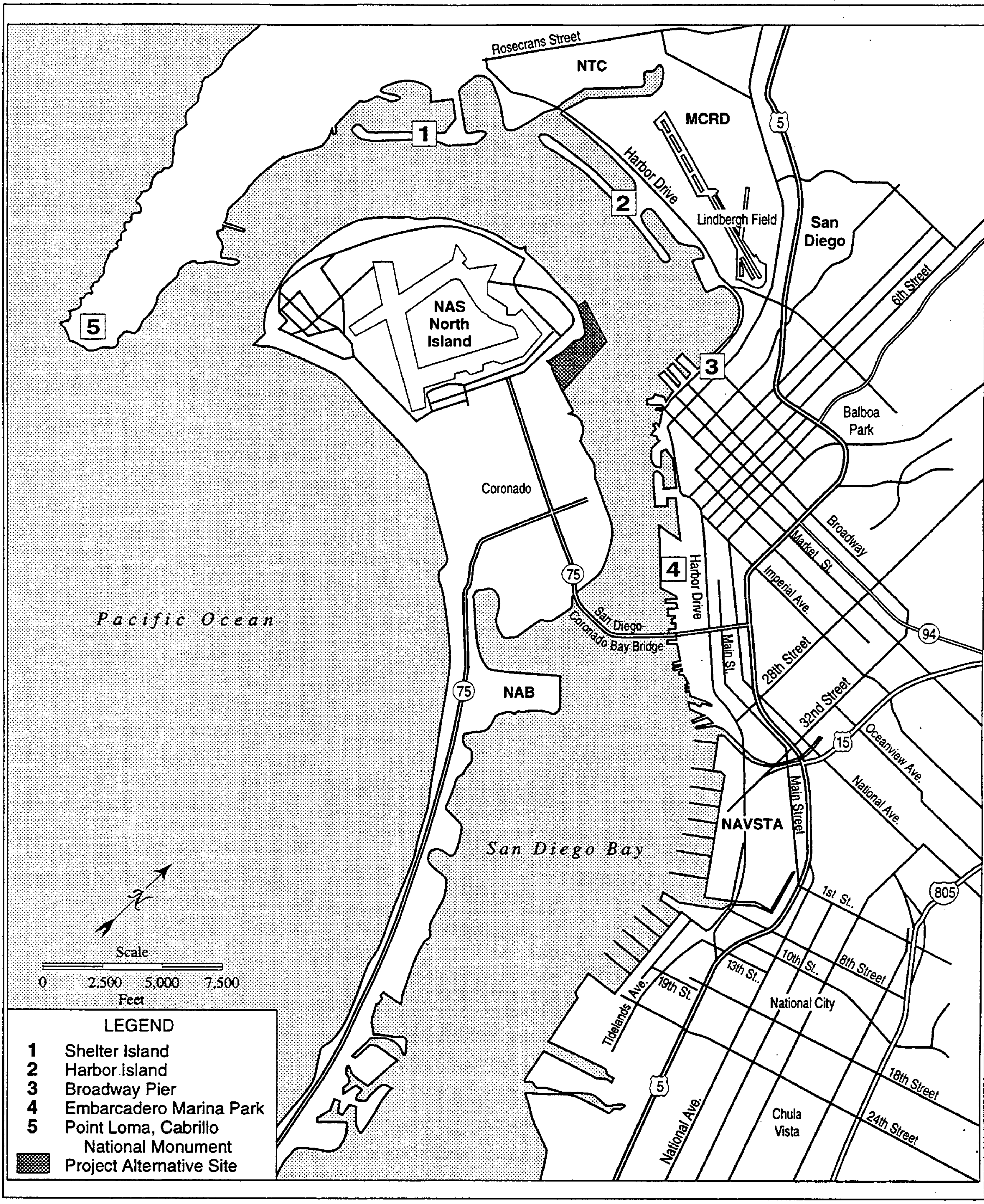

Figure 3.12-1. Major Vista Points of NASNI Home Port

3.12.2 Environmental Consequences and Mitigations

The impacts on aesthetics associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, where the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

The proposed action would result in a significant aesthetic impact if it would result in either of the following:

- Substantially adverse degradation of the quality of an identified visual resource, including but not limited to unique topographic features, undisturbed native vegetation, surface waters and major drainages, and parks or recreational areas; or
- Substantially adverse obstruction of any scenic vista or view visible to the public.

3.12.2.1 Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)

Alternative Five would not require any new projects.

Dredging/Mitigation Site

Because there would be no dredging, no impacts on aesthetics would result.

Facility Improvements

Because there would be no construction, no impacts on aesthetics would result.

Operations

Decommissioning of the remaining CV would not affect the historic capacity to homeport three carriers at NASNI. Berthed aircraft carriers and related ships have been accepted as part of the view of NASNI for decades (DON 1995a). In addition, the nature of the seascape consistently changes with vessels calling and leaving the area. The decommissioning of the remaining CV would result in no net future change to this quality. Therefore, operational impacts on aesthetics would be insignificant.

3.12.2.2 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging/Mitigation Site

Dredges and dredging equipment would be used for removal of approximately 534,000 cy of sediment and disposal into the NAB Enhancement Area or LA-5 associated with providing the capacity to homeport one additional CVN. These activities would be consistent with the visual appearance of NASNI as a marine-industrial area. Impacts would be short term and less than significant.

Facility Improvements

Visual changes brought about by construction activities associated with providing the capacity to homeport one additional CVN would be short term. Facility improvements would not disrupt any historic structures and would incorporate architectural features (style, color, texture) consistent with the BEAP (DON 1995a). Therefore, impacts on aesthetics would be less than significant.

Operations

The homeporting facilities and infrastructure needed for providing the capacity to homeport one additional CVN would be visually consistent with the marine-industrial activity of the area because three homeported aircraft carriers and related ships have been accepted as part of the view of NASNI for decades (DON 1995a). The nature of the seascape consistently changes with vessels calling and leaving the area. One additional CVN, in association with the decommissioning of the remaining CV, would result in no change in the number of vessels in the area. Therefore, operational impacts on aesthetics would be less than significant.

3.12.2.3 Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site

Dredges and dredging equipment would be used for removal of approximately 534,000 cy of sediment and disposal into the NAB Enhancement Area or LA-5 associated with providing the capacity to homeport one additional CVN. Removal of 48,000 cy of sediment from the Pier B mitigation site for placement in the Pier J/K dike fill area and stockpiling or placement in the plover enhancement site would involve earth moving equipment and trucks for transport of the material. These activities would be consistent with the visual appearance of NASNI as a marine-industrial area. Impacts would be short term and less than significant.

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Visual changes brought about by construction activities associated with minor additional utility and fencing upgrades would be short term. Facility improvements would not disrupt any historic structures and would incorporate architectural features (style, color, texture) consistent with the BEAP (DON 1995a). Changes to the facilities and infrastructure would be minimal when compared to facilities and infrastructure previously created to provide historical carrier homeporting capacity. Therefore, impacts on aesthetics would be less than significant.

Operations

The homeporting facilities and infrastructure needed to provide the capacity to homeport a second additional CVN would be visually consistent with the marine-industrial activity of the area because three homeported aircraft carriers and related ships have been accepted as part of the view of NASNI for decades (DON 1995a).The nature of the seascape consistently changes with vessels calling and leaving the area. The two additional CVNs, in association with the decommissioning of the remaining CV, would result in minimal changes to this quality during the 13 days a year that all three CVNs would be predicted to be in port at the same time. Therefore, operational impacts on aesthetics would be minor, intermittent, short-term, and less than significant.

3.12.2.4 No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site

Because there would be no dredging, no impacts on aesthetics would result.

Facility Improvements

Because there would be no construction, no impacts on aesthetics would result.

Operations

The addition of one CVN would be visually consistent with the marine-industrial activity of the area, as three homeported aircraft carriers and related ships have been accepted as part of the view of NASNI for decades (DON 1995a). The nature of the seascape consistently changes with vessels calling and leaving the area. The one additional CVN, in association with the decommissioning of the remaining CV, would result in a minimal net future change to this quality. Therefore, operational impacts on aesthetics would be less than significant.

3.12.2.5 Mitigation Measures

Because all impacts on aesthetics would be less than significant, no mitigation measures are proposed. In addition, facility improvements consistent with BEAP would further mitigate any potential impacts from new construction (DON 1995a).

3.13 CULTURAL RESOURCES

3.13.1 Affected Environment

The cultural resources of NASNI have been studied as a result of previously approved projects. This section focuses on those areas that would be affected as a result of the proposed project if located at NASNI, especially those areas in the vicinity of the Naval Air Station, San Diego Historic District (NASHD). No cultural resources have been documented in the channels to be dredged, so these areas would not be considered in the following discussion. The following is based on previously gathered information, especially the EIS covering the development of homeporting facilities for a NIMITZ-class carrier at NASNI (DON 1995a), and NASNI Master Plan (DON 1991)

Overview

The human occupation of North America goes back at least 12,000 years, and in the vicinity of the project area, the earliest cultures are part of the hunting-focused San Dieguito Culture. About 7,000 years ago, the La Jolla complex appeared, which incorporated a large number of ground stone tools indicative of a greater use of plant foods and subsistence intensification. Economic intensification continued throughout prehistory, culminating in the ethnographic Tipai culture first encountered by Spanish explorers in the 1540s (Moratto 1984; Luomala 1978).

From the start of the Historical Period to about 1893, when North Island passed into federal ownership, it served primarily as range land for cattle or agricultural fields (DON 1992). In 1918, the Navy took control of the northern part of the island, beginning the modern use of North Island for Naval aviation. Many of the original structures for NASNI were constructed near the end of World War I, but major construction projects in the 1920s and 1930s continued to add buildings and physically expanded the island itself by adding dredged materials from San Diego Bay to the western and northwestern margins of the island. Use of NASNI continued through World War II and the Korean War, and it continues to be an active component of the Navy's plans for the defense of the West Coast (DON 1995a).

Cultural Resources in the Project Area

The north end of North Island has been heavily altered by historic-period activities, and only the area from Ramp 7 to Berth "L" (i.e., the quay wall) reflects the alignment of the original shoreline prior to extensive construction (Figure 3.13-1). A cultural resources inventory that included the project area (Chambers Consultants and Planners 1982) did not identify any prehistoric archaeological sites in the northeastern corner of the base. Three prehistoric archaeological sites have been identified in other portions of NASNI, but they are well removed from the areas that would be disturbed.

The only cultural resources near the proposed construction in the northeastern corner of the island are historical Naval base structures. A collection of structures in the northern part of the base have been listed on the National Register of Historic Places (NRHP) (i.e., the NASHD), and two additional buildings (i.e., Buildings 29 and 68) were determined to be eligible for inclusion on the NRHP prior to their demolition as a part of the BRAC CVN homeporting project. Pier J/K, which would be demolished under some of the actions described below, is not a contributing member of the NASHD, nor does it qualify for inclusion on the NRHP. Although the Navy has constructed piers in this general area since at least the 1930s, the current pier was constructed in 1989 and is too recent to be included in the NRHP (personal communication, L. Hernandez 1997).

The largest cultural resource at NASNI is the NASHD, which consists of over 20 major structures and three seaplane ramps near the northeastern corner of the facility. The location of the NASHD relative to the project is shown in Figure 3.13-1. The buildings and structures that make up this district were largely constructed in the period from World War I to World War II, and they played a fundamental role in the development of this nation's Naval aviation program. The BRAC CVN (DON 1995a) summarizes the historical significance of the NASHD as follows:

> The NAS San Diego Historic District is significant for its architectural characteristics and association with noted architect Bertram Grosvenor Goodhue. In addition, the association of the district with the broad national and regional themes in the development of military aviation adds increased importance. Architecturally, the buildings in the district have significance both as individual structures and as contributing structures to the overall group at both the national and local levels. The district qualifies for the NRHP under Criterion C as a "representation of a significant application of the district characteristics of the Spanish Colonial Revival style in military architecture; and in this context, they represent an important example of the work of one of America's acknowledged master architects – Bertram Grosvenor Goodhue" (Yatsko 1990a).

Construction of the BRAC CVN homeporting facilities was determined to have an adverse effect on both Buildings 29 and 68 and the NASHD. Buildings 29 and 68 were demolished for maintenance facilities that were part of the BRAC CVN homeporting. Because they were considered eligible for inclusion on the NRHP, the adverse effects created by their demolition were mitigated through documentation of the buildings, including photographs of the existing conditions in the mid-1990s and the collection of historic-period photographs showing their condition earlier this century.

This construction was also determined to have an adverse effect on the NASHD by altering its setting. "The Historic District's location along the San Diego Bay shoreline and its characteristic viewscapes to and from San Diego were elements supporting the integrity of setting and related feeling, important components in the determination of NRHP eligibility" (DON 1995a). This adverse effect was also mitigated through extensive photographic and video documentation.

3.13.2 Environmental Consequences and Mitigation Measures

The impacts on cultural resources associated with the capacity to homeport three aircraft carriers at NASNI would be from the construction of facilities and infrastructure (e.g., new piers, electrical transformers, utility pipes, etc.). Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental changes to the capacity previously created for the CV that would be replaced by the CVN. Facilities for the first CVN would be developed by 2002, and facilities for the second CVN by 2005.

Significance Criteria

As outlined in the federal regulations that implement the NHPA, the significance of project impacts are assessed only for those cultural resources that are considered "historic properties," which have been defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register" (36 CRF 800.2 [e]). Therefore, the evaluation of historical significance is an important part of assessing impact significance. Evaluation of the significance of cultural resources is guided by specific criteria for listing on the NRHP, as defined in 36 CFR 60.4, as augmented by appropriate state guidelines, and in consultation with the State Historic Preservation Officer. The quality of significance is present in districts, sites, buildings, structures, and objects that have one or more of the following attributes:

- Association with events that have made a significant contribution to the broad patterns of history;
- Association with the lives of persons significant in the past;
- Design or construction techniques that embody the distinctive characteristics of a type, period, or method of construction or represent the work of a master or possess high artistic value or represent a significant and distinguishable entity whose components may lack individual distinction; and
- Cultural materials, including artifacts, features, and other remains, that have yielded, or may be likely to yield, information important in prehistory or history.

The regulations at 36 CFR 800 provide criteria for evaluating effects and determining whether or not the effects should be considered "adverse." For cultural resources, any "adverse effect" on a historic property, as defined by 36 CFR 800.9, would be considered a "significant effect," as defined under NEPA, if it "diminished the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Significant effects (impacts) may include any of the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Alteration of the character of the property's surrounding environment (i.e., setting) that contributes to the property's qualification for the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or
- Neglect of a property resulting in its deterioration or destruction.

Other federal laws, including the American Indian Religious Freedom Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act, deal with cultural resources, but they do not establish criteria for determining significance of impacts. They only pertain after the pertinent cultural resources have been identified, or if their discovery seems likely.

3.13.2.1 *Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new projects.

Dredging/Mitigation Site

No dredging would occur as a result in order to provide the facilities for the existing CVN currently homeported at NASNI. Therefore, no impacts on cultural resources would result. The State Historic Preservation Officer has concurred with this determination (Daniel Abeyta, 1999).

Facility Improvements

No facility improvements would occur in order to provide the facilities for the existing CVN currently homeported at NASNI. Therefore, no impacts on cultural resources would result. The State Historic Preservation Officer has concurred with this determination (Daniel Abeyta, 1999).

Operations

No change in the operations at NASNI would have to be undertaken in order to provide the facilities for the existing CVN already homeported at NASNI. Therefore, this action would not alter any significant cultural resources, alter the setting or feeling, or result in the neglect of any properties. No impacts on cultural resources would result. The State Historic Preservation Officer has concurred with this determination (Daniel Abeyta, 1999).

3.13.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging/Mitigation Site

Excavation of the 2.5-acre mitigation site along the western edge of North Island would take place only in historic-period fill, meaning that no significant archaeological sites or other cultural resources would be disturbed by construction. Therefore, this action would have no impact on cultural resources. The State Historic Preservation Officer has concurred with this determination (Daniel Abeyta, 1999).

Facility Improvements

Demolition of Pier J/K, its replacement with a new wharf, and the construction of the three new structures would not alter structures within the NASHD, nor would these activities alter the setting of the NASHD. Therefore, proposed facility improvements would have no adverse impacts on cultural resources. The State Historic Preservation Officer has concurred with this determination (Daniel Abeyta, 1999).

Operations

Change in the operations of NASNI to provide the capacity for homeporting one additional CVN would not alter any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. This is because operation of up to

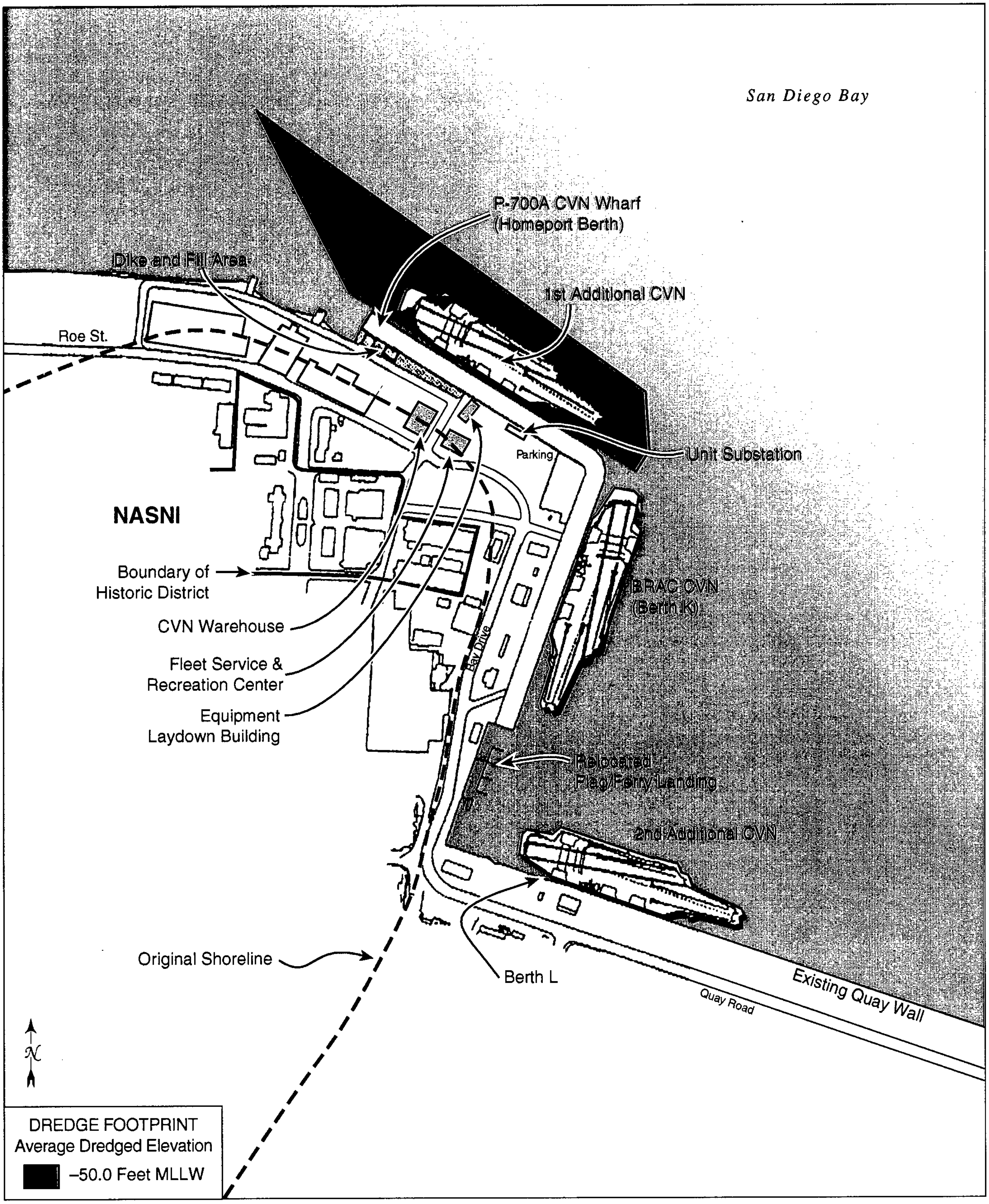

Figure 3.13-1. Location of the Project Area Relative to the Original Shoreline and Important Cultural Resources at NASNI

three aircraft carriers have not resulted in significant impacts on these resources. Therefore, this change in operations would have no adverse impacts on cultural resources. The State Historic Preservation Officer has concurred with this determination (Daniel Abeyta, 1999).

3.13.2.3 *Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)*

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site

No additional dredging beyond that already discussed in 3.13.2.2 would occur as a result of providing the facilities to homeport a second additional CVN. Therefore, no additional impacts on cultural resources would result. The State Historic Preservation Officer has concurred with this determination (Daniel Abeyta, 1999).

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Construction of facilities to provide the capacity to homeport a second additional CVN at NASNI would include minor additional utility and fencing upgrades to the existing quay wall (Berth L). The quay wall is over 363 feet away from the NASHD, the closest significant cultural resource. Because of this distance, facilities improvements in this area would not alter any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. Therefore, these facilities improvements would have no adverse impacts on cultural resources. The State Historic Preservation Officer has concurred with this determination (Daniel Abeyta, 1999).

Operations

Change in the operations of NASNI to provide the capacity to homeport a second additional CVN would not alter any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. This is because operation of up to three aircraft carriers have not resulted in significant impacts on these resources. Therefore, this change in operations would have no adverse impacts on cultural resources. The State Historic Preservation Officer has concurred with this determination (Daniel Abeyta, 1999).

3.13.2.4 *No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site

No dredging would occur. Therefore, no impacts on cultural resources would result.

Facilities Improvements

This action would not require any construction or ground disturbances. Therefore, there would be no impacts on cultural resources caused by facilities improvements.

Operations

Change in the operations of NASNI to accommodate one additional CVN would not alter any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. This is because historical operation of up to three aircraft carriers has not caused significant impacts on these resources. Therefore, this change in operations would have no adverse impacts on cultural resources.

3.13.2.5 *Mitigation Measures*

No significant impacts on cultural resources would result. Therefore, no mitigation measures are proposed.

3.14 GENERAL SERVICES/ACCESS

This section discusses general services affecting Naval personnel quality of life, including recreational facilities, community support facilities, medical care, fire protection, and police protection. Schools are addressed in section 3.8 (Socioeconomics). Access in and out of NASNI is also addressed, though specifics of vehicle movements of roadways are discussed in section 3.9 (Ground Transportation).

3.14.1 Affected Environment

Recreational Facilities

Recreational facilities for NASNI personnel include a gymnasium, physical fitness center, a women's fitness center, and an all-hands fitness center. An 18-hole golf course, driving range, picnic areas, and softball fields are also available (DON 1995a). The beach on the southern station perimeter is accessible for recreation. Additionally, a new field house, track, swimming pool, and ball fields will be constructed in 1998. These additional facilities are part of the NASNI Master Plan (DON 1991) to accommodate future personnel and related station civilian recreational demand.

Community Support Facilities

Community support facilities include the NASNI Child Development Center, the Family Services Center, the Counseling and Assistance Center, the Navy Relief, Legal Assistance Services, and the Navy Exchange (DON 1995a). Religious services are coordinated at the NASNI Chapel and Chaplain's office. These community services are operating at capacity.

The NASNI Master Plan has identified capital improvement projects including a new Child Development Center (programmed for fiscal year 2001) and Enlisted Club (currently unprogrammed) (DON 1995a).

Medical Facilities

Medical facilities at NASNI include the Branch Medical Clinic and Branch Dental Clinic, two blocks from the Main Gate on McCain Boulevard. The clinics complete out-patient services including emergency care with 24-hour ambulance service, complete physical examinations, X-rays, laboratory tests, pharmacy prescriptions, and full dental care (DON 1995a).

Fire Protection

NASNI fire protection and inspection is provided by the Federal Fire Department under Commander Naval Base, San Diego. NASNI has two stations, including three engine companies, one ladder truck, and two crash companies. A Hazardous Material Unit is stationed at the 32nd Street Naval Station. Staffing and emergency response times are currently within criteria established by the Department of Defense Instruction (DODI) 60.555.5 such that fire protection level of service meet requirements. Sufficient resources at NASNI exist to combat any shipboard fire.

Law Enforcement

The NASNI Security Department provides random vehicle patrols, emergency response, and gate security (DON 1995a). Vehicular and pedestrian access to vessels berthed at piers, including proposed CVNs, is provided by individual ship security personnel under the guidance of the NASNI Security Department. When major felonies such as homicides occur, NASNI security coordinates with the Coronado Police Department.

Access

NASNI has four gates along the eastern perimeter (Main Gate, Gate 2, Gate 3, and Gate 5) that provide access to public facilities in the City of Coronado. Gate 5 access is limited to the peak morning and afternoon periods for vehicles traveling to and from the Silver Strand, south along the Coronado peninsula. During all other times, Gate 5 is used by wide and/or hazardous load trucks (DON 1995a).

The NASNI Master Plan has identified a series of projects to improve local circulation, traffic, and access: replacing channelized intersections with standard four-leg or "T" intersections; developing a one-loop road for Rogers Road southeast of the home port site; and realigning Read Road and eliminating unnecessary streets. These projects will be in operation by 1999 (DON 1995a).

3.14.2 Environmental Consequences and Mitigation Measures

Unlike most other impacts analyzed in this EIS, the impacts on general services/access conditions associated with the capacity to homeport three aircraft carriers at NASNI derive from the factors directly tied to the number of aircraft carriers homeported at NASNI (e.g., crew size, number of military dependants requiring housing on the local economy, number of dependant children in local schools, money entering the local economy, etc.). Impacts on general services/access derived from the number of aircraft carriers homeported at NASNI are measured in terms of the incremental changes from CV to CVN and the incremental change from the existing condition of two homeported carriers to three homeported carriers.

Significance Criteria

The proposed action would result in a significant impact on general services/access if it would result in any of the following:

- A substantial adverse increase on the remaining service/access capacity;
- Reach or exceed the current capacity of the service/access such that accepted levels of service would not be maintained;
- Cause response times for fire protection or law enforcement to increase beyond their respective department standards; or
- Require development of new services/access beyond those existing or currently planned.

3.14.2.1 *Facilities for No Additional CVN : Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new projects.

Dredging/Mitigation Site

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because no dredging would occur, no impacts on general services/access would result.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because no construction would occur, no impacts on general services/access would result.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

One existing CVN would result in no population changes at NASNI. The decommissioning of the remaining CV would lead to a net decrease of military personnel and their dependents of 6,077 persons. General services and access needs at NASNI would continue to be met, and the decreased demand would result in beneficial impacts on general services/access.

3.14.2.2 *Facilities for One Additional CVN : Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging/Mitigation Site

RECREATIONAL FACILITIES

Dredging and disposal of approximately 582,000 cy of sediment associated with providing the capacity to homeport one additional CVN would cause a minimal, short-term interruption to recreational boating (DON 1995a). Therefore, impacts would be less than significant.

COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Because dredging and disposal of sediment associated with providing the capacity to homeport one additional CVN takes place in the water and not on land, and since the labor force would be local, no impacts to these services would result.

ACCESS

Dredging associated with providing the capacity to homeport one additional CVN would take place in a localized area adjacent to NASNI. Therefore, since this would not preclude access to the home port site, no significant impacts would occur.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Construction associated with providing the capacity to homeport one additional CVN would be temporary and the labor force would be local. Therefore, no significant impacts on general services would result.

ACCESS

Existing routes would be sufficient to provide access for construction. Therefore, impacts associated with providing the capacity to homeport one additional CVN would be short term and less than significant.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Providing the capacity to homeport one additional CVN would result in an increase in military personnel and dependents by 296 persons. This increase in population is extremely small when compared to the existing regional population and projected increases. Therefore, existing regional general services and access would be adequate to allow for this increase. Therefore, impacts on general services or access would be less than significant.

3.14.2.3 Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site

RECREATIONAL FACILITIES

No additional dredging associated with providing the capacity to homeport two additional CVNs would be required beyond that addressed for providing the capacity to homeport one additional CVN (section 3.14.2.2). Therefore, impacts also would be less than significant.

COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

No additional dredging associated with providing the capacity to homeport two additional CVNs would be required beyond that addressed for providing the capacity to homeport one additional CVN (section 3.14.2.2). Impacts to these services also would be less than significant.

ACCESS

No additional dredging associated with providing the capacity to homeport two additional CVNs would be required beyond that addressed for providing the capacity to homeport one additional CVN (section 3.14.2.2). Impacts to these services also would be less than significant.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Minor additional utility and fencing upgrades would be minimal when compared to facilities and infrastructure previously created to provide historical carrier homeporting capacity. The construction would be temporary and the labor force would be local. Therefore, no significant impacts on general services would result.

ACCESS

Existing routes would be sufficient to provide access for construction to provide the capacity to homeport two additional CVNs. Therefore, impacts would be short term and less than significant.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Providing the capacity to homeport two additional CVNs would result in an increase in military personnel and their dependents of 6,572 persons. The increased demand on general services would be dispersed among military housing and surrounding communities where military personnel and their dependents would reside. This increase in population is relatively small when compared to the existing regional population and projected increases. Therefore, existing general services would be adequate to allow for this increase. Therefore, impacts on general services would be less than significant.

ACCESS

Proposed facility improvements would be sufficient to provide access for a second additional CVN. Homeporting of a second additional CVN at NASNI would result in an additional 13 days per year that 3 CVNs would be in port. During that time, the additional vessel would not preclude water-based access to NASNI. Therefore, impacts would be short term and less than significant.

3.14.2.4 *No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because no dredging would occur, there would be no impacts to general services or access.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because no construction would occur, there would be no impacts on general services or access.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

One additional CVN would result in a net increase in military personnel and dependents by 245 persons. This increase in population is extremely small when compared to the existing population and projected increases. Therefore, existing general services and access would be adequate to allow for this increase. Therefore, impacts on general services or access would be less than significant.

3.14.2.5 *Mitigation Measures*

Because impacts on general services and access would be less than significant, no mitigation measures are proposed.

3.15 HEALTH AND SAFETY

3.15.1 Affected Environment

This section addresses health and safety issues related to the project alternatives at NASNI. All operations at NASNI are governed by the Navy Occupational Health and Safety (NAVOSH) program (DON 1994). Volume 3, section 3.15, provides a detailed summary of the content of this program, which is applied by the Navy.

NAVOSH Program

The Navy has historically maintained safety and health programs to protect its personnel and property. Occupational health has been an element of the overall program, which includes explosive, nuclear, aviation, and off-duty safety. On occasion, live ordnance has been encountered and properly disposed of at NASNI without any threat to safety. The Hazardous Material Management Program and Navy Occupational Safety and Health Program summary are discussed in Volume 3, section 3.15.

Up to three CVs have been homeported at NASNI over the years, in addition to port calls by CVNs. All station operations supporting these ships come under the authority of the NASNI NAVOSH program (DON 1996). The last Navy triennial oversight inspection was conducted during the period 23 to 26 March 1996 and a satisfactory grade was assigned.

Hazardous Materials Program

The Public Works Center (PWC), San Diego, operates the Industrial Waste Treatment Plant (IWTP), containerized hazardous waste storage facilities (CST 1 and CST 2), the Oily Waste Treatment Plant, a new Oil Recovery Plant (ORP), and a PCB Permitted Storage Area handle all of the hazardous wastes generated at the station. The facilities are permitted by a RCRA Part B permit issued by the California Department of Toxic Substances Control (DTSC) (DON 1997).

The Navy has implemented a strict Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program for all of its facilities. These programs are governed Navy-wide by OPNAVINST 4110.2 and OPNAVINST 5090.1B, respectively. At NASNI, the programs are governed by NASNI INST 4110.2 and 5100.4B and NASNI INSTS 5090.2A respectively. The Navy continuously monitors its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes. For example, nonhazardous materials are substituted for hazardous materials wherever practicable, processes are changed to ones that do not employ hazardous materials, and care is taken to avoid contaminating nonhazardous materials with hazardous materials.

Existing facilities have demonstrated capacity to easily service the three CVs that have been historically homeported at NASNI. The hazardous waste generated by these vessels have been managed without major incident and the waste generated by a CVN is approximately the same as a CV. The program would provide more than adequate capacity and would not pose a threat to health and safety.

NNPP Radiological Impact

Chapter 7 provides detail on the radiological health and safety aspects of NNPP activities. Also, the Navy's safety and health record is well documented. As is discussed in the Navy's annual report (NNPP 1997a), procedures used by the Navy to control releases of radioactivity from Naval nuclear-powered ships and their support facilities have been effective in protecting the environment and the health and safety of the general public.

Other Federal Health and Safety Requirements

All proposed facilities at NASNI are designed, constructed, and operated to meet the requirements of Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, to ensure whenever feasible that pollution would be prevented or reduced at the source, that pollution that cannot be prevented would be recycled in an environmentally safe manner; that pollution that cannot be prevented or recycled would be treated in an environmentally safe manner; and that disposal or other releases to the environment would be employed as a last resort. These requirements are contained in all contractual documents for the design, construction, and operation of the proposed facilities. Operations such as the proposed action are required to comply with regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

3.15.2 Environmental Consequences and Mitigation Measures

The impacts on health and safety associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, where the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

Impacts associated with hazardous waste generation are considered significant if the construction, and/or operation of the proposed action create either of the following:

- Substantially increases the risk of a hazardous substance release during construction; or

- Generates or otherwise manages hazardous materials in a manner that substantially increases the risk of hazardous waste upset (e.g., release or spill).

3.15.2.1 *Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new projects.

Dredging/Mitigation Site

No dredging or mitigation would be required. No impacts on hazardous waste releases or upset would result.

Facility Improvements

No construction would be required. Therefore, no impacts on hazardous waste releases or upset would result.

Operations

The hazardous waste facilities resulting from the BRAC CVN are capable of accommodating the demand of the existing CVN especially when considering the reductions of hazardous materials management and hazardous waste demand related to the decommissioning of the remaining CV. The impact of no additional CVN on hazardous waste releases or upset is less than significant.

3.15.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging/Mitigation Site

Dredging, disposal, and mitigation site construction activity to provide the capacity to homeport one additional CVN would be short term and would not involve handling of hazardous wastes. Prior to excavation and any disposal of soils from the mitigation site, a survey for ordnance would be conducted in accordance with procedures specified in DON (1996d). No potential for hazardous waste releases or upset would occur.

Facility Improvements

Facility improvement construction activity to provide the capacity to homeport one additional CVN would be short term. Any unexpected releases of hazardous substances during construction would be subjected to existing NAVOSH Program procedures. These procedures would reduce potential impacts to health and safety to less than significant.

Operations

The NAVOSH program and Hazardous Materials Management Program would apply to proposed homeporting operations to provide the capacity to homeport one additional CVN. Hazardous waste facilities have the capacity to accommodate the demand of an additional CVN. This is because it is replacing an existing CV that will be decommissioned and the hazardous wastes generated by a CVN are approximately equal to those generated by a CV (DON 1994a). Operations would also comply with the Navy's Hazardous Waste Minimization Program and regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act. Therefore, the impact of providing the capacity to homeport one additional CVN on hazardous waste releases or upset is less than significant. A quantitative analysis of a hypothetical accident involving the release of hazardous substances at NASNI has been included in Volume 2 Appendix J. Using conservative assumptions, the analysis concludes that if an accident involving hazardous substances were to occur at NASNI without the currently established mitigative measures (such as emergency planning) in place, there could be a potential impact to safety and environmental health. However, as described in Volume 2 Appendix J, the Navy already has mitigative measures in place at NASNI which minimize the possibility of such an accident occurring, and minimize the impact if such an accident occurs. These mitigative measures include administrative controls for safe handling of hazardous substances, personnel protective equipment, and emergency response programs involving established resources such as fire departments and emergency command centers. In addition, since the number of aircraft carriers at NASNI would not increase over the historical limit of three, no additional impacts over existing conditions would occur as a result of CVN maintenance at NASNI.

Nuclear-powered ships homeported at North Island and the propulsion plant maintenance facilities would comply with the NAVOSH program for the radiological aspects of the work. This program meets or exceeds all applicable OSHA regulations and has proven to be effective in ensuring safe and healthful conditions in the workplace. No significant occupational safety and health impacts are expected to occur.

PERSONNEL RADIATION EXPOSURE

Trained personnel would encounter radioactivity when performing work shipboard on the reactor plant, and in areas of the DMF that would handle radioactive materials (i.e., the controlled industrial facility, the mixed waste storage facility, and the container storage facility). Personnel radiation exposure would be controlled using the same controls used in shipyards performing Naval nuclear work. Individual radiation worker exposure is strictly controlled, resulting in exposures well below the federally established limit of 5 roentgen-equivalent-man (rem) per year. In fact, no shipyard worker has exceeded 2 rem per year since 1980 (NNPP 1997b). These controls are discussed further in Chapter 7.

The effectiveness of these controls is demonstrated by the fact that the average occupational exposure of shipyard personnel is less than three-tenths of a rem per year, which is equivalent to the amount of radiation exposure a typical person in the United States receives each year from natural background radiation. For workers performing the mixed-waste activities, their average occupational exposure is about 0.04 rem per year. It should be noted that shipyard workers perform nuclear refuelings and manage spent nuclear fuel; these activities would not be conducted at North Island. With additional NIMITZ-class aircraft carriers at North Island, radiation levels outside of the facilities that handle radioactive material would continue to be well below federal standards for permissible levels of radiation in uncontrolled areas. There would continue to be no distinguishable effect on the normal background radiation levels at the site perimeter (NNPP 1997a).

The risk to radiation workers from occupational radiation exposure related to nuclear propulsion plant maintenance is small compared to the risks accepted in normal industrial activities and compared to the risks regularly accepted in daily life outside work (NNPP 1997b). In 1991, researchers form the Johns Hopkins University in Maryland completed a comprehensive epidemiological study of the health of workers at the six Navy shipyards and two private shipyards that serviced Navy nuclear-powered ships. This independent study evaluated a population of over 70,000 civilian workers over a period from 1957 through 1981 to determine whether there was an excess risk of leukemia or other cancers associated with exposure to low levels of gamma radiation. This study did not show any cancer risks linked to radiation exposure. Furthermore, the overall death rate among radiation-exposed shipyard workers was less than the death rate for the general U.S. population. In conclusion, the Johns Hopkins study found no evidence to conclude that the health of people involved in work on U.S. nuclear-powered ships has been adversely affected by exposure to low levels of radiation incidental to their work (NNPP 1997b). Thus, homeporting additional NIMITZ-class aircraft carriers and performing Naval nuclear propulsion plant maintenance, either aboard the ship or in shoreside maintenance facilities, would pose no significant radiological risk to other Navy personnel or to the general public.

RADIOACTIVE MATERIAL CONTROL

The principal source of radioactive materials encountered during Naval nuclear propulsion plant maintenance is from trace amounts of corrosion and wear products from reactor plant metal surfaces in contact with reactor coolant water, which is either deposited internally or contained in the coolant water. Radioactive materials would be strictly controlled to protect the environment and human health, utilizing the same proven methods used in shipyards performing Naval nuclear work. Examples of techniques used to control the spread of radioactive contamination include use of multiple boundaries, HEPA filters, and impermeable easily cleaned surfaces. In addition, frequent monitoring is performed to detect contamination. Only specially trained personnel are permitted to handle radioactive material.

Environmental monitoring at facilities supporting Naval nuclear-powered ships shows these controls have been effective in protecting the environment, and that radioactivity associated with Naval nuclear-powered ships has had no significant or discernible effect on the quality of the environment. The results of this monitoring are reported annually in publicly available reports (NNPP 1997a). Thus, since stringent control of radioactive materials would continue, there would be no significant impact on the environment from homeporting additional NIMITZ-class aircraft carriers at North Island.

SOLID RADIOACTIVE WASTE

The Navy uses stringent controls to minimize the generation of radioactive waste from nuclear propulsion plant operation and maintenance. Radioactive waste is waste that contains man-made radionuclides as described in the Atomic Energy Act of 1954 and its implementing regulations. This waste includes radioactively contaminated rags, plastic bags, paper, filters, ion-exchange resin, and scrap materials resulting from operations and minor, routine work aboard ship. Liquids that cannot be processed for reuse are solidified. Radioactive waste is strictly controlled to prevent loss, and is packaged in rigid containers, shielded as necessary, accumulated in a controlled storage area, and shipped to licensed burial sites. Radioactive waste from the DMF would be shipped to a commercial or Department of Energy burial site. However, a controlled area would be available in the facility to manage waste for a limited period of time, should a commercial facility become unavailable.

The Barnwell disposal site is available to accept low-level waste generated at North Island, along with waste from other California radioactive waste generators. It is also the Navy's understanding that the State of California is pursuing a commercial radioactive waste disposal site at Ward Valley near Needles.

It is expected that for each CVN maintained at North Island, approximately 325 cubic feet of low-level radioactive waste per year would be generated. Low-level radioactive waste generated as a result of homeporting NIMITZ-class aircraft carriers in the San Diego area would be stored only at the DMF. Mixed waste generated from NNPP activities is a mixture of low-level radioactive waste and chemically hazardous waste. The Navy has implemented strict controls to prevent, to the maximum extent practicable, mixing radioactive and chemically hazardous waste. However, small amounts of mixed waste (less than 3 cubic meters per year from each CVN) would be generated by the Navy and temporarily stored at North Island until arrangements can be made to ship it for treatment and disposal outside the San Diego area. The mixed waste would be primarily solid in form. The radioactivity would be controlled as noted above. The chemically hazardous constituents of the waste would be regulated in accordance with the California Hazardous Waste Rules (CCR Title 22), which implements the federal RCRA. Detailed characterization of NNPP mixed waste has been accomplished using sampling and extensive process knowledge, and has confirmed that the waste is suitable for safe storage until it is shipped off site for treatment and disposal. Mixed waste would be packaged in sealed containers, accumulated in a controlled area, and shipped to permitted treatment, storage, and disposal facilities. Mixed waste would be stored in a dedicated, controlled mixed-waste storage facility that meets Navy, EPA, and State of California requirements for storing mixed waste. The mixed-waste storage facility would be permitted in accordance with State of California regulations.

The same effective methods used to control other radioactive materials and to minimize personnel radiation exposure would be used to control low-level radioactive and mixed wastes. Thus, there would be no significant radiological environmental impacts as a result of storing this waste generated by additional NIMITZ-class aircraft carriers at North Island.

Radioactive Material Transportation

All shipments of radioactive materials in the NNPP are required to be made in accordance with the applicable regulations of the U.S. Department of Transportation, the U.S. Department of Energy, and the U.S. Nuclear Regulatory Commission. In addition, the Navy has issued instructions to further control these shipments. These regulations and instructions ensure that shipments of radioactive materials are adequately controlled to protect the environment and the health and safety of the general public, regardless of the transportation route taken, and have proven to be effective.

There have never been any significant accidents involving release of radioactive material during shipment since the NNPP began. Shipments of radioactive materials associated with Naval nuclear propulsion plants have not resulted in any measurable release of radioactivity to the environment. The maximum exposure to any individual member of the public is far less than that received from natural background radioactivity. Carriers of radioactive materials are required to have accident plans that identify the actions to be taken in case of an accident, including notification of the civil authorities and communication with the shipment originator for guidance and assistance. The Navy would communicate with and cooperate fully with state radiological officials in the event of occurrences involving shipments of radioactive materials (NNPP 1997a).

Thus, there would be no significant impacts related to shipment of radioactive materials with homeporting additional NIMITZ-class aircraft carriers at North Island.

3.15.2.3 *Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)*

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site

No additional dredging or disposal would occur to provide the capacity for homeporting two additional CVNs beyond that specified for providing the capacity for homeporting one additional CVN (section 3.15.2.2) and would not involve handling of hazardous wastes. Prior to excavation and any disposal of soils from the mitigation site, a survey for ordnance would be conducted in accordance with procedures specified in DON (1996d). Therefore, no potential for hazardous waste releases or upset would occur.

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Minor additional utility and fencing upgrades construction activity would be short term. Any unexpected releases of hazardous substances during construction would be subjected to existing NAVOSH Program procedures. These procedures would reduce potential impacts to health and safety to less than significant.

Operations

The NAVOSH program and Hazardous Materials Management Program would apply to providing the capacity for homeporting two additional CVNs. Hazardous waste facilities are capable of accommodating the demand of two additional CVNs. The first additional CVN in 2002 would replace the decommissioned CV that generates approximately the same volume of hazardous wastes. Under this alternative, it is predicted that three CVNs would be in port at the same 13 days per year. Minimization techniques for personnel radiation exposure, radioactive material control, and radioactive material transportation are discussed in section 3.15.2.2. The same methods discussed in that section would be implemented for the second additional CVN. It is expected that for each CVN maintained at North Island, approximately 325 cubic feet of low-level radioactive waste per year would be generated. As discussed in section 3.15.2.2, low-level radioactive waste generated as a result of homeporting NIMITZ-class aircraft carriers in the San Diego area would be stored only at the DMF. Existing NAVOSH programs and hazardous waste facilities would be capable of handling increased hazardous waste from this CVN during those intermittent, short-term periods 13 days per year. Operations would also comply with the Navy's Hazardous Waste Minimization Program and regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act. The impact of two additional CVNs on hazardous waste releases or upset is intermittent, short-term, and less than significant.

A quantitative analysis of a hypothetical accident involving the release of hazardous substances at NASNI has been included in Volume 2 Appendix J. Using conservative assumptions, the analysis concludes that if an accident involving hazardous substances were to occur at NASNI without the currently established mitigative measures (such as emergency planning) in place, there could be a potential impact to safety and environmental health. However, as described in Volume 2 Appendix J, the Navy already has mitigative measures in place at NASNI which minimize the possibility of such an accident occurring, and minimize the impact if such an accident occurs. These mitigative measures include administrative controls for safe handling of hazardous substances, personnel protective equipment, and emergency response programs involving established resources such as fire departments and emergency command centers. In addition, since the number of aircraft carriers at NASNI would not increase over the historical limit of three, no additional impact over existing conditions would occur as a result of CVN maintenance at NASNI.

The radiological effects would be similar as identified under section 3.15.2.2 for total of two CVNs.

3.15.2.4 No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site

No dredging or mitigation site development would occur, since the additional CVN would use existing facilities at the transient carrier berth. Therefore, no impacts on hazardous waste releases or upset would occur.

Facility Improvements

No facility improvement development would occur. Therefore, no impacts on hazardous waste releases or upset would occur.

Operations

The NAVOSH Program and Hazardous Materials Management Program would apply to proposed homeporting operations. Hazardous waste facilities are be capable of accommodating the demand of one additional CVN, especially when considering the reductions of hazardous materials management and hazardous waste demand associated with CV decommissioning. CVNs and CVs generate approximately the same volume of hazardous materials. Operations would also comply with the Navy's Hazardous Waste Minimization Program and regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act. The impact of one additional CVN on hazardous waste releases or upset is less than significant.

A quantitative analysis of a hypothetical accident involving the release of hazardous substances at NASNI has been included in Volume 2 Appendix J. Using conservative assumptions, the analysis concludes that if an accident involving hazardous substances were to occur at NASNI without the currently established mitigative measures (such as emergency planning) in place, there could be a potential impact to safety and environmental health. However, as described in Volume 2 Appendix J, the Navy already has mitigative measures in place at NASNI which minimize the possibility of such an accident occurring, and minimize the impact if such an accident occurs.

These mitigative measures include administrative controls for safe handling of hazardous substances, personnel protective equipment, and emergency response programs involving established resources such as fire departments and emergency command centers. In addition, since the number of aircraft carriers at NASNI would not increase over the historical limit of three, no additional impacts over existing conditions would occur as a result of CVN maintenance at NASNI.

The radiological effects would be the same as identified under section 3.15.2.2 for one additional CVN.

3.15.2.5 *Mitigation Measures*

None of the facilities and infrastructure required to support additional CVNs at NASNI would result in significant impacts to health and safety. Therefore, no mitigation measures are proposed.

3.16 UTILITIES

This section addresses the utilities including energy (natural gas and electricity), fuel supply, drinking water, wastewater (sanitary, industrial, and oily industrial) disposal, stormwater disposal, solid waste (hazardous and non-hazardous waste) disposal, steam, and compressed air required to serve the proposed home port site.

3.16.1 Affected Environment

The Public Works Center, San Diego is responsible for all major utilities servicing NASNI except for the storm drainage system and fuel system, which are maintained by NASNI.

3.16.1.1 Energy

Natural Gas

NASNI receives natural gas via a San Diego Gas & Electric (SDG&E) 4-inch-diameter steel main in McCain Boulevard. The gas is distributed throughout the station by approximately 82,000 linear feet of main operated at 10 pounds per square inch gauge (psig), but the distribution system does not include the waterfront and home port site (DON 1995a).

Electricity

NASNI receives electricity via SDG&E aerial 12-kV circuits originating at the 69-kV Coronado substation. Two SDG&E 12-kV, 23 million volts/ampere (MVA) turbine generators and a 4.5-MVA generator located at the NASNI cogeneration plant provide capacity during peak loading periods (DON 1995a). The 12-kV distribution feeder lines are considered sufficient for NASNI Master Plan buildout (DON 1991), although they continue to be extended throughout the station area.

Power for the existing CV is provided by three 480-V substations along the quaywall. Power for the BRAC CVN will be provided by a substation associated with construction of a CVN berthing wharf at Berth K. Power for the transient CVN berth (Berth L) is provided by substations SS-3 (69-12.47 kV), and W (12.47-4.16 kV). Substation SS-3 distributes power to newer substations including Substation W (DON 1995a).

MILCON improvements associated with the BRAC CVN under construction will increase overall capacity to 64,140 megawatt-hours per year. Substation SS-3 was improved to provide adequate capacity for BRAC CVN homeporting (DON 1995a).

SDG&E is continually upgrading and expanding its system capabilities. Circuits with 12-kV originate from 69 kV substations dispersed throughout San Diego. Most substations within the NASNI area are between 50 and 90 percent loaded (personal communication, Monica Curry, 1999).

3.16.1.2 Fuel Supply

The Fleet and Industrial Supply Center (FISC) La Playa Fuel Farm at Point Loma provides fuel to NASNI. Purchased from private contractors, the fuel is moved through two 10-inch-diameter pipelines. Pipelines within NASNI are the station's responsibility, while off base the lines are owned and maintained by FISC (DON 1995a). A back-up fuel supply of 24 to 30 days (3,098,000 gallons of jet petroleum [JP-5] and 1,517,000 gallons of diesel fuel marine [DFM] fuel) is stored at NASNI's on-station fuel farm that can be provided to the present and proposed CVN berths. Fuel distribution lines serve 10 stations along the quaywall, including one of the proposed CVN berths, but no distribution lines currently serve Pier J/K (DON 1995a) and the proposed CVN berth area. BRAC CVN berthing wharf improvements are increasing the capacity of JP-5 fuel to 17.0 million gallons per year (mgy), designed to exceed the anticipated peak demand.

3.16.1.3 Water Supply

NASNI purchases drinking (potable) water from the City of San Diego and receives it from a Navy 24-inch-diameter transbay pipeline. The water resources for the quaywall and Pier J/K, the area of the two proposed CVN homeporting sites, are transported through an existing distribution system that has a 1,500-gallon-per-minute capacity (for each one) (DON 1995a). Mechanical systems related to construction of the BRAC CVN berthing wharf will increase the overall capacity of the station by 200,000 gallons per year, for a total of 80.5 mgy, which exceeds anticipated peak demand (DON 1995a). The SDCWA considers that adequate supplies exist to provide for current and future demand during normal rainfall periods.

3.16.1.4 Wastewater Disposal

Sanitary Wastewater

Sanitary wastewater (effluent) generated onboard vessels at dockside and generated at onshore maintenance facilities is collected by the NASNI sewer system, which is comprised of pipes, small pump or lift stations, and three main pumping stations. Sanitary hose stations along the CV quaywall berths and Pier J/K connect the vessels to the sanitary wastewater system. The collected sanitary wastewater (along with treated industrial wastewater discussed below) flows into the First Street interceptor sewer line in the City of Coronado. Together with City of Coronado effluent, the wastewater is transported through a pump station and transmission line across the San Diego Bay to the Point Loma Metropolitan Wastewater Treatment Plant (DON 1995a). The treatment plant provides primary treatment before discharging the effluent into an outfall extending into the ocean.

NASNI projected sanitary wastewater demand, including that generated by the BRAC-realigned CVN, will be approximately 1.65 mgd (DON 1995a). City of Coronado demand is approximately 4.0 mgd. The combined demand of 5.65 mgd is substantially less than the transbay sewer pump station and transmission line capacity of 14.0 mgd. NASNI, the City of Coronado, and the City of San Diego and the surrounding areas are serviced primarily by the Point Loma Metropolitan Wastewater Treatment Plant. This plant has a capacity of 230 mgd and current flows average 180 mgd. In addition, the North City Water Reclamation Plan services these areas and has a capacity of 30 mgd, with current flows averaging 22 mgd (personal communication, Ron Kole, 1999).

Industrial Wastewater Disposal

Industrial wastewater results from cleaning equipment activity from onshore maintenance building showers, sinks, laundry, and floor drains; and vessel deck drains, galley drains, bilgewater, equipment cooling water, brine solutions, and refrigerant emissions (DON 1995a). NASNI onshore building industrial wastewater is collected in the industrial wastewater collection system, including gravity collection lines, pump stations, and force mains. Onshore showers, sinks, laundry, and floor drains discharge into the city sewer. Wastewater is conveyed to an industrial wastewater treatment plant with a capacity of approximately 1.0 mgd, which typically receives between four and five million gallons per year (DON 1995a). The plant was designed in 1988, using historical flow as the basis of the design and thus was built to accommodate three CVs. Projected demand at NASNI, including the BRAC CVN, is approximately 0.37 mgd (DON 1995a), which is well within IWTP capacity.

The industrial wastewater collection system does not include collection lines connecting the CVN facility under construction to the IWTP, which is located on base, and not in Coronado. Industrial wastewater from the CVN and supporting maintenance building will be transported by truck to the IWTP and is addressed in NASNI Industrial Discharge permit for waste stream discharge (DON 1995a).

Oily Wastewater

Oily wastewater (including water brake fluid, catapult piston oil, and grease) from ships and barges at Pier J/K and the quaywall is collected in an oily wastewater collection system (OWS). The OWS was designed in 1993, using historical data as the basis of the design, and thus built to accommodate three CVs. After physical removal of oil, the water fraction is treated through a plate coalescer and a diffused air flotation system. The effluent is then sent directly to the sanitary sewer system under a permit from MIWP. The system has the ability to redirect the effluent to the IWTP if necessary through the piping system. The wastewater is transported from vessels through a series of hoses at CV berths, through onshore gravity lines powered by pump stations, and then to force mains to the oily waste treatment plant (OWTP) (DON 1995a). After treatment at OWTP, recovered oil is stored at NASNI and then removed by a private contractor. Separated non-oily fluids are transported to the industrial wastewater treatment plant (IWTP) by way of the First Street industrial wastewater interceptor in Coronado (DON 1995a).

The Navy has invested over $50 million in the San Diego region to upgrade its ability to process industrial hazardous waste and oily waste. At NASNI, the IWTP processed 3.5 million gallons in FY 96, which contrasts to 63 million gallons in FY 92, due to better process management practices. The oily waste treatment fluctuates substantially depending on the number of in-port ship days. This ranges from 12 to 56 million gallons processed per year. The Navy is constructing new plants at the Naval Station and Submarine Base. This will decrease the number of truck trips transporting oily waste to the North Island plant from nearly 2,000 in 1995 to an estimated 300 in 1998. See Volume 3, section 3.15 for more detailed information regarding these facilities.

3.16.1.5 Stormwater Disposal

NASNI stormwater disposal is provided by a conventional drainage system that carries runoff to San Diego Bay (to the east and north) and to the ocean (to the west). Although some stormwater overflows periodically into the NASNI industrial and sanitary waste collection system, the system is considered generally adequate (DON 1991). Discharge of stormwater in the ocean and bay is discussed in section 3.2.

3.16.1.6 Solid Waste Disposal

Non-Hazardous Waste

Non-hazardous solid waste and potentially recycled materials are separated by a private contractor at the station. The approximately 800 tons/month of non-recyclable material is transported to the City of San Diego's Miramar landfill, while recyclable material (approximately 300 tons/month) is taken to the station's recycling center (DON 1995a).

Hazardous Waste

Hazardous waste generated at NASNI is stored in approved containers designed for this purpose up to 1 year under satellite accumulation and up to 1 year in the permitted storage units. The containerized waste is picked up, transported, consolidated, and stored at Container, Storage and Transfer Unit (CST) 1, which is a permitted storage facility. CST 2 is currently utilized as a 90-day accumulation point. Yearly volumes fluctuate but average just under 100,000 pounds. PWC owns and operates a 29-vehicle fleet that is certified to transport hazardous waste. The Navy Public Works Center (PWC) coordinates the hazardous waste turnover to the Defense Reutilization Marketing Office (DRMO) for off-site shipment and disposal. (See section 3.15 for additional discussion of hazardous waste storage procedures.) Industrial wastewater from metal finishing operations at NASNI are treated at the PWC industrial waste treatment facility.

3.16.1.7 Steam

Steam is required at NASNI for industrial activity, building (office, residence, and industrial) heating, and hot water. A steam plant privately owned and operated by SITHE Energy Group supplies steam (DON 1995a). A distribution system including steam and condensate piping is designed in interconnecting loops that carry steam from two directions. This allows for better quality steam availability, delivered at 125 psig.

CV berths at the quaywall and Pier J/K are served by steam mains and outlets. Proposed improvements for the BRAC CVN will increase the capacity of steam to 3.25 million pounds per year (DON 1995a).

3.16.1.8 Compressed Air

Compressed air used for industrial activities is generated at a NASNI compressor plant. The low pressure air (LPA) is distributed throughout the station through a supply main system, operated at approximately 125 psig (DON 1995a). As part of the BRAC CVN berthing wharf improvements, two new compressors and related facilities are being added to the main compressor plant, increasing compressed air capacity to 2,500 standard cubic feet per minute (scfm), in excess of the peak demand of 2,400 scfm.

3.16.2 Environmental Consequences and Mitigation Measures

The impacts on utilities associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, where the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Various MILCON projects are associated with development of the various proposed actions. These are designed to provide sufficient utility capacity for associated CVN homeporting actions. They are summarized in Chapter 2. In addition, the greater San Diego regional utility grid is assumes that NASNI operations at complete capacity would not impact regional utilities during peak demand. The incremental increased demand resulting from the proposed project, when below maximum capacity, is a utilization of previously available capacity and is not considered an increased demand. Consequently, utilities which are accommodated by current systems would have a less than significant impact on the regional environment (personal communication, Ed Raush 1998).

Significance Criteria

The proposed action would result in a significant impact on utility systems if it would result in any one of the following:

- Use a substantial proportion of remaining system capacity;
- Reach or exceed the current capacity of the system; or
- Require development of new facilities and sources beyond those existing or currently planned.

The facilities associated with the proposed project would be designed, constructed, and operated to meet the requirements of Section 306 of Executive Order 12902 to minimize the life cycle cost of the facilities by utilizing energy efficiency, water conservation, or solar or other renewable energy techniques when they are cost effective. These considerations are contained in all contractual documents for the design, construction, and operation of Naval facilities.

3.16.2.1 Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)

Alternative Five would not require any new projects.

Dredging/Mitigation Site

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no dredging would occur, no impacts on utilities would result.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no construction would occur, no impacts on utilities would result.

Operations

ENERGY

Natural Gas. The decommissioning of the remaining CV would result in a decreased demand on natural gas. Therefore, impacts would be beneficial.

Electricity. The decommissioning of the remaining CV would reduce electrical demands by 9,600 amps at 450 volts per year (DON 1994). Therefore, this decreased demand would result in a beneficial impact on electricity.

FUEL SUPPLY

The decommissioning of the remaining CV would result in a decreased demand on the fuel supply. Therefore, impacts would be beneficial.

WATER SUPPLY

The decommissioning of the remaining CV would reduce demands on the water supply by approximately 125,000 gallons per day (gpd) (DON 1988). The net decreased demand on the water supply would result in beneficial impacts.

WASTEWATER DISPOSAL

Sanitary Wastewater. The decommissioning of the remaining CV would reduce the production of sanitary wastewater by approximately 161,000 gpd (DON 1994). The net decreased production of sanitary wastewater would result in beneficial impacts.

Industrial Wastewater. The decommissioning of the remaining CV would not significantly reduce the production of industrial wastewater (DON 1995a); therefore, no impacts on industrial wastewater would result.

Oily Wastewater. The decommissioning of the remaining CV would reduce the production of oily wastewater by a maximum of 400,000 gpy (DON 1994). The net decreased production of oily wastewater would result in beneficial impacts.

STORMWATER DISPOSAL

The decommissioning of the remaining CV would not affect stormwater at NASNI. Therefore, no impacts on stormwater disposal would result.

SOLID WASTE DISPOSAL

Non-Hazardous Waste. Using the average solid waste generation rate of 3.7 pounds per person per day (DON 1994), non-hazardous waste generated by the remaining CV would decrease by 5,809 pounds per day (1,570 personnel x 3.7 pounds per person). Therefore, a beneficial impact on non-hazardous waste disposal would result.

Hazardous Waste. The decommissioning of the remaining CV would reduce the amount of hazardous waste produced at NASNI. The net decreased production of hazardous waste would result in beneficial impacts.

STEAM

The decommissioning of the remaining CV would reduce demands on steam by approximately 22,000 pounds per hour (DON 1988). The net decreased demand on steam would result in beneficial impacts.

COMPRESSED AIR

The decommissioning of the remaining CV would reduce demands on compressed air by approximately 4,800 scfm (DON 1988).

The net decreased demand on compressed air would result in beneficial impacts.

3.16.2.2 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging/Mitigation Site

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Dredging and disposal of approximately 582,000 cy of sediment to provide the capacity to homeport one additional CVN would place minimal additional demands on utilities. Construction activities would occur over an approximate 3-month period, resulting in short-term and less than significant impacts.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Construction to provide the capacity to homeport one additional CVN would place minimal additional demands on utilities. Construction activities would occur over an approximate 2-year period, resulting in short-term and less than significant impacts.

Operations

ENERGY

Natural Gas. Demands on natural gas associated with providing the capacity to homeport one additional CVN would be minimal and offset by the decommissioning of the remaining CV (DON 1988). A net decrease in demand on natural gas would result, and impacts would be beneficial.

Electricity. Providing the capacity to homeport one additional CVN requires maximum electrical capacity equivalent to 16,000 amps at 450 volts (DON 1994). The decommissioning of the remaining CV would reduce electrical demands by 9,600 amps at 450 volts. The increased demand of 6,800 amps at 450 volts would be available through the existing capacity at NASNI. Impacts would be less than significant.

Housing that would accommodate increased military personnel and dependents would be linked to an existing 12 kV circuit. Increased electrical demand would be minor in comparison to the regional utility capacity. Housing would not require installation of additional circuits and would not preclude SDG&E from providing adequate service to the San Diego Area (personal communication, Monica Curry, 1999).

FUEL SUPPLY

Construction of the BRAC CVN berthing wharf increased jet fuel capacity and would accommodate any increased demand on the fuel supply required by one CVN (DON 1988). In addition, increased demand in jet fuel associated with providing the capacity to homeport one additional CVN would be offset by the decommissioning of the remaining CV. The net decrease in demands on the fuel supply would result in beneficial impacts.

WATER SUPPLY

A CVN requires 185,000 gpd of potable water at peak demand. The decommissioning of the remaining CV would reduce demands on the water supply by approximately 125,000 gpd (DON 1988). The increased demand of 60,000 gpd on the water supply would be available by the existing water delivery system at NASNI. Impacts would be less than significant.

Housing that would accommodate increased military personnel and dependents would be serviced by the SDCWA. The County has adequate water supply to service new development during normal rainfall periods.

WASTEWATER DISPOSAL

Sanitary Wastewater. Providing the capacity to homeport one additional CVN generates approximately 171,000 gpd of sanitary wastewater at peak CVN production. The projected decommissioning of the remaining CV would reduce this production by a approximately 161,000 gpd (DON 1994). The Point Loma Metropolitan Wastewater Treatment Plant has sufficient capacity to meet the increased demand of 10,000 gpd. Therefore, impacts on sanitary wastewater would be less than significant.

Housing that would accommodate military personnel and dependents associated with the proposed action would be serviced by either the Point Loma Wastewater Treatment Plant or the

North City Water Reclamation Plant. Both of these plants have adequate capacity to service this increased demand. Compared to existing flows, increased sanitary wastewater generation would be less than significant.

Industrial Wastewater. Providing the capacity to homeport one additional CVN does not generate an appreciable amount of industrial wastewater, except during CVN maintenance when the maintenance facility generates 16,500 gpy of industrial wastewater (DON 1995a). Therefore, no impacts on industrial wastewater disposal would result.

Oily Wastewater. Providing the capacity to homeport one additional CVN generates a maximum of 440,000 gpy of oily wastewater (DON 1994). The decommissioning of the remaining CV would reduce the production of oily wastewater by approximately 400,000 gpd. The net increased production of 40,000 gpy of oily wastewater would be accommodated for by the existing capacity at NASNI. Impacts would be less than significant.

STORMWATER DISPOSAL

Providing the capacity to homeport one additional CVN, in association with the projected decommissioning of the remaining CV, would not generate any additional stormwater at NASNI, and, as such, would not require additional stormwater improvements. Therefore, no impacts on stormwater disposal would result.

SOLID WASTE DISPOSAL

Non-Hazardous Waste. Using the average solid waste generation rate of 3.7 pounds per person per day (DON 1994), non-hazardous waste generated by providing the capacity to homeport one additional CVN, and in association with the removal of the remaining CV, would decrease by 189 pounds per day (51 personnel x 3.7 pounds per person). Therefore, a beneficial impact on non-hazardous waste disposal would result.

Hazardous Waste. Providing the capacity to homeport one additional CVN and the decommissioning of the remaining CV would result in a minor increase in hazardous waste production. Increases would not exceed existing storage and treatment capacities at NASNI. Impacts would be less than significant.

STEAM

Maximum demands for steam to provide the capacity to homeport one additional CVN would be 15,500 pounds per hour, plus, 2,200 mega Btu per year (DON 1988). The capacity of steam will increase to 3.25 million pounds per year under the BRAC CVN project. In addition, the decommissioning of the remaining CV would reduce demands on steam by approximately 11,000 pounds per hour (DON 1988). The net increased demand of 4,500 pph on steam would be accommodated for by the existing capacity at NASNI. Impacts would be less than significant.

COMPRESSED AIR

Providing the capacity to homeport one additional CVN would demand 2,400 scfm of compressed air plus an additional 2,800 scf per year during CVN maintenance (DON 1988). The decommissioning of the remaining CV would reduce demands on compressed air by approximately 2,400 scfm (DON 1988). The net increased demand of 400 scfm of compressed air would be accommodated for by the existing capacity at NASNI. Impacts would be less than significant.

3.16.2.3 Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Dredging required for two additional CVNs would not change from that required for one additional CVN (section 3.16.2.2). Therefore, dredging impacts resulting from the addition of two CVNs would be less than significant.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Construction needed for minor additional utility and fencing upgrades to homeport two additional CVNs would place minimal additional demands on these utilities. Construction activities would result in short-term and less than significant impacts.

Operations

ENERGY

Natural Gas. Any increased demands on natural gas resulting from providing the capacity to homeport two additional CVNs would be minimal and offset in part by the decommissioning of the remaining CV (DON 1988). Therefore, operational impacts on natural gas demands would be less than significant.

Electricity. Providing the capacity to homeport two additional CVNs would require maximum electrical capacity equivalent to 32,000 amps at 450 volts. The decommissioning of the remaining CV would result in a decreased demand on electricity by 9,600 amps at 450 volts (DON 1988 and 1994). Following the MILCON improvements associated with the BRAC CVN, overall capacity will be increased to 64,140 megawatt-hours per year. In addition, electrical upgrades are proposed as part of the project design. Thus, there would be ample electricity for increased demands of 22,400 amps associated with the homeporting facilities and infrastructure needed for two additional CVNs. Therefore, impacts on electricity would be less than significant.

Housing that would accommodate increased military personnel and dependents would be linked to an existing 12 kV circuit. Increased electrical demand would be minor in comparison to the regional utility capacity. Housing would not require installation of additional circuits and would not preclude SDG&E from providing adequate service to the San Diego Area (personal communication, Monica Curry, 1999).

FUEL SUPPLY

Any increased demands on the fuel supply resulting from providing the capacity to homeport two additional CVNs would be minimal and offset in part by an equivalent amount with the decommissioning of the remaining CV (DON 1988). Therefore, no operational impacts on the fuel supply would result.

WATER SUPPLY

Providing the capacity to homeport two additional CVNs would require approximately 370,000 gpd of potable water at maximum demand. The decommissioning of the remaining CV would decrease demands on potable water by 125,000 gpd (DON 1988). Therefore, the net increase in demand would be 245,00 gpd, resulting in less than significant impacts on the water supply.

Housing that would accommodate increased military personnel and dependents would be serviced by the SDCWA. The County has adequate water supply to service new development during normal rainfall periods.

WASTEWATER DISPOSAL

Sanitary Wastewater. Providing the capacity to homeport two additional CVNs would generate approximately 342,000 gpd of sanitary wastewater at peak production. The decommissioning of the remaining CV would reduce sewer production by 161,000 gpd. The Point Loma Metropolitan Wastewater Treatment Plant has sufficient capacity to meet the increased demand of 181,000 gpd. Therefore, impacts on sanitary wastewater would be less than significant.

Housing that would accommodate military personnel and dependents associated with the proposed action would be serviced by either the Point Loma Wastewater Treatment Plant or the North City Water Reclamation Plant. Both of these plants have adequate capacity to service this increased demand. Compared to existing flows, increased sanitary wastewater generation associated with additional CVN staff dependents would be less than significant. Other dependents living throughout the greater San Diego region would represent a relatively small percentage of existing and projected regional demand on wastewater treatment. Regional impacts would be less than significant.

Industrial Wastewater. Providing the capacity to homeport two additional CVNs would not produce appreciable amounts of industrial wastewater, except during CVN maintenance, when the maintenance facility would generate 16,500 gpy of industrial wastewater (DON 1995a). The current wastewater treatment plant would adequately meet this demand. Therefore, impacts on industrial wastewater disposal would be less than significant.

Oily Wastewater. Providing the capacity to homeport two additional CVNs generate a maximum of 880,000 gpy of oily wastewater. However, the decommissioning of the remaining CV would reduce the production of oily wastewater by approximately 400,000 gpy. The existing oily wastewater treatment facilities would adequately handle the net increased demand of 480,000 gpy (DON 1994). Therefore, operational impacts on oily wastewater would be less than significant.

STORMWATER DISPOSAL

Providing the capacity to homeport two additional CVNs would not generate any additional stormwater at NASNI, and, as such, would not require additional stormwater improvements. Therefore, no impacts on stormwater disposal would result.

SOLID WASTE DISPOSAL

Non-Hazardous Waste. Using the average solid waste generation rate of 3.7 pounds per person per day (DON 1994), non-hazardous waste generated in association with providing the capacity to homeport two additional CVNs and decommissioning of CV would increase by 754 pounds per day (204 persons x 3.7 pounds per person), which would be transported to a landfill. However, because this increase is small compared to the total non-hazardous wastes generated at NASNI, impacts on non-hazardous wastes would be less than significant. The increased impact on regional solid waste disposal associated with additional CVN staff dependents would be a relatively small percentage of existing and projected regional demand. Regional impacts would be less than significant.

Hazardous Waste. Increases in hazardous waste resulting from providing the capacity to homeport two additional CVNs would be offset in part by the decommissioning of the remaining CV. Increases would not exceed existing storage and treatment capacities at NASNI. Therefore, operational impacts on hazardous waste would be less than significant.

STEAM

Maximum demands for steam for providing the capacity to homeport two additional CVNs would be 31,000 pounds per hour plus 2,200 mega BTU per year during CVN maintenance. In addition, the decommissioning of the remaining CV would reduce demands on steam by approximately 11,000 pounds per hour (DON 1988). The capacity of steam will be increased to 3.25 million pounds per year under the BRAC-realigned CVN, so sufficient steam production would meet the demands of operations of the homeporting facilities and infrastructure needed for two additional CVNs. Therefore, impacts on steam would be less than significant.

3.16.2.4 No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no dredging would occur, no impacts on utilities would result.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no construction would take place, no impacts on utilities would result.

Operations

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Additional utility demands caused by the addition of one CVN and decommissioning of the remaining CV are discussed in section 3.16.2.2. Operational impacts under this alternative would be the same (ranging from no impacts to beneficial impacts) as described in that section.

3.16.2.5 Mitigation Measures

Because adverse impacts on utilities would be less than significant (ranging from no impacts to beneficial impacts), no mitigation measures are proposed.

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3.17 ENVIRONMENTAL JUSTICE

This section addresses the proposed action's potential to generate disproportionately high and adverse human or environmental effects on minority and low-income populations, as required under Executive Order 12898. As part of this directive, the federal agency must promote enforcement of all health and environmental strategies in areas where minority and low-income populations reside. Identifying differential patterns of natural resource consumption and ensuring greater public participation is required. In addition, federal agencies may provide project information to non-English speaking populations whenever practicable and appropriate (DON 1995a). The EPA Office of Solid Waste and Emergency Response (OSWER) *Environmental Justice Task Force Draft Final Report* (EPA 1994) recommends identifying minority or low-income communities in the vicinity of the proposed action to determine whether they may be disproportionately or adversely affected by the proposed action, identifying any proposed action health and safety risks, and proposing ways to distribute project information and potential effects to affected communities. Guidance provided by the Council on Environmental Quality (CEQ 1997) has been considered in developing the environmental justice analysis presented below.

Also addressed in this section is the proposed action's potential to generate disproportionately high environmental health and safety risks to children, as required under Executive Order 13045. This executive order was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. Under this order, the federal agency must ensure that its policies, programs, activities, and standards address disproportionate environmental health or safety risks to children that result from the project, described as those risks to health or safety that are attributable to product or substances that the child is likely to come into contact with or ingest. These impacts include increases in noise levels in public school areas, which could disrupt children while they are in a learning environment.

3.17.1 Affected Environment

Minority Populations

Information on the presence of minority populations in the vicinity of the home port site is found in the 1990 Census. The census provides information in terms of subregional areas. NASNI and the City of Coronado are within the Coronado Subregional Area (SRA), which includes Coronado Island southward along the Silver Strand, to the southern end of San Diego Bay. Although the census data are over 7 years old, they are the only statistical information currently available for population composition analysis. They are presented in Table 3.17-1.

The Coronado SRA is predominantly white. It has a much higher percentage of white persons and less ethnic diversity when compared to the larger Central Metropolitan Statistical Area that includes the Coronado, Central San Diego (downtown San Diego), Peninsula (Point Loma), National City, Southeast San Diego, and mid-city SRAs. These data indicate that residential areas adjacent to the project alternate site at NASNI do not contain a disproportionate minority population.

Table 3.17-1. Comparison of Minority Populations (1990 Census Data)

	Coronado SRA		Central Metropolitan Statistical Area	
Ethnicity	*Number*	*Percent*	*Number*	*Percent*
White	21,589	81.3	274,589	46.2
Black	1,766	6.7	86,392	14.5
Hispanic	2,191	8.3	165,570	27.8
Asian/Other	849	3.2	64,359	10.8
Total	**26,540**	**100.0**	**595,720**	**100.0**

Source: DON 1995a.

Income

The Coronado peninsula is separated from the other SRAs by San Diego Bay. Restricted in size and adjacent to the waterfront and beach, the area is an extremely desirable residential area. Census data characterize it as a middle- to high-level income community. Median household income in the Coronado SRA was 144 percent of the greater San Diego median income. Only 2.6 percent of the Coronado SRA population was characterized as below the poverty level, much lower than other SRAs in the San Diego region.

These income data also indicate the relative lack of lower income populations adjacent to the home port site at NASNI.

Public Participation and Informational Access

The proposed action has been subject to public participation as required under NEPA. The EIS Notice of Intent (NOI) was circulated to neighborhood and community groups who have demonstrated interest in or are considered likely to show interest in the environmental review process. A scoping meeting was held on February 10, 1997 (see section 1.6) to solicit input on the EIS scope of investigation. Public hearings to receive comments on the DEIS were held on October 27, 1998 in Coronado and October 28, 1998 in San Diego. The Navy also translated the toll-free information telephone message into Spanish regarding the project and where it was in the NEPA process. Notices were placed in the following local newspapers, *San Diego Union Tribune, Coronado Eagle/Journal, North County Times, San Diego Voice and View Point, Chula Vista Star News,* and *La Prensa*. *La Prensa* is a publications that is printed in Spanish.

Local Public Schools and Day Care Facilities

There are a total of four schools in the Coronado USD, the school district that potentially could be impacted by increased noise levels, located at varying distances from the project site. In addition, day care facilities are located within 0.25 miles of the proposed homeporting facilities.

3.17.2 Environmental Consequences and Mitigation Measures

The impacts on environmental justice associated with the capacity to homeport three aircraft carriers at NASNI would be from vehicles used in the construction of facilities and infrastructure (e.g., construction workers, supply vehicles, dump trucks, etc.) and from the physical presence of homeported carriers in port at NASNI at any one time (e.g., crew members, official vehicles, supply vehicles, etc.). As explained in section 3.0, where the capacity to homeport three aircraft carriers at NASNI exists, the number of homeported aircraft carriers physically present at any given time is essentially the same whether there are three carriers homeported at NASNI, as has been the case historically, or two carriers homeported at NASNI, as is the existing condition.

Impacts from the construction of facilities and infrastructure necessary to create the capacity to homeport one or more additional CVNs are measured in terms of the incremental increase in average daily trips at NASNI due to construction workers commuting to and from the construction site and the movement of construction materials and debris to and from the construction site. Impacts from the physical presence of homeported CVNs are measured in terms of the difference in crew size between a CV and a CVN. Even though the physical presence of two homeported aircraft carriers represents normal conditions when either two or three carriers are homeported at NASNI, the impact analysis is carried one step further, examining relative changes in impacts during those limited times (an average of 13 days per year) when three homeported aircraft carriers could be expected to be physically present at NASNI.

Significance Criteria

The proposed action would result in a significant impact on environmental justice if it would result in any one of the following:

- Degrading the health and safety of low-income or minority communities or children disproportionately when compared to the regional population;
- Causing a disproportionately high and adverse impact on members of low-income or minority communities adjacent to the proposed action area;
- Failing to provide for or encourage effective participation of members of low-income or minority communities adjacent to the proposed action area in the associated environmental review and decision-making process; or
- Relocating public schools within a 65 dBA CNEL contour that was not previously located in such an area.
- Substantially increase project air emissions of carbon monoxide (CO), toxic pollutants, or odors to sensitive receptors (such as day care centers and hospitals) in proximity to the project site.

Public participation in this environmental impact analysis is described in section 3.17.1.

3.17.2.1 *Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five)*

Alternative Five would not require any new projects.

Dredging/Mitigation Site

No dredging would take place, so there would be no impacts on environmental justice.

Facility Improvements

No construction would take place, so there would be no impacts on environmental justice.

Operations

Decommissioning of the remaining CV would not affect the historic capacity to homeport three carriers at NASNI. Therefore, no environmental justice impacts would occur.

3.17.2.2 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of construction of a CVN berthing wharf and dredging.

Dredging/Mitigation Site

Dredging, disposal, and mitigation site construction to provide the capacity to homeport one additional CVN would primarily affect the Coronado SRA. Considering demographics in the immediate vicinity of NASNI, there would not be a disproportionate effect on minority or low-income communities from dredging and disposal associated with the addition of one CVN.

Dredging and disposal impacts, would be experienced proportionally by all members of the community in the greater San Diego area (DON 1995a). Air quality impacts to the community generally would be greatest in proximity to the proposed emission sources, then decrease at a further distance from the emission sources. As a result, air quality impacts from the alternative would generally be the greatest in the City of Coronado. However, air quality impacts were determined to be insignificant (see section 3.10.2.2) and would be of a lesser impact at the more distant communities of San Diego.

Public schools and day care centers are all further from the noise source than the closest noise sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care centers would be located within a 65 dBA CNEL contour (see section 3.11.2.2). In addition, dredging activity would be short term and not located near any schools or day care centers. Schools and day care centers would not experience increased exposure to air quality emissions from dredging equipment. Therefore, impacts on environmental justice would be less than significant.

Facility Improvements

Facility improvement construction activity to provide the capacity to homeport one additional CVN would affect primarily the Coronado SRA. Considering the demographics of the local population, there would not be a disproportionate effect from construction on minority or low-income communities (DON 1995a). Construction impacts, including equipment traffic, noise, and air quality emissions, would be experienced proportionally by all members of the affected community in the San Diego area.

Public schools and day care centers are all further from the noise source than the closest noise sensitive receptor, and thus experience lower noise levels than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care centers would be located within a 65 dBA CNEL contour. Furthermore, as the schools and day care centers would not be located within a 65 dBA CNEL, they would necessarily be in compliance with the Noise Abatement Control Ordinance, which is less restrictive, allowing up to 75 dBA of construction noise for up to one hour (see section 3.11.2.2). The schools and day care centers would not experience increased exposure to air quality emissions from construction equipment. Therefore, impacts on environmental justice would be less than significant.

Operations

Providing the capacity to homeport one additional CVN would not subject minority or low-income individuals or children to environmental or health effects from proposed action operations apart from the rest of the population. Emissions resulting from one additional CVN would provide a less than significant contribution to health risks identified in a 1993 Human Health Risk Assessment completed at NASNI. Considering the demographics of the adjacent Coronado SRA, minority and low income populations in that community would not be impacted apart from the community as a whole. Air quality and traffic impacts would be dispersed over the greater San Diego area and would not disproportionately affect minority or low income communities. The potential risk for adverse health effects on minority or low income individuals or children would be minimal as a result of the project.

Providing the capacity to homeport one additional CVN, in association with the decommissioning of the remaining CV, would reduce most pollutant emissions from existing levels, which would result in less than significant air quality impacts. The main source of emissions would be commuter vehicles. This action would result in a minor increase of 175 commuter vehicles per day. Consequently, air quality impacts on children would be insignificant.

Public schools and day care facilities are all further from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care centers would be located within a 65 dBA CNEL contour (see section 3.11.2.2). The schools and day care centers would not experience increased exposure to air quality emissions from operations. In conclusion, operational impacts on environmental justice would be less than significant.

3.17.2.3 Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternatives One, Two, Three)

Alternatives One, Two, and Three that would provide the capacity to homeport two additional CVNs consist of the same construction of a CVN berthing wharf, relocation of the ferry/flag landing, and dredging that is associated with the capacity to homeport one additional CVN (Alternative Four), and minor additional utility and fencing upgrades.

Dredging/Mitigation Site

Dredging and disposal activity to provide the capacity to homeport two additional CVNs would be the same as required to provide the capacity to homeport one additional CVN, and would affect primarily the Coronado SRA. Impacts would be the same as discussed in section 3.17.2.2.

Facility Improvements

There would be minimal difference in the changes associated with providing the capacity to homeport a second additional CVN from those to provide the capacity to homeport one additional CVN. Construction of minor additional utility and fencing upgrades_to provide the capacity to homeport two additional CVNs would affect primarily the Coronado SRA. Considering the demographics of the local population, there would not be a disproportionate effect from this minor construction on minority or low-income communities (DON 1995a). Construction impacts, including equipment traffic, noise, and air quality emissions, would be experienced proportionally by all members of the affected community, including children, in the greater San Diego area.

Public schools and day care facilities are all further from the noise source than the closest sensitive receptor, and thus experience lower noise levels than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65 dBA CNEL contour. Furthermore, as the schools and day care facilities would not be located within a 65 dBA CNEL, they would necessarily be in compliance with the Noise Abatement Control Ordinance, which is less restrictive, allowing up to 75 dBA of construction noise for up to one hour (see section 3.11.2.3). The schools and day care centers would not experience increased exposure to air quality emissions from construction equipment. Therefore, impacts on environmental justice would be less than significant.

Operations

Providing the capacity to homeport two additional CVNs would not subject minority or low-income individuals or children to environmental or health effects from project operations apart from the rest of the population. Air quality impacts would be insignificant.. Considering the demographics of the adjacent Coronado SRA, minority and low income populations in that community would not be impacted apart from the community as a whole. Air quality and traffic impacts, including those occurring on the 13 days when all three CVNs would be in port at the same time, would be minor and dispersed over the greater San Diego area and would not disproportionately affect minority or low income communities. Impacts would be less than significant. In addition, air quality impacts from the project on children, including those at day care facilities in proximity to NASNI, would be less than significant.

Public schools and day care facilities are all further from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65 dBA CNEL contour (see section 3.11.2.3). The schools and day care centers would not experience increased exposure to air quality emissions from operations. In conclusion, impacts on environmental justice would be less than significant.

3.17.2.4 *No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging/Mitigation Site

Because no dredging would occur, there would be no impacts to environmental justice.

Facility Improvements

Because no construction would occur, there would be no impacts on environmental justice.

Operations

Environmental justice impacts would be the same as described for one additional CVN, as described in section 3.17.2.2.

3.17.2.5 Mitigation Measures

All other impacts on environmental justice would be less than significant. No further mitigation measures are proposed.

3.18 CUMULATIVE IMPACTS

In this section, the proposed action is analyzed in relation to the other projects in the region. Cumulative impacts on environmental resources result from the incremental effects of the project when added to other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from minor but collectively significant actions undertaken over a period of time. In accordance with NEPA, a discussion of past projects, those under construction, proposed projects, or projects that are reasonably anticipated in the near future are included. This section addresses the cumulative impacts associated with the action at NASNI that has the greatest potential for environmental impacts, either the Facilities for No Additional CVN: Capacity for Total of One CVN (Alternative Five), Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four), or Facilities for Two Additional CVNs: Capacity for Total of Three CVNs (Alternative One, Two, and Three), in combination with other future military and civilian projects in the area. In order to ensure a comprehensive impact analysis, this section considers the region of influence for each environmental resource area for which cumulative impacts are evaluated, and the timeframe during which all reasonably foreseeable projects would occur. The combined impact of the proposed action and reasonably foreseeable projects is discussed. When the proposed action's incremental contribution to the cumulative impact is significant, mitigation is proposed to reduce this effect. Guidance provided by the Council on Environmental Quality (CEQ 1997) has been taken into account in developing the cumulative analysis presented below.

Past, Present, and Reasonably Foreseeable Projects

A total of 25 approved, planned, and reasonably foreseeable projects have been included in this analysis (personal communication, C. Jallo 1997; Gail Brydges 1998; Patrick McCay 1999). These projects are identified on Figure 3.18-1 and summarized below.

1. Naval Training Center San Diego Disposal and Reuse

The Naval Training Center (NTC) San Diego was approved for closure by Congress in September 1993 and the base was operationally closed in April 1997. The Navy will dispose of the 429-acre NTC property for reuse by another party(ies). The City of San Diego has prepared a Draft Reuse Plan for NTC San Diego and is the Local Redevelopment Authority (LRA) for base reuse.

2. North Bay Redevelopment Study Area

The proposed North Bay Redevelopment Plan includes recommendations for blighted areas in the Midway/Pacific Highway Community, as well as portions of the Peninsula Community. The City is currently preparing an Environmental Impact Report (EIR) to address potential impacts of the North Bay Redevelopment.

3. Lindbergh Field Expansion

The San Diego Unified Port District is in the process of implementing its Immediate Action Program (IAP), which was designed to relieve immediate congestion at Lindbergh Field. The IAP consists of several facility-related improvements that are necessary to accommodate projected increased passenger demand. These improvements were completed in January 1998.

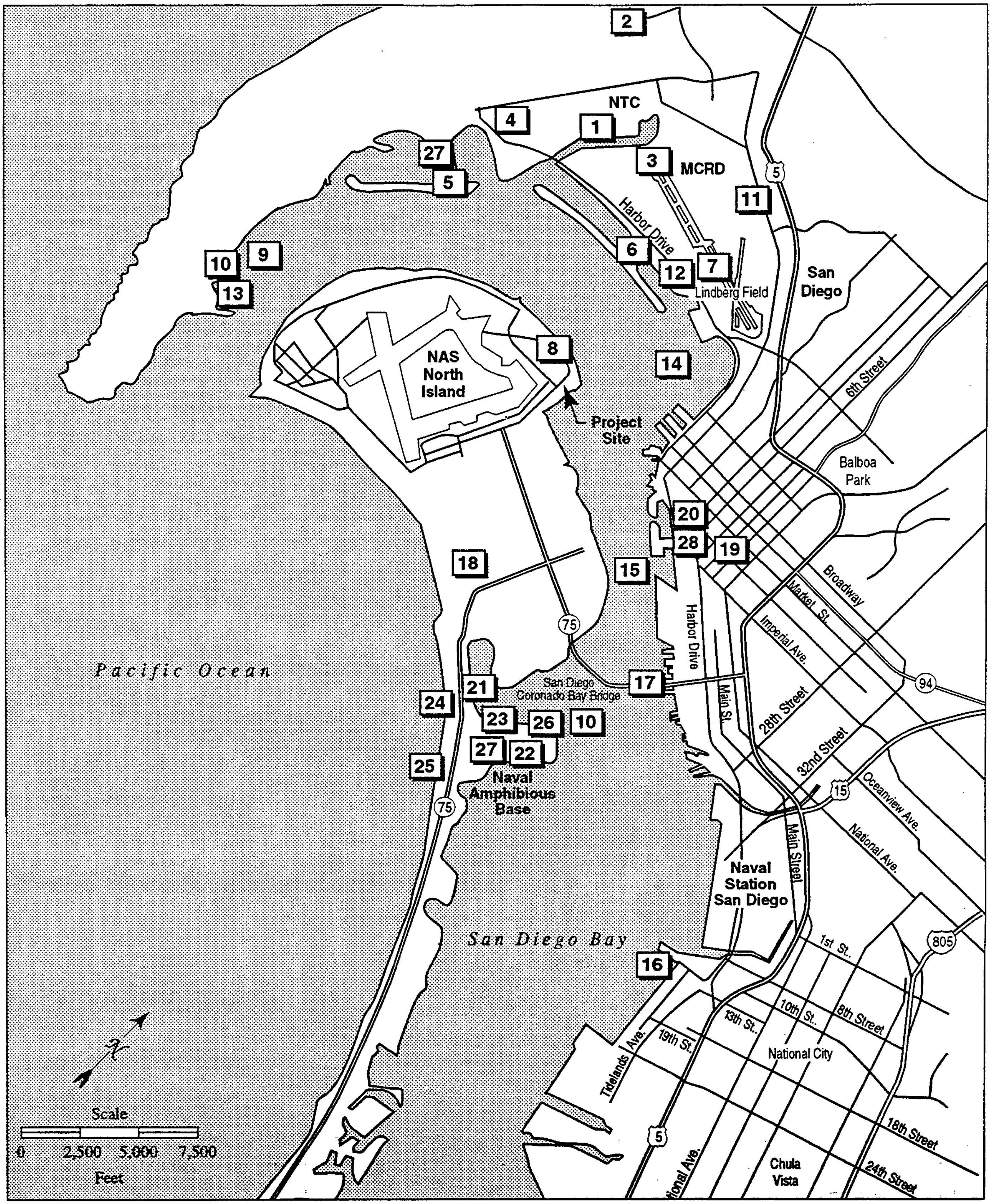

Figure 3.18-1. Projects Considered in Cumulative Impact Analysis

4. Military Family Housing

A military family housing project is proposed including 500 dwelling units on approximately 50 acres of an 87-acre site adjacent to the NTC San Diego disposal and reuse project boundary. The Navy currently owns the proposed family housing site that was originally part of NTC San Diego.

5. Kona Kai Development

A Final EIR has been prepared for this project and consists of the demolition of the present Kona Kai Club and Hotel that was built in 1958. The structures would be replaced with a two-level underground parking garage that could accommodate 900 vehicles, four structures limited to 41 feet in height, and extensive landscaping. The new facility would include a 318-room hotel; present operations of the Kona Kai Club would continue.

6. Ritz-Carlton Hotel

A Final EIR for the East Harbor Island Hotel, Infrastructure, and Plan Amendment has been prepared. The site consists of 6.4 acres of hotel development, 1.16 acres of open space (landscape and hardscape), and 0.85 acre of water area for a hotel guest dock or mooring facility.

7. Lindbergh Field Master Plan

The San Diego Unified Port District is preparing a Lindbergh Field Master Plan for the airport and surrounding airport-related properties, including the previous General Dynamics site and NTC San Diego. The update will address existing and future operations, future demand, capacity, and expansion alternatives for Lindbergh Field. The Master Plan and environmental process is expected to be completed by mid-1999.

8. BRAC CVN Homeporting

The 1993 Base Closure Commission recommended relocation of ships homeported previously in NAS Alameda to fleet concentrations in San Diego and the Pacific Northwest. The Navy prepared an EIS for the development of facilities to support one aircraft carrier at NASNI (DON 1995a). The Navy began dredging operations in September 1996 to accommodate the aircraft carrier berthing area and the vessel is in operation at NASNI.

9. Submarine Base

The Navy proposes to transfer submarine maintenance capabilities from the USS MCKEE and establish them at Submarine Base San Diego (SUBASE) near the existing submarine berths, drydock, and non-radiological maintenance building, or established at other facilities within Naval Port San Diego. The maintenance capabilities to be retained at SUBASE would include welding, pipe, insulation, valve, and pump shops, and the capability to support routine radiological maintenance. The only construction required under the proposed action would be a minimum-footprint Submarine Support Facility (SSF), to be constructed on a developed site at SUBASE. This action was addressed in an Environmental Assessment prepared in September 1998 (DON 1998).

10. Point Loma Military Sealift Command, Pacific

The Military Sealift Command, Pacific (MSCPAC) recently relocated to Submarine Base San Diego as a result of two BRAC-related closures. This project will completely renovate four existing administrative buildings and partially renovate two more for occupation by approximately 315 personnel.

11. Space and Naval Warfare Systems Command Program (SPAWAR)

As part of the Navy's Space and Naval Warfare Systems Command (SPAWAR) program, 900 personnel associated with this project were relocated from Washington, D.C. to the former Airforce Plant 19, known as "Oldtown Campus," which is located on Pacific Highway (Highway 1). Completion of this move occurred in late 1997.

12. North Embarcadero Planning District Master Plan

The North Embarcadero Alliance was organized to prepare a Visionary Plan to guide urban development in North Embarcadero, a 287.8-acre area. A consultant planning team was recently selected to assist in preparation of the Master Plan, which was completed in 1998.

13. USS CORONADO

The Navy has directed that the USS CORONADO be relocated from her current berth at Naval Station, San Diego to Naval Submarine Base, San Diego. The only construction associated with this proposed action is the installation of a fiber optics cable in an existing conduit.

14. Central Bay Dredging

A Feasibility Study is in progress to study the effects of dredging approximately 1.96 million cubic yards (cy) of sediment in the San Diego Central Bay. This dredging would deepen the channel to approximately 45 feet MLLW. This project would request federal funding in the year 2000, and would not begin until that year.

15. Bay Dredging

A reconnaissance survey has been completed and a request for funding submitted to complete a feasibility study for dredging from the San Diego Bay Bridge to the National City Marine Terminal. Dredging would deepen the channels to -45 MLLW and require phased dredging totaling 15 mcy of material. This project has not been authorized, as it has not been determined if there is a federal interest. The project would seek appropriations in 2004, and it has not been determined when dredging would begin.

16. Development of Facilities to Support Deep-Draft, Power Intensive Ships

The Navy proposes dredging, disposal, and pier replacement at NAVSTA San Diego Piers 10/11 in order to accommodate Deep-Draft, Power Intensive (DDPI) ships. Approximately 536,000 cy of material would be dredged, of which approximately 268,000 cy would be unsuitable for ocean disposal. Alternatives to this project include replacement of Pier 12 or Pier 14. The Pier 12 replacement would generate approximately 206,000 cy of sediment unsuitable for ocean disposal, while replacement of Pier 14 would generate approximately 40,000 cy of sediment unsuitable for ocean disposal. A variety of alternatives for disposing of the unsuitable sediments are being analyzed, including creating additional land area adjacent to NAVSTA San Diego piers, placement of sediment in Confined Aquatic Disposal (CAD) facilities in San Diego Bay, disposal in an upland landfill, or sediment placement on commercially or industrially designated lands within San Diego and southern Orange Counties that have been determined to meet waiver criteria established by the California Regional Water Quality Control Board for this use. The berths would be deepened to –37 feet MLLW. Pier dimensions would be 120 feet wide and 1,458 feet long, and utility upgrades would be required. The project is scheduled for development in 2001.

17. San Diego-Coronado Bridge Seismic Retrofit Financial Plan

The San Diego County Association of Governments (SANDAG) is considering removing tolls for vehicles crossing the San Diego-Coronado Bridge. The tolls are used for a variety of trip reduction programs, and serve to encourage carpooling (two or more occupants travelling in the same vehicle do not pay the toll). An initial study has been prepared (SANDAG 1998) that estimates removal of bridge tolls would result in an approximate 10 percent increase in average daily traffic volume. Added traffic would impact nearby surface streets, including Third and Fourth Streets and Orange Avenue, while traffic on the Silver Strand and Palm Avenue (including in Imperial Beach) would decrease. The initial study (SANDAG 1998) proposes several possible measures to improve traffic and safety conditions, including added lanes, new intersection traffic signals, a tunnel from the west end of the bridge to the NASNI Main Gate under 4th Street, and traffic calming devices (narrowing the striping between lanes, decreasing number of lanes, or placing meter boxes to slow traffic) between the toll booths to be removed and 3rd Street and 4th Street. A potential date for removing the bridge tolls has not been identified.

18. Hotel Del Coronado Master Plan

The proposed Hotel Del Coronado Master Plan includes renovation and consolidation of existing facilities, and new facilities: 206 hotel rooms, 15,200 square feet of meeting space, a 12,000 square foot spa, and 146 parking spaces. A reduction of 46,000 SF of building space currently used for laundry (40,000 SF) and retail (6,000 SF) would partially offset the expansion, resulting in a net increase of 187,200 SF of building space. Development would occur between 1999 and 2001.

19. Center City East District Expansion

Preparation of an EIR is currently underway for construction of a new baseball park and redevelopment with recreational and retail facilities within the Centre City East District in downtown San Diego. The primary development area would include: the 42,000 seat ball park; a 3-4 acre park; 276,000 SF of sports-related retail and entertainment space; 5,000 parking spaces for ballgames (parking structure and surface lots); and infrastructure improvements (roadways, plazas, utilities). Land Use Regulation Changes would be required as part of this project, as the ball park facility was not included in the previously approved Centre City Redevelopment Plan, Community Plan, and Planned District Ordinance. Construction would occur from 2000 through February 2002.

20. Convention Center Expansion

The Port District of San Diego proposes to double the size of the convention center, adding 864,000 SF of convention floor space including exhibit halls and meeting rooms. Construction is underway and would continue through May 2001 (personal communication, Sal Ochoa 1999).

21. Glorietta Bay Master Plan

This proposal would result in doubling the size of the existing convention center at Glorietta Bay, requiring demolition of existing recreational facilities. Improvements could include a theater/playhouse, relocation of the Coronado City Hall, and co-locating an Engineering Department Building. No timeframe has been established for these improvements.

22. Operational Storage Facility

This project would involve the expansion, renovation, and new construction of support facilities, operational locker rooms, and craft storage immediately adjacent to and south of the SOF – PC Pier Upgrade (project No. 23) site. It would provide additional facilities for storage of small craft and safety equipment as well as office space for administrative staff needed to support the increased number of small craft at NAB Coronado. Project impacts are assessed in the Environmental Assessment, May 1997, which analyzes this project and the SOF – PC Pier Upgrade. Construction began in December 1998 and is expected to last for 10 months.

23. SOF — PC Pier Upgrade

This project would provide facilities for berthing and operations of four Patrol Coastal (PC-1 Class) ships on the northern shore of the main NAB. Construction includes demolishing existing Pier 15, then dredging and building a new pier 150 feet (46 m) to the east. An additional four officers and 24 enlisted men for each ship (total of 112 personnel) would be required. The project also includes construction of a boat launch/recovery ramp. Construction began in October 1997 and was completed in June 1998.

24. CNSWC Headquarters Addition

The project will develop an additional 21,000 SF at the Naval Special Warfare Command Headquarters building, on the ocean side of NAB Coronado. It would provide offices, an auditorium, and associated storage to support growth of the staff. Construction would last one year and is scheduled to begin in 1999.

25. Operations and Logistics Facility

This facility will provide an 81,840 SF permanent four-story building for operational storage and adjunct administration functions for Seal Teams One and Three. The project is located on the ocean side of NAB in a developed portion of the base. Construction is underway and will be completed in 1999.

26. Explosives Ordnance Disposal Mobile Unit Three (EODMU) Waterfront Operations Facility

The EODMU Waterfront Operations Facility would be a permanent low-maintenance facility consisting of several buildings and a pier, totaling 27,578 SF. A floating causeway would provide for access to marine mammal pens that would be relocated to the proposed project site from their current location at the southeast corner of NAB. A jib crane located on the concrete pier would provide waterfront loading capacity and transferring the marine mammal systems. A Finding of No Significant Impact (FONSI) was signed for this project in September 1998, and construction is scheduled to begin in June 1999.

27. Campbell Shipyard Hotel Development

Negotiations for potential hotel construction at the Campbell Shipyard are currently in progress. The hotel would include a maximum of 1,400 rooms, possibly a marina, a large parking area, and meeting room facilities. Preparation of the site for hotel construction would require cleanup of existing contaminated materials. Hotel construction would require a Port Master Plan amendment to rezone the area from maritime/industrial to commercial/recreational. No construction date has been set for this project, although construction would occur over an approximate 30-36 month period (personal communication, Karen Wyman, 1999).

28. America's Cup Harbor Redevelopment

A master plan amendment for this 350-acre harbor area would allow for redevelopment of existing facilities. Cleanup activities at existing boatyards were recently completed, and conversion of the boatyards to a marina is proposed. Other proposed project activities include reconfiguring public open space areas, converting vacant properties to commercial/recreational areas, and modifying the existing parking facilities. The plan amendment would be finalized in approximately April 2000, and construction would begin at that time (personal communication, Bill Briggs 1999).

In addition to the reasonably foreseeable projects defined above, Table 3.18-1 shows the change in bay coverage from Navy wharves, piers, and floating docks. These factors are taken into account in the discussion of cumulative impacts on marine biology, section 3.18.5.

Cumulative Impacts for Each Environmental Resource

3.18.1 Topography, Geology, and Soils

The region of influence for topography, geology, and soils includes the greater San Diego Bay region, due to the interrelated nature of the geology and soils of this region. The time frame for projects considered in this analysis includes past, present, and reasonably foreseeable projects. Past projects are included in the cumulative impact analysis since existing structures would be exposed to the same earthquake-related hazards as those affecting reasonably foreseeable project construction. Significance criteria described in section 3.1.2 are applicable to the cumulative analysis.

Analysis of the geographic distribution of past, present, and reasonably foreseeable projects suggest that, with the exception of project Nos. 9, 10, and 13 located at Point Loma, the projects are

Table 3.18-1. Change in Bay Coverage from Navy Wharves, Piers, and Floating Docks

Item	*Width (ft)*	*Length (ft)*	*Width (m)*	*Length (m)*	*SF*	*SM*	*Acres*	*Hectares*
Ramp notch P-211 (NAB)	40	40	12.19	12.19	1,600.00	148.64	0.04	0.01
New Pier P-211 (NAB)	-30	-455	-9.14	-138.68	-13,650.00	-1,268.13	-0.31	-0.13
Pier 15 Demo P-211 (NAB)	15	350	4.57	106.68	5,250.00	487.74	0.12	0.05
Floating (access) Dock P-144 (NAB)	-14	-60	-4.27	-18.29	-840.00	-78.04	-0.02	-0.01
Brow P-144 (NAB)	-6	-20	-1.83	-6.10	-120.00	-11.15	0.00	0.00
Floating (access) Dock P-144 (NAB)	-20	-100	-6.10	-30.48	-2,000.00	-185.81	-0.05	-0.02
Jib Crane Pier P-144 (NAB)	-20	-84	-6.10	-25.60	-1,680.00	-156.08	-0.04	-0.02
CB Pier Demo (NAB)					15,750.00	1,463.22	0.36	0.15
Recreational Pier (NAB)	-14	-100	-4.27	-30.48	-1,400.00	-130.06	-0.03	-0.01
Small Craft Pier P-187 (NAB)	15	412	4.57	125.58	-6,180.00	-572.14	-0.14	-0.06
New Pier P-326 (NAVSTA)	-120	-1,458	-36.58	-444.40	-174,960.00	-16,254.32	-4.02	-1.63
Pier 11 Demo P-326 (NAVSTA)	30	1,458	9.13	444.40	43,740.00	4,063.58	1.00	0.41
Pier 10 Demo P-326 (NAVSTA)	30	1,458	9.13	444.40	43,740.00	4,063.58	1.00	0.41
New Pier P-327 (NAVSTA)	-120	-1,458	-36.58	-444.40	-174,960.00	-16,254.32	-4.02	-1.63
Pier 12 Demo P-326 (NAVSTA)	30	1,458	9.13	444.40	43,740.00	4,063.58	1.00	0.41
P-700 Wharf (NASNI)	-90	-1,300	-27.43	-396.24	-117,000.00	-10,869.66	-2.69	-1.09
Mark V mooring P-653 (NASNI)					-3,096.00	-287.63	-0.07	-0.03
Mark V finger piers P-653 (NASNI)					-2,466.00	-229.10	-0.06	-0.02
P-700A Wharf (NASNI)	-90	-1,300	-27.43	-396.24	-117,000.00	-10,869.66	-2.69	-1.09
Pier J/K Demo P-700A (NASNI)					62,360.00	5,793.43	1.43	0.58
Pier 9 Demo (ASW)					12,600.00	1,171.00	0.29	0.12
Ferry Pier (ASW)					-2,230.00	-228.00	-0.05	-0.02
P-122 Demo (SUBASE)	25	120	7.62	36.58	3,000.00	278.71	0.07	0.03
P-122 Pens (SUBASE)	-12	-186	-3.66	-56.69	-2,232.00	-207.36	-0.05	-0.02
TOTAL					-388,034.00	-36,049.54	-8.91	-3.60

Notes: Calculation is for coverage only. Bay fill is usually mitigated by creating more bay through excavation.
CB Pier calculation based on seven floating pier sections (25'x90') recovered in May 1996. The CB Pier brow is not included in the calculation.

Item	*Quantity*	*Width (ft)*	*Length (ft)*	*Width (m)*	*Length (m)*	*SF*	*SM*	*Acres*	*Hectares*
Pier Sections	7	25	90	7.62	27.43	15,750.00	1,463.22	0.36	0.15

generally dispersed throughout the area. A significant seismic event, however, would have the potential to affect all of the project sites concurrently.

Creating the capacity for homeporting two additional CVNs (Alternatives One, Two, or Three) would result in a small incremental increase of people and property exposed to earthquake-related hazards. Reasonably foreseeable projects in the San Diego Bay region involving new structural development (e.g., Lindbergh Field Expansion, Military Family Housing, Kona Kai Development, Ritz-Carlton Hotel, BRAC CVN Homeporting, Submarine Base, Development of Facilities to Support DDPI Ships, Campbell Shipyard Hotel) would be exposed to earthquake-related hazards such as ground acceleration, ground shaking, fault rupture, liquefaction, and settlement. Most of these reasonably foreseeable projects are also located adjacent to the San Diego Bay where hydraulic fill soils with a high potential for liquefaction are prevalent. This would intensify an adverse cumulative effect during a substantial seismic event.

Potential seismic impacts associated with the proposed action, in combination with potential seismic impacts associated with past and reasonably foreseeable projects, could potentially result in increased cumulative impacts from the overall loss of use of naval facilities, airport facilities, and hotel facilities in the San Diego Bay region. The proposed action (Alternatives 1,2 or 3) would add incrementally to risks to property and human safety associated with geologic hazards and erosional hazards; however measures incorporated into the proposed action would reduce the incremental effects such that there would not be a cumulatively significant impact.

Creating the capacity for homeporting two additional CVNs would also result in a small incremental increase of people and property exposed to flooding hazards in the event of 100-year storms. Those projects adjacent to the shoreline could also be subject to tsunamis and seiches, although these hazards are extremely rare and would likely not occur during the projects' operational lifespan. Potential flooding impacts associated with the proposed action, in combination with potential flooding impacts associated with past and reasonably foreseeable projects, may result in increased cumulative impacts with respect to overall loss of use of naval and visitor-serving retail facilities along the Bay waterfront area (e.g. project Nos. 5, 6, 8, 9, 10, 12, 13, 16, 27, and 28). However, potentially significant cumulative impacts would be reduced to a level of insignificance by components of the project design, including incorporation of building code regulations and flood control measures.

Future project construction would be completed primarily within previously developed areas where the topography is generally flat. However, construction could result in excessive soil erosion and resultant water quality impacts if not completed properly. Although most of these projects are geographically separated, potential erosional impacts associated with the proposed action, in combination with potential erosional impacts associated with past and reasonably foreseeable projects, may result in increased cumulative impacts with respect to water quality impacts (surface water and marine waters) in the San Diego Bay area. However, potentially significant cumulative impacts would be reduced to a level of insignificance by components of the project design, including soil compaction and incorporation of standard erosion control measures.

Reasonably foreseeable projects involving dredging (i.e., BRAC CVN Homeporting, Central Bay dredging, Bay dredging, Development of Facilities to Support DDPI Ships) would create an incremental increase in bathymetry changes in San Diego Bay. Dredging would temporarily disrupt submarine depositional processes, however, depositional equilibrium would be reestablished within a short period of time and no regional, long-term depositional disruptions would occur. Dredging would primarily occur within previously dredged areas. Impacts would generally be confined to the immediate vicinity of the dredged area and would be less than significant. Because projects included in the cumulative analysis are geographically separated and potential impacts are confined to the immediate vicinity of the dredged area, impacts associated with dredging at the proposed action site, in combination with potential dredging impacts associated with past and reasonably foreseeable projects, would not result in increased cumulative impacts.

3.18.2 Terrestrial Hydrology and Water Quality

The region of influence for terrestrial hydrology and water quality includes the San Diego Bay watershed, the area in which local water sources are related. Past, present and reasonably foreseeable projects occurring in this area that impact local water quality also have the potential to impact water quality of the region as a whole. Projects considered in this analysis are reasonably foreseeable projects expected to occur from 1998 to 2005, as well as past projects that have influenced the water quality of the region. Due to the high level of industrial activity in the region, bay waters have historically been subject to contaminants from runoff. Significance criteria described in section 3.2.2 are applicable to this cumulative analysis.

Analysis of the distribution of reasonably foreseeable projects identified suggests that, with the exception of the proposed Bay Dredging project (No. 15), reasonably foreseeable Navy and non-military projects do not have time frames identified. However, with the exception of Navy projects Nos. 9, 10, 13, and 28 at Point Loma, the distribution of these projects is generally distant such that if they did occur simultaneously, their cumulative effects would be lessened due to their geographical separation. Creating the capacity for homeporting two additional CVNs (Alternatives One, Two, or Three) would include standard erosion control measures and pollution control measures to reduce construction impacts on surface water or groundwater quality to below a level of significance. Construction and operations of several reasonably foreseeable projects located within the region of influence (e.g., Lindbergh Field Expansion, Military Family Housing, Kona Kai Development, Ritz-Carlton Hotel, BRAC CVN Homeporting, Submarine Base, Campbell Shipyard Hotel, and America's Cup Harbor Redevelopment), could produce discharges which would flow into surface or groundwater sources. If not designed properly, these projects could result in stormwater quality degradation, contaminating discharges, release of toxic substances, and release of hydrocarbons or related contaminants. Sediment disposal associated with reasonably foreseeable dredging projects could also have similar effects.

Although most of these projects are geographically separated, potential water quality impacts associated with the proposed action, in combination with potential water quality impacts associated with past and reasonably foreseeable projects, may result in increased cumulative water quality impacts in the San Diego Bay area. All of these projects, including the proposed action would be required to comply with applicable federal, state, and local regulations such as a National Pollutant Discharge Elimination System (NPDES) permit, mandating management plans to regulate soil and groundwater contamination, and hazardous materials releases. These measures would reduce potential cumulative impacts to a level of insignificance. Soil and groundwater remediation related to creating the capacity for homeporting two additional CVNs, in conjunction with any similar remediation occurring during other related project development in the vicinity, would be a beneficial cumulative impact.

3.18.3 Marine Water Quality

The region of influence for potential cumulative impacts on marine water quality includes the San Diego Bay and the ocean dredged material alternative disposal site, LA-5. The time period considered includes recent historical and present-day conditions, as well as future projects. Significance criteria used to evaluate cumulative impacts to marine water quality are the same as those used to evaluate project-specific impacts. As described in section 3.3, impacts to water quality from the proposed action are associated with the following: (1) resuspension of sediments during the dredging and pier construction activities causing localized and temporary increases in turbidity; (2) contaminant inputs from leaching anti-fouling hull paints, metal corrosion, and sacrificial anodes; and (3) potential contaminant inputs from accidental spills. Temporary resuspension of sediments and associated increases in turbidity would also occur at the proposed mitigation site, and temporary increases in suspended particle concentrations and turbidity would occur at the NAB Enhancement Area or LA-5. Overall, impacts to marine water quality from the proposed action would be less than significant. Proposed action mitigation measures would ensure that contaminant releases would be reduced to insignificant levels in areas adjacent to the pier improvement and disposal sites.

Reasonably foreseeable projects within the project vicinity affecting marine water quality include both Navy and San Diego Port Authority projects that require dredging and disposal of bay sediments. Analysis of the distribution of past, present, and reasonably foreseeable projects suggests that many of the naval projects are clustered at NAVSTA, NAB, NASNI, Point Loma, and NTC. Construction of the projects at each naval facility would be spread out over time, such that the activities that are close geographically would not generally occur simultaneously. Other reasonably foreseeable non-military projects do not have time frames identified. The distribution of these other reasonably foreseeable development projects, however, are generally dispersed over a large area such that if their construction periods did overlap in time, their cumulative effects on marine water quality would be minimized. Because impacts to the quality of bay waters from dredging projects are typically localized and temporary, cumulative impacts to water quality from individual reasonably foreseeable dredging projects that are separated by time and space would be insignificant.

The proposed action including pier improvements and construction of a mitigation site would result in some minor, localized changes in circulation (bay currents) from modifications to bathymetry. These effects would be short-term and would not result in hydrologic conditions that would cause persistent adverse effects to water quality, navigation, or biological resources. Most reasonably foreseeable development projects are local in their scope and effect (e.g., naval dredging projects, San Diego Port Authority projects, Glorietta Bay Master Plan). Major dredging projects including the Central Bay Dredging and Bay Dredging, could contribute cumulatively to substantial changes to circulation. The proposed action, including deepening the area adjacent to Pier J/K, would only minimally contribute to this cumulative effect.

Reasonably foreseeable projects that involve land-based demolition or construction adjacent to San Diego Bay could result in increased transport of contaminants by stormwater runoff that, if not contained, could significantly impact marine water quality. Wastewater and stormwater runoff from the proposed action would be regulated under an NPDES permit. Compliance with permit conditions, as well as proposed mitigation measures including establishment of project-specific Best Management Practices (BMPs), implementation of standard erosion control measures, and implementation of spill prevention and containment measures, would ensure that the proposed action would not contribute to significant cumulative impacts on marine water quality. Other reasonably foreseeable projects would also be subject to these regulations. Therefore, the cumulative impact on marine water quality would result from several actions whose individual effects would have been reduced to less than significant, and their combined impact would be less than significant.

Anti-fouling paints applied to the hulls of naval, commercial, and recreational vessels represents a major source for copper inputs to the bay. The magnitude of this input source would likely change in relation to the number and size of vessels berthed in the bay, and future development and use of hull coating formulations that do not depend on biocidal components. The number of Navy ship homeported in San Diego has seen a steady reduction from 76 ships in 1992 to 55 ships in 1999, resulting in a lessening of cumulative impacts from copper inputs. The time frame for adoption of non-copper-based hull paints within the region is uncertain.

Section 303(d) of the Clean Water Act requires states to identify water bodies with limited or impaired water quality. Impaired conditions are those in which technology-based or more stringent effluent limitations or best management practices are not sufficient to meet applicable water quality standards. For water bodies meeting these criteria, the state is required to establish Total Maximum Daily Loads (TMDLs) for the specific pollutants impacting water quality. Specific areas of San Diego Bay have been proposed by the San Diego Regional Water Quality Control Board (RWQCB) as impaired with respect to beneficial uses, as part of the Section 303(d) listing process, due to presence of contaminants or bacteria in waters and/or sediments. For some contaminants, such as chlordanes, DDTs, PCBs, and other materials whose use in the United States has been banned, present inputs are expected to be very small compared to historical inputs. However, insufficient information presently exists to evaluate the relative magnitude of specific input sources for individual contaminants to San Diego Bay.

Although the impacts on water quality associated with individual reasonably foreseeable projects are likely to be less than significant, cumulative effects on marine water quality from historical inputs combined with other present, and future projects may constitute impaired water quality. Cumulative changes could be considered significant if they cause incremental increases in certain contaminants or in areas that are already affected by historical waste discharges. As mentioned, the proposed action would result in less than significant impacts on marine water quality. However, proposed action-specific activities, combined with those of other reasonably foreseeable projects, would contribute to the total watershed-based inputs of contaminants into San Diego Bay. For those water bodies in which present beneficial uses are impaired, a TMDL process could be initiated by the RWQCB to determine quantitatively the important input sources and appropriate load allocations.

Compared to the temporary and localized effects from dredging operations, the effects from multiple chemical spill events, both within the bay and within the watershed, can be of greater seriousness. The potential significance of cumulative impacts to water quality resulting from combined reasonably foreseeable activities depend on the location, size, and frequency of the events and the nature of the material released to the environment. The magnitude and location of potential spill events can not be predicted. OPNAVINST 5090.1B delineates responsibilities and issues policy for the management of the environmental and natural resources for all Navy ship and shore activities. NASNI piers have hose connections for all ships including bilge water to the oily waste treatment plant and sanitary sewer connections to the sewer system. Fuel and oil transferred by hose to the ships is regulated by the State Lands Commission under California's Oil Spill Prevention and Response Act of 1990. The State Lands Commission and the Coast Guard signed a memorandum of understanding in January 1991 to coordinate pollution prevention programs at marine terminals that transfer fuel. These programs would reduce the incremental impact on water quality resulting from accidental chemical spills such that there would not be a cumulatively significant impact.

3.18.4 Sediment Quality

The region of influence of potential cumulative impacts on sediment quality is within the San Diego Bay. The time period considered includes historical and present-day conditions, as well as future projects. The significance criteria used to evaluate cumulative impacts to sediment quality are the same as those used to evaluate project-specific impacts (section 3.4.2). Impacts to sediment quality from the proposed action are associated with the following: (1) potential changes to the texture of bottom sediments in dredged areas and in the vicinity of pier construction activities; (2) contaminant inputs to bottom sediments from leaching anti-fouling hull paints, metal corrosion, and sacrificial anodes; and (3) potential contaminant inputs to bottom sediments from accidental spills. Discovery of ordnance contamination would not impact sediment quality, as any ammunition discovered would likely be intact, and would therefore not leach any contaminants into the soil. Overall, the impacts to sediment quality from the proposed action are expected to be less than significant.

The BRAC CVN and NAVSTA pier deepening and maintenance dredging projects would have direct impacts on sediment quality that are similar to those described for the proposed action. Other non-military dredging projects would also have similar impacts to sediment quality. Dredging would contribute to larger-scale changes in the sediment texture. In particular, dredging would likely remove the more recently deposited sediments with generally finer grain sizes, compared to sediments associated with the underlying Bay Point Formation. Therefore, bottom sediments in dredged areas could have a coarser texture than the existing (i.e., pre-dredging) sediments. Dredging would also likely remove some of the sediment-associated chemical contaminants from the bay, as sediments would be places in an upland disposal site, so they would no longer impact the bay. Several of these projects, in particular the NAVSTA dredging projects and Port of San Diego dredging projects, would involve dredging and removal of large volumes of chemically-contaminated sediments. Some sediments resuspended during dredging and construction would be dispersed to adjacent areas where they would settle back to the bottom. However, the volume of sediments dispersed would be small compared to the total dredging volumes. To the extent that the proposed action and other reasonably foreseeable dredging projects would collectively contribute to overall reductions in the present contaminant loads in bay sediments, the cumulative impacts to sediment quality from the proposed action would be beneficial.

Many other reasonably foreseeable projects involve land-based demolition or construction adjacent to San Diego Bay. These other reasonably foreseeable projects could result in increased transport of contaminants by stormwater runoff that, if not contained, could significantly impact sediment quality. All of these reasonably foreseeable projects, however, would be required to comply with the applicable federal, state, and local regulations such as NPDES permits, mandating management plans to regulate soil and groundwater contamination, and hazardous materials releases. Therefore, the cumulative impact on sediment quality would result from many actions whose individual effects would have been reduced to less than significant. The proposed action and other reasonably foreseeable development projects would be located throughout the bay and would not likely be occurring at the same time. Therefore, their cumulative effect on sediment quality would be less than significant, as the concentrations of any discharges and releases would be diffused over space and time.

Similar to those impacts discussed for marine water quality above, cumulative impacts on sediment quality from dredging operations associated with the combination of the proposed action and other reasonably foreseeable projects would be less than significant and potentially beneficial. However, some areas of San Diego Bay presently contain elevated sediment contaminant concentrations, which could be used by the RWQCB as the basis for designating impaired water bodies. Although the impacts associated with individual projects would be less than significant, cumulative changes to sediment quality from historical inputs combined with the proposed action, together with other past, present, and reasonably foreseeable projects, could constitute a significant impact to beneficial uses in specific water segments of the bay. For those water bodies in which contaminant levels exceed the applicable criteria, a TMDL process could be initiated by the RWQCB to determine quantitatively the important input sources and appropriate load allocations.

Anti-fouling paints on naval, commercial, and recreational vessels represent a major source for copper inputs to the bay. The magnitude of this input source would likely change in relation to the number and size of vessels berthed in the bay and future developments of hull coating formulations that do not depend on biocidal components. The number of Navy ship homeported in San Diego has steady decreased from 76 ships in 1992 to 55 ships in 1999. Therefore, cumulative impacts from naval operations to copper inputs would likely decrease.

Compared to the temporary and localized effects from dredging operations, the effects from multiple spill events both within the bay and within the watershed can be more serious. Potentials for significant cumulative impacts to sediment quality would depend on the location, size, and frequency of spill events and the composition of the material spilled. The magnitude and location of potential spill events can not be predicted. OPNAVINST 5090.1B delineates responsibilities and issues policy for the management of the environmental and natural resources for all Navy ship and shore activities. NASNI piers have hose connections for all ships including bilge water to the oily waste treatment plant and sanitary sewer connections to the sewer system. Fuel and oil transferred by hose to the ships is regulated by the State Lands Commission under California's Oil Spill Prevention and Response Act of 1990. The State Lands Commission and the Coast Guard signed a memorandum of understanding in January 1991 to coordinate pollution prevention programs at marine terminals that transfer fuel. These programs would reduce the incremental impact on water quality resulting from accidental chemical spills such that there would not be a cumulatively significant impact.

3.18.5 Marine Biology

The marine biological resources region of influence includes much of San Diego Bay, due to the influence of ocean current and tidal transport. This is based on the substantial historical degradation that has occurred to many marine habitats and species throughout San Diego Bay (SAIC 1998). These historical conditions are particularly relevant when considering the potential for cumulative impacts. Similarly, despite the lack of quantitative data to show long-term trends for many marine biological resources, historical (e.g., a few decades), present, and potential future impacts represented by the 28 reasonably foreseeable projects are used to address potential cumulative impacts.

Like most bays and harbors located near large urban centers, the health of San Diego Bay and its biological resources has been substantially affected by human activities (e.g., dredging and construction activities) during the past century. Several factors, however, support the conclusion that bay conditions have improved over the past three decades compared to the 1970s and earlier. Specifically, sewage and industrial waste discharges to the bay have been eliminated, other routine waste inputs from identifiable sources are mainly being controlled through discharge permits, and best management practices are being used by most industries operating near the bay (SAIC 1998). Additionally, for several locations in the bay, the RWQCB has issued cleanup and abatement orders for removal of sediments containing high levels of contaminants. Most of these areas are in the central and south parts of the bay. Together these changes have reduced the amounts of contaminants that enter San Diego Bay, generally contributing to improving biological conditions in some areas and increased abundance of some species (SAIC 1998).

Significance criteria used to evaluate cumulative impacts to marine biological resources are the same as those used to evaluate project-specific impacts (section 3.5). Potential impacts from construction and operations associated with proposed wharf construction and dredge material disposal activities would include impacts to soft-bottom, subtidal communities, including eelgrass, from dredging and filling, as well as short-term disruption of California least tern and brown pelican foraging. Mitigation of these impacts would be accomplished through the creation of a mitigation site that optimizes intertidal habitat. Eelgrass losses would be mitigated by the habitat that is created as part of a banking agreement associated with replanting credit from the USS STENNIS mitigation site. Further, impacts to least terns and brown pelicans in the immediate construction area would also be mitigated by construction of the mitigation site as part of agency requirements for U.S. waters replacement.

Other important recent and planned fill and associated mitigation areas include approximately 13 acres on the north side of NASNI (completed for the STENNIS homeporting project), and about 4 acres of subtidal habitat at Naval Station San Diego being evaluated as part of a project for homeporting DDPI ships. Construction of a mitigation site needed to offset P-700A impacts for the present project would at most add about 1.5 acres of constructed intertidal habitat. In comparison, the bay is comprised of over 12,000 acres, even though undisturbed habitat represents only a few thousand acres of that total. Consequently, the fill and mitigation areas resulting from the proposed action, together with past, present, and reasonably foreseeable projects, total less than 20 acres. These project collectively represent a cumulatively small and percentage of the bay habitat, and result in a less than significant cumulative impact. Moreover, since the mitigation sites are constructed in accordance with permit requirements, including performance criteria for creating a productive biological habitat, there would be no net cumulative loss of bay habitat. Other reasonably foreseeable projects such as the Kona Kai Development, Ritz-Carlton Hotel, Submarine Base Command, Point Loma Sealift Military, Hotel Coronado Master Plan, Center City East District Expansion, Convention Center Expansion, Campbell Shipyard Hotel, and San Diego-Coronado Bridge Retrofit Study, that do not propose in-bay dredging or construction would not contribute to regional impacts affecting broader areas of the bay.

Dredging and filling for P-700A and the mitigation site are not planned to start until about the second quarter and extending to the end of the Year 2000, so there is a substantial separation in time from the USS STENNIS project (completed in 1998) and NAVSTA pier improvements (not planned to start until 2001). Further, the adjacency of the USS STENNIS and the P-700A wharves, as well the associated mitigation sites, localizes the regions of influence and allows integrated planning of the mitigation site habitats by the resource and regulatory agencies. There is a geographic separation of several miles between the USS STENNIS and P-700A projects and NAVSTA (DDPI Ship Facility Development), thus minimizing the collective cumulative impacts for these projects. Therefore, when temporal and geographic relationships among the reasonably foreseeable projects with in-bay construction impacts, their cumulative effects are would be less than significant.

Similarly, significant impacts are also unlikely due to net shading effects by piers and wharves, including the present project, throughout the bay. Table 3.18-1 summarizes that there has been a net gain of approximately 9 acres of pier area since about 1994, but this does not account for large areas under the piers that would be exposed to sunlight (i.e., not shaded) ranging from several hours to much of the day. It also does not account for areas of lower habitat quality, typically defined as soft-bottom areas deeper than about 20 feet where, for example, eelgrass is absent or very uncommon due to natural light limitations and the biological communities are less diverse and abundant. Exact calculations of the amount of shading from all the piers in the bay are not feasible. However, it is likely that any impacts (e.g., reduction in habitat use or feeding efficiency by visual predators) are offset, at least in part, by the higher diversity and abundance of fish that commonly occur near many pier and wharf structures, as compared to adjacent, unvegetated soft bottom areas. Therefore, although some cumulative net increase in shading may have occurred since 1994, the net decrease in pier area from the new wharf would be about 1.4 acres. Cumulative impacts due to shading on marine biology from the proposed action together with past, present, and reasonably foreseeable projects would be less than significant.

The previous conclusions are generally applicable to the use of open water and shoreline habitats by threatened and endangered marine birds that occur in San Diego Bay, including the California brown pelican, peregrine falcon, western snowy plover, and California least tern. In general, potential impacts on these species are fully addressed on a project-by-project basis, taking into account the regional status of the species. This approach, facilitated by consultation between the USFWS and the Navy and other responsible agencies, and by the Navy's monitoring and management programs for these species (e.g., Copper and Patton 1998), minimizes the possibility that cumulative impacts would go unrecognized or unmitigated. Additional species-specific considerations are as follows:

Given the maintenance of water quality in the Bay (section 3.18.3) and of acreages of open water and shoreline foraging habitats at approximate historic levels, no cumulative impacts on the peregrine falcon or California brown pelican would be likely. Isolated nesting locations of the peregrine falcon around the Bay would continue to be protected and potential impacts considered when necessary in project-specific analyses. Otherwise, both of these species are wide-ranging and less dependent on site-specific resting/nesting and foraging habitats than are the least tern and snowy plover discussed below. Where reasonably foreseeable projects overlap in space and time, it is unlikely there would be any cumulative effect on peregrine falcons and brown pelicans, given the ability of these species to adjust their foraging and resting locations.

In contrast to the peregrine falcon and brown pelican, the western snowy plover and California least tern are more dependent on site-specific nesting or foraging habitats. Critical areas for both of these species are on Navy property, and are protected and monitored by the Navy (Copper and Patton 1998). Future projects could theoretically have adverse or beneficial effects on these species, although the Navy's programs and consultation with USFWS make it unlikely that adverse impacts would go unmitigated.

Navy activities affecting the California least tern are governed by a February 1993 Memorandum of Understanding (MOU) with the USFWS. The Navy is working with the USFWS and will make any changes to the MOU as necessary as part of their continuing consultation with that agency.

3.18.6 Terrestrial Biology

The region of influence for terrestrial biological resources generally includes the near-bay areas over much of the San Diego Bay and the adjacent coastal area. Many of the potentially affected species are associated with habitats that have been substantially degraded and/or reduced in size, principally due to historical impacts such as building and parking lot construction (SAIC 1998). Similarly, the time period that is considered for project and cumulative impacts includes the past several decades when much of the degradation and habitat loss occurred, as well as present and future projects including the 28 projects considered in this analysis. Significance criteria used to evaluate cumulative impacts to terrestrial biological resources are the same as those used to evaluate project-specific impacts (section 3.6.2).

Under construction and operations associated with dredging and construction for homeporting two additional CVNs (Alternatives One, Two, or Three), the principal species of concern include several sensitive plant and animal species (both listed and non-listed species; Volume 3, Table 3.6.1). However, as summarized in section 3.6.3, these impacts would be less than significant. The proposed action, in combination with reasonably foreseeable projects on NASNI, the Silver Strand, and elsewhere in and around San Diego Bay, could significantly impact these sensitive resources by incrementally reducing habitat areas, reducing population sizes for sensitive plant and animal species, or affect their survival and reproductive success. The mitigation measures proposed as part of the proposed action, however, would reduce the incremental impact on sensitive plant species such that there would not be a cumulatively significant impact.

3.18.7 Land Use

The region of influence for land use impacts includes the surrounding land areas on NASNI, in the immediate vicinities of the proposed action berths and the biological mitigation site. With increasing distance from the proposed action, land use changes resulting from other projects would have a decreasing contribution to cumulative impacts on land use. The timeframe for land use impacts is the post-construction period after the new land use has been established, through the lifetime of the constructed facilities. The cumulative impact significance thresholds are the same as those presented in section 3.7.2. None of the proposed actions at NASNI would create any significant adverse land use impacts or incompatibilities with existing uses or inconsistencies with the NASNI Master Plan or local jurisdiction land use plans.

The only reasonably foreseeable project that is within the region of influence is the BRAC CVN homeporting project. The BRAC CVN project is compatible with existing uses and consistent with the NASNI Master Plan and local jurisdiction land use plans. The two projects would be compatible with each other and would not result in any adverse cumulative land use impact. Because cumulative land use impacts would be less than significant, no mitigation is identified.

3.18.8 Socioeconomics

The region of influence for the assessment of cumulative socioeconomic impacts is comprised of San Diego County. Although the socioeconomics of this area is a function of growth throughout the 20th century, the historic time frame for the cumulative analysis is reasonably defined in the last 5 years, as economic trends have substantially changed since then. The time frame for evaluation of socioeconomic impacts extends into the future beyond the 2005, when a second homeported CVN would arrive under the proposed action. The significance criteria used to evaluate potential cumulative impacts on socioeconomics are the same as those used to address project-specific impacts (section 3.8.2).

The most adverse socioeconomic impacts are associated with Alternative Five (creating the capacity for no additional CVN). Specific impacts could result in a loss of 1,570 military personnel. This represents almost 9 years' worth of regional employment growth. There could be an additional loss of secondary jobs that would accompany the reduction in direct jobs (military personnel). In addition to the loss of jobs would be the departure of 12,154 military personnel and dependents from the San Diego area and an associated reduction in demand for 2,741 family housing units in the communities of the County. School enrollments could also drop by 1,435 students in the San Diego USD (1,349 students) and Coronado USD (86 students).

The economy in the San Diego region has seen a turnaround since 1996. The implementation of a number of Navy-related actions in the area (including the proposed relocation of the Military Sealift Command, Pacific to Submarine Base San Diego) could counteract the adverse impacts of Alternative 5. Reasonably foreseeable projects in the region (e.g., Lindbergh Field expansion, a military family housing construction project, and Hotel Del Coronado Master Plan, Kona Kai Development, Ritz Carlton Hotel, Convention Center expansion, Center City East District expansion, Campbell Shipyard Hotel, and America's Cup Marina Redevelopment) would further counteract the adverse employment impacts.

The vast majority of the impacts associated with all reasonably foreseeable projects will occur within San Diego County. However, the construction and operations phases of some of the reasonably foreseeable projects will overlap and thereby offset the anticipated reduction in employment from the proposed action. Therefore, the cumulative impacts on regional employment from creating the capacity for homeporting no additional CVN, when considered in the light of new employment from other reasonably foreseeable projects in the region, would be adverse but not significant. Reductions in school enrollment in both districts could have beneficial effects where schools are currently operating at or above design capacity. It is likely that the economy of San Diego County will continue to expand bringing with it additional in-migrating workers and their families to the region. Because cumulative impacts would be less than significant, no mitigation measures are identified.

3.18.9 Transportation

Ground Transportation

The region of influence relative to traffic impacts for NASNI consists of the local street network within Coronado and the regional highways that provide access to Coronado (i.e., the San Diego-Coronado Bay Bridge and Silver Strand Boulevard/State Route 75). These facilities are described in section 3.9.1.1. The cumulative traffic analysis of these facilities uses 2005 as the target year, and the significance criteria for the traffic analysis are the same as those used to address project-specific impacts (section 3.9.1.2). The proposed action would result in a change in site-generated traffic volumes ranging from a decrease of 4,579 vehicle trips per day to a long-term increase of 150 trips per day. The traffic analysis indicates that the creating the capacity for homeporting one or two additional CVNs (Alternatives One, Two, Three, or Four) (150 additional daily trips and 27 peak hour trips) would not result in a significant traffic impact. (This cumulative assessment does not evaluate impacts occurring 13 days per year when three carriers could be in port at the same time under Alternatives One, Two, or Three, as these actions would be intermittent and short-term). The Navy is considering a redesign of the Main Gate so that the entrance would align with Third Street and thereby provide a more direct connection into and out of the base.

The approach for the traffic analysis is to forecast the future traffic volumes without the project by using data from a draft report prepared by the San Diego Association of Governments (SANDAG) titled "San Diego-Coronado Bridge Toll Removal Impact Study (October 1998) or by applying a 5 percent growth factor to the existing traffic volumes on the study area roadways (whichever is highest), then adding the project traffic to the future scenario. The traffic forecasts account for the cumulative increase in traffic volumes that would occur as a result of other development projects that may be implemented in Coronado and the San Diego region. The analysis of potential cumulative impacts from other reasonably foreseeable projects at NASNI includes the volume of site-generated traffic from all the activities at the base. Some temporary fluctuations in traffic may occur associated with specific construction projects or special activities such as PIAs or potential realignment of the Main Gate at NASNI; however, these activities are not permanent and are not included in the quantification of cumulative traffic conditions.

The year 2015 traffic projections from the SANDAG report represent future traffic conditions taking into account projections of population and employment growth in Coronado and the San Diego region, assuming that the bridge tolls continue to be charged (Scenario 2). Although the traffic volumes for the year 2015 baseline scenario are higher than what would be expected for the year 2005 when under the proposed action capacity to homeport a second additional CVN to would be created (under Alternatives One, Two, and Three), this scenario has been addressed to ensure that the level of anticipated growth and the cumulative traffic increases in Coronado have been considered (see section 3.9.1.2.3). The intersection analysis for this scenario is summarized in Table 3.18-2 below. Based on the criteria for significant impacts, the proposed action's impacts at these intersections would be less than significant.

Table 3.18-2. Impact on Intersection Levels of Service – Facilities for Two Additional CVNs at NASNI

Year 2015 Projections

	A.M. PEAK HOUR		P.M. PEAK HOUR	
Intersection	*Delay (sec) & V/C Ratio*	*LOS*	*Delay (sec) & V/C Ratio*	*LOS*
Orange/First				
W/o Project	14.6 – 0.594	B	12.6 – 0.552	B
W/ Project	14.6 – 0.596	B	12.7 – 0.564	B
Orange/Third				
W/o Project	21.3 – 1.007	C	20.3 – 0.628	C
W/ Project	22.1 – 1.011	C	20.4 – 0.631	C
Orange/Fourth				
W/o Project	29.8 – 0.624	D	66.7 – 1.082	F
W/ Project	29.8 – 0.625	D	69.8 - 1.091	F
Orange/R.H. Dana				
W/o Project	22.0 – 0.788	C	30.8 – 0.858	D
W/ Project	22.1 – 0.791	C	30.9 – 0.860	D
Alameda/Third				
W/o Project	0.3 – N/A	A	6.9 – N/A	B
W/ Project	0.3 – N/A	A	7.1 – N/A	B
Alameda/Fourth				
W/o Project	6.7 – 1.006	B	>120 - 2.624	F
W/ Project	6.7 – 1.006	B	>120 - 2.630	F

Source: SANDAG 1998.

Similarly, the proposed action's impacts on daily traffic volumes have been analyzed by using SANDAG traffic forecasts for the year 2015 as the future scenario. Table 3.18-3 shows the projected traffic volumes for the scenarios without and with the project. Based on the criteria for significant impacts, the proposed action's impacts on these roadways would not be significant.

The SANDAG report also provides a scenario (Scenario 4) in which the bridge tolls and toll-funded commute services would be discontinued. Under this scenario, traffic volumes travelling the bridge for the year 2015 would be approximately 18 percent higher, representing a significant cumulative impact. The proposed action would have an incremental, but less than significant, contribution to this cumulative impact.

Similarly, the proposed action's impacts on daily traffic volumes have been analyzed by using SANDAG traffic forecasts for the year 2015 as the baseline scenario. Table 3.18-3 shows the projected traffic volumes for the scenarios without and with the project. Based on the criteria for significant impacts, the proposed action's impacts on these roadways would be less than significant.

The SANDAG report also provides a scenario (Scenario 4) in which the bridge tolls and toll-funded commute services would be discontinued. Under this scenario, traffic volumes travelling the bridge for the year 2015 would be approximately 18 percent higher, representing a significant cumulative impact. The proposed action would have an incremental, but less than significant, contribution to this cumulative impact.

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Table 3.18-3. Impact on Daily Traffic Volumes — Facilities for Two Additional CVNs at NASNI

Roadway/Location – Capacity	*Future Traffic Volume - V/C - LOS*	*Project Traffic*	*Traffic Volume w/Project - V/C - LOS*
Coronado Bay Bridge – 65,000			
Average	74,600 - 1.15 – F	150	74,750 - 1.15 – F
Peak Season	83,600 - 1.29 - F	150	83,750 - 1.29 – F
Silver Strand Boulevard – 39,000			
North of NAB	40,000 - 1.03 – F	30	40,030 - 1.03 – F
South of NAB	28,000 - 0.72 - C	30	28,030 - 0.72 – C
First Street – 9,750			
Orange to Alameda	6,600 – 0.68 - B	25	6,625 - 0.68 – B
Third Street (one-way) – 32,500			
C to Orange	30,000 – 0.92 - E	75	30,075 - 0.93 – E
Orange to H	19,100 – 0.59 - A	60	19,160 - 0.59 – A
H to Alameda	17,200 – 0.53 - A	60	17,260 - 0.53 – A
Fourth Street (one-way) – 32,500			
Pomona to C	37,000 – 1.14 – F	75	37,075 - 1.14 – F
C to Orange	37,000 – 1.14 – F	75	37,075 - 1.14 – F
Orange to H	19,100 – 0.59 – A	60	19,160 - 0.59 – A
H to Alameda	18,300 – 0.56 – A	60	18,360 - 0.57 – A
Pomona Avenue (one-way) – 32,500			
Fourth to Third	30,000 – 0.92 - E	75	30,075 - 0.93 – E
Ocean Boulevard – 19,500			
Orange to Alameda	11,700 – 0.60 - B	30	11,730 - 0.60 – B
Alameda to Gate 5	8,200 - 0.42 - A	30	8,230 - 0.42 – A
Orange Avenue			
First to Third – 19,500	12,500 – 0.64 - B	25	12,525 - 0.64 – B
Third to Fourth – 39,500	33,500 – 0.86 - D	15	33,515 - 0.86 – D
Fourth to Eighth – 39,500	38,500 – 0.99 - E	5	38,505 - 0.99 – E
Eighth to Tenth – 39,500	30,000 – 0.77 - C	5	30,005 - 0.77 – C
Tenth to Pomona – 39,500	32,600 – 0.84 - D	5	32,605 - 0.84 – D
Alameda Boulevard			
First to Third – 9,750	4,140 - 0.42 - A	15	4,155 - 0.43 – A
Third to 4th (one-way) – 32,500	21,000 – 0.65 - B	50	21,050 - 0.65 – B
Fourth to Sixth – 19,500	9,960 - 0.51 - A	5	9,965 - 0.51 – A
Sixth to Ocean – 19.500	4,880 - 0.25 - A	5	4,885 - 0.25 – A

2

Vessel Transportation

The region of influence for vessel transportation would include the water areas of San Diego Bay from the NASNI piers to the Pacific Ocean. By definition, this resource area includes only water-based activities. Historical development around the bay, including naval activity, commercial shipbuilding, and recreational sportfishing have contributed to the existing setting. The reasonably forseeable time period assessed in the cumulative analysis extends from the present through 2005, and into the future. The significance criteria to evaluate cumulative impacts are the same as those used to address project-specific impacts (section 3.9.2.2). With creating the capacity to homeport two additional CVNs (Alternatives One, Two, or Three), no net future increase in vessel traffic would occur. Creating the capacity for homeporting two additional CVNs would result in a less than significant increase in vessels in San Diego Bay. Therefore, this action would not contribute to regional cumulative impacts on vessel transportation. The 1995 BRAC CVN homeporting action at NASNI resulted in the replacement of infrastructure associated with one CV with that for one CVN. Consequently, this action did not contribute to regional impacts on vessel transportation either. Other reasonably foreseeable projects affecting vessel transportation include the relocation of the USS CORONADO, the submarine base, and America's Cup Harbor Redevelopment. The relocation of the USS CORONADO would not result in additional vessel trips, and the submarine base would only provide a support facility for existing vessels (subject to a separate NEPA review), with no additional vessel trips. America's Cup Harbor Redevelopment would include conversion of an existing boat yard to a marina. This could result in increased use of waters in the immediate vicinity of Shelter Island by recreational boaters. Boats would use standard precautionary procedures and would not significantly affect vessel transportation. Therefore, none of these projects would affect cumulative impacts as well. Activities affecting vessel transportation in the vicinity of Glorietta Bay include the Glorietta Bay Master Plan and two naval projects. Both naval projects will have been completed in advance of dredging associated with the proposed action in 2001. The timing of Glorietta Bay Master Plan improvements is unknown. If it did occur coincident with dredging dredged sediment disposal in the vicinity of NAB, the combined cumulative effect could be significant. However, measures incorporated into the project to alert boaters of dredging activity would reduce the incremental effects or the proposed action such that there would not be a cumulatively significant impact. Dredging and disposal activities that would occur under Central Bay Dredging, Bay Dredging, and Development of Facilities to support DDPI ships would result in temporary impacts to vessel transportation. Dredging activities routinely occur in San Diego Bay, and these impacts would be less than significant. Therefore, the cumulative impacts on vessel transportation from creating the capacity for homeporting two additional CVNs under the proposed action, combined with those from related projects in the vicinity, would not cumulatively impact vessel transportation.

3.18.10 Air Quality

The region of influence for air quality impacts would mainly include the San Diego Bay region, in proximity to project emission sources. The existing quality of the air basin is a function of previous development and pollution control measures. Significance thresholds are based on past and existing cumulative emission levels, as well as regional plans that take into account projected regional growth and land uses. These thresholds are the same as the project-specific thresholds (see section 3.10.2). Operation of the proposed actions would produce insignificant air quality impacts in the region, as the increase in pollutant emissions (except VOC and CO) from creating the capacity for homeporting two additional CVNs (Alternatives One through Four, and Six) would be reduced by a greater amount from the removal of one CV. Although VOC emissions would increase under either scenario, they would not exceed any emission significance threshold. Due to the increase in traffic from the addition of a second CVN in the year 2005, emissions from the action would exceed the SDCAPCD major source threshold of 100 tons per year for CO. However, the majority of these emission increases would occur from vehicles that transport crew dependents from off-base housing to the greater San Diego metropolitan region. These emissions would be spread over a large area and would not be expected to contribute to an exceedance of an ambient air quality standard. For 13 days per year beginning in 2005, the second CVN would also generate an additional 4,700 additional ADT at NASNI. However, since the population levels at NASNI would decrease in future years even with the addition of a second CVN, future traffic generated by NASNI in the year 2005 would not be expected to exceed historical levels. As a result, traffic associated with the alternative would not be expected to exceed any ambient air quality standard within roadways in proximity to NASNI and CO emissions from the action would therefore be insignificant.

Peak annual construction emissions from the preferred dredging and disposal construction scenario would not exceed any threshold and would be insignificant. However, the dredge and disposal scenario three, which would exclusively use a clamshell dredge, would exceed the SDCAPCD major source threshold of 50 tons per year for NO_x and would therefore be potentially significant. A risk analysis was performed to evaluate the impact of toxic air contaminants from proposed dredging and disposal sources. This analysis determined that the health impacts from each of the three dredge and disposal scenarios would be insignificant. In addition, emissions from either construction or operation of the proposed actions would not trigger a conformity determination under the 1990 CAA (less than 100 tons per year for CO and 50 tons per year for NO_x and VOC) and would therefore conform to the SIP.

The BRAC CVN project is in operation as of late 1998. Operation of this project has resulted in a net decrease in emissions within the region, due primarily to the elimination of the CV boilers. Since there were originally three CVs homeported at NASNI until 1993, implementation of the two additional CVN project alternatives would ultimately replace the two CVs not decommissioned as part of the BRAC project. Therefore, the proposed action provides for a cumulative scenario at NASNI where three CVNs replace three CVs. Review of Table 3.10-1 in section 3.10, Volume One shows the comparison of annual emissions from the addition of one CVN and removal of one CV. An estimate of the net change in emissions associated with this project cumulative scenario can be obtained by comparing three times the emissions for each vessel group, but assuming that emissions from only one PIA cycle would occur per year for the three CVN vessel group. This shows that replacing three CVs at NASNI with three CVNs also would reduce emissions of all pollutants within the project region. Other reasonably foreseeable projects and several dredging and disposal projects (Bay dredging, Central Bay Dredging, and the Development of Facilities to Support DDPI Ships) would increase pollutant emissions within the project region. However, because the proposed action would have a less than significant contribution to emissions, its contribution to cumulative effects on air quality would remain less than significant. In addition, substantial emissions from future projects at NASNI, Coronado, and San Diego (Convention Center expansion, Centre City East District expansion, etc.) would be minimized through the SDCAPCD permit process. This permit process would reduce the incremental impact on air quality such that there would not be a cumulatively significant impact.

3.18.11 Noise

The region of influence for noise impacts is a roughly circular area around the noise source. The radius of the circle is equal to the distance that the noise source can be heard. Any reasonably foreseeable project that has a region of influence that overlaps with the region of influence of any proposed CVN homeporting action may have a cumulative impact if a sensitive receptor is located within the overlap area. The region of influence also includes the areas along public roadways that would be traveled by traffic induced by proposed CVN homeporting actions. The timeframe of the impacts would include the construction period through the lifetime of the constructed facilities. The cumulative impact significance thresholds are the same as those presented in section 3.11.2. None of the proposed CVN homeporting actions at NASNI would create any significant adverse noise impacts.

The only project that would be located within the cumulative impact region of influence is the BRAC CVN homeporting project. By itself, the BRAC CVN project would not create any significant adverse noise impacts (DON 1995a). The cumulative impact of this project in conjunction with the proposed action was analyzed as part of the projected baseline condition in section 3.11.2, and it was shown that they would not result in any significant adverse cumulative noise impacts.

Section 3.11.1 identifies numerous locations along NASNI access roads and other major Coronado streets where existing noise levels exceed the City of Coronado *General Plan Noise Element* standard of 65 dBA CNEL. The proposed CVN homeporting Alternatives One, Two, Three, and Four would cause increased average daily traffic. Under these alternatives, average daily traffic would increase by approximately 150 trips. (This cumulative assessment does not evaluate impacts occurring 13 days per year when three carriers could be in port at the same time under Alternatives One, Two, or Three, as these actions would be intermittent and short-term). Compared to existing average daily traffic on NASNI access roads (see Table 3.9-1), this increase is so small that even if all the additional trips occurred during peak traffic hours, the change would not be distinguishable as an increased noise level. This is because when noise is generated by many sources of equal noise level, additional similar sources have very little effect on overall noise level (CERL 1975). Since the projected traffic increase would not be distinguishable as an increased noise level, future noise levels *with* the proposed action would not represent an increase over future baseline noise levels *without* the proposed action.

Traffic noise is an issue of considerable local concern in the City of Coronado, and existing base-related traffic contributes to existing noise levels along city streets. During the summer of 1998, a series of noise measurements were taken as part of the *City of Coronado Noise Study – 1998* (RECON 1998). Using these noise measurements and existing traffic volumes, the study modeled future noise levels based on future traffic volumes as estimated by the San Diego Association of Governments for the year 2015. The study concluded, in part, "Much of the noise that the residents of Coronado will experience in the future exists today. Locations predicted to exceed noise standards in the year 2015, already exceed those standards. Residences not currently exposed to noise in excess of the General Plan standard are not predicted to exceed that standard in the future." The study further concluded, "The reduction of traffic on area roads sufficient to achieve a noticeable reduction in noise would be difficult."

If these conclusions are correct, it appears that *traffic reduction* may not be the optimum solution for the traffic noise problem. The noise study presented several roadway and building design measures that could help to reduce traffic noise levels in Coronado, including diversion of NASNI traffic from surface streets into a tunnel under Fourth Street from the bridge toll plaza to the NASNI main gate.

Because the proposed CVN homeporting actions would not result in any distinguishable increase in traffic noise levels, no project-specific cumulative traffic noise mitigation is proposed. The U.S. Navy, however, remains committed to working with the City of Coronado to assist in finding solutions to the existing traffic noise problem.

3.18.12 Aesthetics

The region of influence for cumulative aesthetic impacts is the NASNI shoreline, adjacent shoreline and marine areas, as well as the San Diego city shoreline across the bay. These areas comprise the view corridors experienced from prominent public vantage points around the bay. Historical development has contributed to the cumulative impact on shoreline view corridors. The time period for assessment of cumulative impacts includes the CVN buildout of the year 2005.

The cumulative impact significance thresholds are the same as those presented in section 3.12.2. The proposed action consisting of creating the capacity to homeport two additional CVNs (Alternatives One, Two, or Three), would result in less than significant impacts on aesthetics, as there would be no net change in the number of ships berthed at NASNI. Aircraft carriers have been recognized as part of the view of NASNI for decades, and the nature of the seascape consistently changes with different vessels calling and leaving the area. Other reasonably foreseeable projects in the vicinity, such as the Ritz-Carlton Hotel, the Kona Kai Development, Central Bay Dredging, Convention Center Expansion, Campbell Shipyard Hotel, America's Cup Harbor Redevelopment and potentially the North Embarcadero Master Plan, would result in aesthetic impacts within scenic corridors adjacent to San Diego Bay. Therefore, the cumulative impacts on aesthetics of San Diego Bay would be potentially significant. Although the facilities created for homeporting two additional CVNs would be slightly more massive than the facilities historically present to homeport three carriers, they would be visually consistent with the historical NASNI activity and would not add to the appearance of intensified buildout within the bay. Consequently, the proposed action's contribution to cumulative impacts would be less than significant.

3.18.13 Cultural Resources

The region of influence for cultural resources (i.e., historic properties) focuses on North Island and other properties in the general vicinity of North San Diego Bay. The time period covers previous development in the area as well as the period between the present and 2005. Criteria for accessing the cumulative impacts do not differ from the significance criteria used to address project-specific impacts (section 3.13.2). None of the homeporting actions would affect historic properties in the project area, such that the proposed action would not contribute to cumulative effects resulting from other projects in the region.

Both North Island and North San Diego Bay have been subject to numerous construction projects over the past several decades. These actions have impacted historic properties as well as provided opportunity for discovery of new cultural resources. The potential for significant impacts resulting from the other foreseeable projects varies depending on their proximity to the worst case action. Impacts to historic properties on NASNI resulting from the BRAC CVN Homeporting have been mitigated to less than significant by extensive documentation of the existing conditions prior to construction (DON 1995a). Renovation of facilities at the Point Loma Military Sealift Command would include improvements to the interiors of three historic buildings. Nevertheless, these renovations do not constitute adverse effects because the significance of these structures rests primarily on their exterior design. The three reasonably foreseeable dredging projects have little potential to impact any marine cultural resources, resulting in no contributions to cumulative impacts. Impacts to cultural resources are also likely to be insignificant for those projects that involve disturbance of imported fill, as would be the case for the Kona Kai Development, the Ritz Carlton Hotel project, and selected areas around Lindbergh Field. The North Bay Redevelopment Study Area, Hotel Del Coronado, Glorietta Bay Master Plan, Convention Center expansion, Centre City East District expansion, and Campbell Shipyard Hotel projects are located within areas where the potential for significant cultural resources, including historical archaeological resources, exists. Due to their relatively large cumulative disturbance areas, the potential for cumulative impacts on cultural resources is considered potentially significant. Given that redevelopment of the areas may improve the condition of some historic-period properties, these projects could have beneficial effects as well. In the Northern San Diego Bay area, the other cumulative project sites are either adjacent to or on ancient shorelines. These landforms are characterized by comparatively high densities of prehistoric archaeological sites. These were also locations for early settlement by Euroamericans, such that significant historic-period properties could be present. Impacts to cultural resources in these areas could be significant on an individual basis, and collectively, they could also create significant cumulative effects. Although the reasonably foreseeable projects assessed above could result in cumulatively significant impacts on cultural resources within the greater San Diego Bay area, the proposed action creating the capacity to homeport two additional CVNs would not contribute to this cumulative impact.

3.18.14 General Services/Access

The region of influence for general services includes NASNI, as all services are provided for on base. Previous NASNI development has contributed to cumulative impacts on general services and access that are reflected in current conditions. Reasonably foreseeable projects considered are those that would occur from the present through 2005. Significance criteria for cumulative impacts are identical to those used to address project-specific impacts (section 3.14.2). Creating the capacity to homeport two additional CVNs (Alternatives One, Two, or Three) would result in less than significant impacts on general service and access. Creating the capacity to homeport two additional CVNs would result in an increase of military personnel and their dependents by 3,350 persons, and this would be accommodated for by existing facilities and access routes. Because the region of influence is confined by the borders of NASNI, reasonably foreseeable projects off-base would not impact cumulative conditions on general services at NASNI. Since there are no additional on-base projects in the reasonably foreseeable future, no cumulative impacts on general services would result.

The region of influence for access includes the naval station perimeter where access gates are located, as well as major streets that lead to NASNI such as Silver Strand Boulevard, Pomona Avenue, and Orange Avenue. In addition, San Diego Bay in its entirety is included in the region of influence, as projects occurring in this area could impact water-based access. Previous development around the San Diego Bay has contributed to cumulative impacts on general services and access that are reflected in current conditions. Reasonably foreseeable projects considered in this analysis include those occurring between the present and 2005. Due to recent access constraints at NASNI, the Master Plan (DON 1991) has identified projects to improve local circulation on and around the base.

The proposed action would not result in a significant impact on land-based access during construction. No reasonably foreseeable construction projects at NASNI would impact on-base circulation. Impacts on access during construction of the other reasonably foreseeable projects would be addressed by individual construction management plans. Several of the reasonably foreseeable projects are in the vicinity of Lindbergh Field and Harbor Drive. Based on these projects' estimated schedules, construction would likely not overlap such that no cumulatively significant impacts on access would result. The San-Diego Coronado Bridge Seismic Retrofit could increase traffic along Orange Avenue. In addition, Convention Center Expansion in downtown San Diego could result in traffic delays on Harbor drive during construction, as well as increased congestion during events at the new ball field. Reasonably foreseeable projects at the Naval Amphibious Base could increase use of Silver Strand Boulevard, although the San-Diego Coronado Bridge Seismic Retrofit would result in less use of this access. The flow of traffic from reasonably foreseeable projects including the Hotel Del Coronado Master Plan and Glorietta Bay Master Plan and the proposed action would continue along these major streets providing access to NASNI. Other reasonably foreseeable projects are located away from NASNI, so that they would not contribute to cumulative impacts on major streets leading to NASNI. Since land based access to NASNI would remain available, cumulative impacts would be less than significant. See section 3.18.9 for a discussion of cumulative impacts to ground transportation.

Several reasonably foreseeable projects could potentially result in cumulative impacts to water-based access. A previously completed EIS determined that the BRAC CVN homeporting would have a less than significant impact on marine access (DON 1995a). The BRAC CVN would be homeported at NASNI at the time of construction for the proposed action. Central Bay Dredging could occur in year 2000, potentially resulting in a construction schedule that would overlap with the proposed action. The combination of these three projects would increase the use of the waters around NASNI, although access to the site would still be available. The relocation of the USS CORONADO and the Submarine Base project are located adjacent to one another and could result in water-based access constraints in their immediate vicinity. However, both of these projects are located on Point Loma, across the Bay from the proposed action such that they would not collectively contribute cumulative impacts. There are several projects that would occur on NAB that may require in-water work. The NAB is over 4 miles south of the proposed action project site. Disposal of dredged sediment by hydraulic barge south of NAB would add incrementally to access to impacts in the vicinity of NAB. However, measures incorporated into the proposed action would reduce the incremental effects such that there would not be a cumulatively significant impact. The number of Navy ships homeported in San Diego has declined steadily from 76 ships in 1992 to 55 ships in 1999. Although some reasonably foreseeable projects surrounding San Diego Bay would increase the number of vessels in the bay, the collective, cumulative effect of project maritime activity in the bay would not be exacerbated by the proposed action. The overall cumulative impact on maritime access, and particularly that to NASNI, would not be significant.

3.18.15 Health and Safety

The region of influence is defined as the area around the carrier piers and NASNI. This is the area in which use of hazardous materials from the proposed action are located. Approximately 95 hazardous waste generators operate at NASNI, representing past activities that contribute to the existing setting. The time period considered for assessment of cumulative impacts includes the construction activities associated with the first additional CVN commencing late 1999 and for continuing operations into the future with the arrival of the second additional CVN in 2005. The significance criteria for cumulative impacts are the same as stated for project-specific impacts (section 3.15). Due to required compliance with be the existing Hazardous Material Control and Management Program and the Hazardous Waste Minimization Program, and demonstrated available hazardous waste treatment capacity, creating the capacity to homeport two additional CVNs (Alternatives One, Two, or Three) would result in a less than significant risk of a hazardous substance release during construction and operation. Other proposed Naval projects would be subject to hazardous waste management programs and procedures that would be similar to those implemented for the proposed action, resulting in less than significant cumulative impacts. All other reasonably foreseeable non-military projects including residential, commercial, and visitor-serving commercial (hotels) development are outside of the region of influence. Nevertheless, they typically do not involve the use of hazardous substances. Impacts to health and safety would be limited to construction activities and would be subject to standard safety mitigations precluding non-construction personnel access to activity areas. These projects would not have an impact on cumulative health and safety in the region of influence. Since no other reasonably foreseeable projects fall within the region of influence and any incremental health and safety impact related to the proposed action would be minimized by regulation programs and procedures, the cumulative impacts from creating the capacity to homeport two additional CVNs would be less than significant. Volume 2, Appendix F, Section 3.3 presents a discussion of cumulative radiological impact. Cumulative impacts were identified as less than significant.

As described in the annual report referenced in the EIS, 26 previous versions of that report, and the 1998 update of the report, the total long-lived gamma radioactivity in liquids released annually to all ports and harbors from all Naval nuclear-powered ships and supporting tenders, Naval bases and shipyards is less than 0.002 curies. This annual total includes any accidental releases of radioactivity that occurred during the year. For perspective, the total annual amount is less than the amount of naturally occurring radioactivity present in the seawater displaced by a single submarine, and is environmentally inconsequential. Since the total amount released was inconsequential, any individual release was also inconsequential, and was not subject to reporting, immediate or otherwise, by any regulatory requirements. Thus, there would be no cumulative impacts from releases to any one water body from various NNPP activities in close proximity to that water body.

3.18.16 Utilities

The region of influence for utilities encompasses the greater San Diego metropolitan grid. Previous regional development and particularly that at NASNI has contributed to cumulative impacts on utilities that are reflected in current conditions. Projects considered in the cumulative analysis are those that would occur between 1998 and 2005. The significance criteria for cumulative impacts are the same as stated for project-specific impacts (section 3.16.2). Creating the capacity to homeport two additional CVNs (Alternatives One, Two, or Three) would result in less than significant impacts on utilities, as increased demands would be accommodated by existing and planned facilities. Utility increases that remain below existing NASNI capacity would have a less than significant impact to the environment because the regional metropolitan utility grid is determined on the conservative assumption that NASNI operations could occur at full capacity.

Other reasonably foreseeable projects with the highest potential for incremental cumulative impacts are new construction projects, rather than reuse of existing urban infrastructure. These projects, including Military Family Housing, the Ritz-Carlton Hotel, Convention Center Expansion, Center City East District Expansion, the North Embarcadero Master Plan, and Campbell Shipyard Hotel could create additional, previously unaccounted for demands on utilities, if they have not been accounted for in regional growth or community plan projections. Housing developed for the dependents of the second additional CVN (Alternatives One, Two, and Three) could also contribute to this cumulative demand. Increased cumulative demands on utilities would be minor in comparison to the regional utility capacity. Housing associated with the alternative to create capacity for homeporting two additional CVNs would not require installation of additional infrastructure and would not preclude utilities from providing adequate service to the San Diego Area. Individual project permit conditions of approval would require that each project provide fees to compensate for the increased demand on utilities, including needed infrastructure improvements. Other reasonably foreseeable projects (Naval Training Center Disposal and Reuse, the Submarine Base, SPAWAR, and many of the projects on NAB) would operate within NASNI peak utility consumption rates. These reasonably foreseeable projects would not represent a new demand on utilities, resulting in a less than significant contribution to cumulative impacts. The large number of new projects collectively have the potential for significant cumulative impacts on utilities. However, these projects represent a very small portion of the total demand on utilities within the region of influence. Because the proposed action's increased demand would be accommodated by existing utility capacity, it would represent a less than significant incremental increase to the cumulative impact on utilities.

3.18.17 Environmental Justice

The region of influence for environmental justice includes the Coronado Subregional Area (SRA). This discrete location provides regional census data that characterize minority and low income communities. Reasonably foreseeable projects considered include historic environmental justice conditions of the area as well as projects occurring between 1998 and 2005. The Coronado SRA is a predominantly white and high income community. In addition, residential areas adjacent to the proposed action area do not contain a disproportionately high minority or low income population. As such, the area has historically experienced relatively few environmental justice impacts. The significance criteria for cumulative impacts are the same as stated for project-specific impacts (section 3.17.2).

Creating the capacity to homeport two additional CVNs (Alternatives One, Two, or Three) would result in less than significant impacts on environmental justice. Adverse health impacts, such as air quality, would be balanced by the decommissioning the one remaining CV. This would result in no net impacts to environmental justice. Considering the demographics of the surrounding population, there would be no opportunity for minorities or low income communities to experience impacts apart from the population as a whole (DON 1995a). The North Bay Redevelopment Plan, Center City East Expansion, and Convention Center Expansion, while located outside the region of influence, would result in improved conditions to existing areas targeted for urban renewal. It is unknown at this time whether these projects would adversely impact minority or low-income communities to a greater extent than the region as a whole. Creating the capacity to homeport two additional CVNs, however, would not contribute incrementally to any potential cumulative impact on environmental justice resulting from the these or other foreseeable projects.

4.0 PUGET SOUND NAVAL SHIPYARD BREMERTON

4.1 TOPOGRAPHY, GEOLOGY, AND SOILS

4.1.1 Affected Environment

Topography

The topography at the Puget Sound Naval Shipyard (PSNS) in Bremerton, Washington ranges from flatland, along the waterfront, to steep hillsides that form the plateaued, rolling uplands of the Military Support Area. The industrial waterfront area ranges in elevation from sea level to 25 feet above mean sea level. Bulkheads have been constructed along the shoreline. The hillsides adjacent to the waterfront reach a maximum of 170 feet above sea level. The transition from waterfront to plateaued uplands is most severe in the 100-foot-tall bluff that crosses the central portion of the location in a northeast-to-southwest direction. In addition to the bluff, there is a valley transecting the upland area in a north-south direction. The western portion of this upland area is generally 50 feet lower in grade (DON 1989).

Geology and Soils

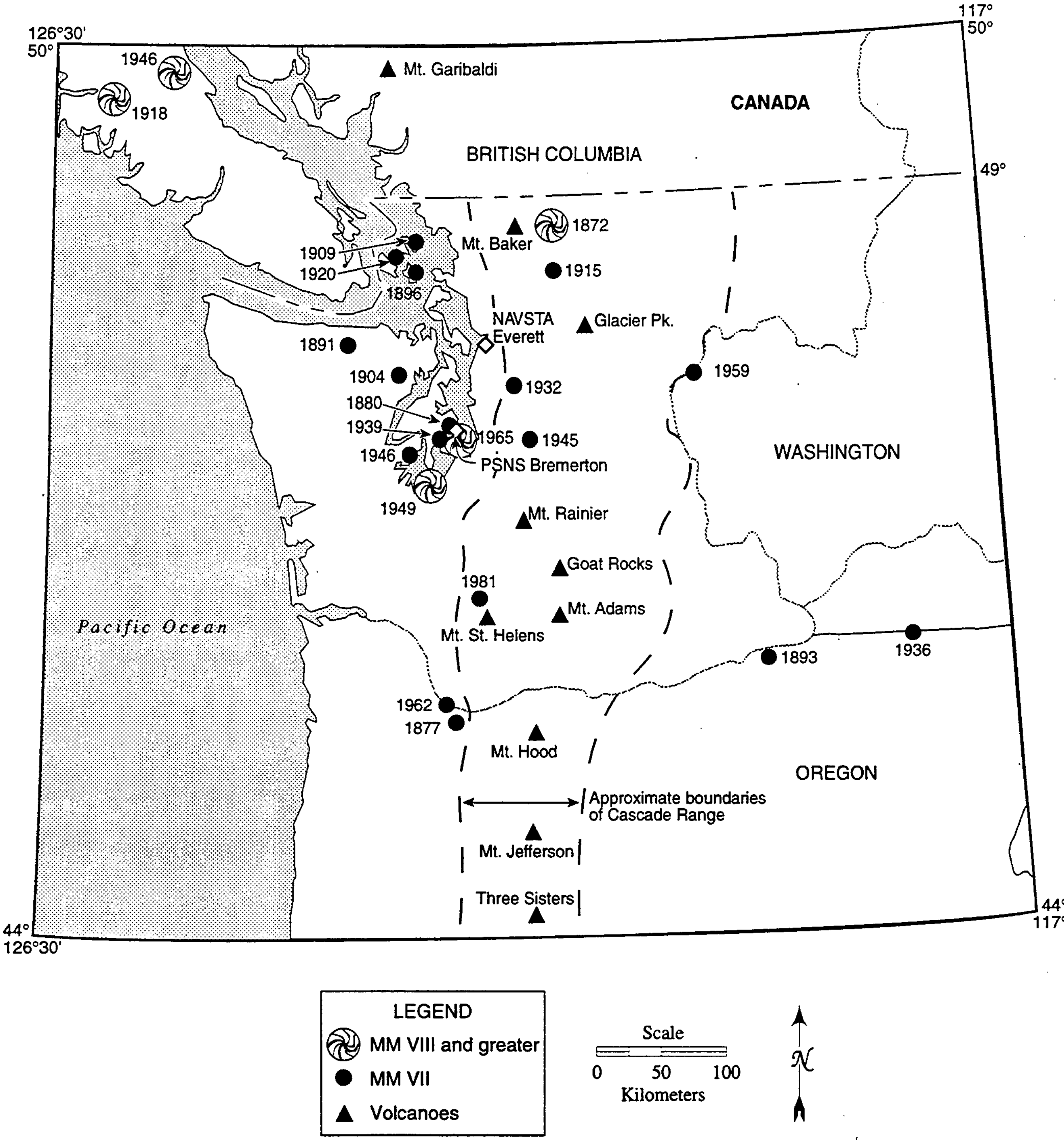
PSNS is located on Kitsap Peninsula, which is the remnant of a glacial-drift plain. Vashon Glacier of the Pleistocene period deposited sedimentary layers of Vashon drift till and outwash deposits across the location. The upland areas of the location are underlain by glacial clay, silt, sand, and gravel, overlain by soils of the Urban Alderwood series. This soil series consists of a stiff hardpan with low permeability and good characteristics for building (DON 1989, 1995b).

The waterfront area is underlain by artificial fill deposits and bay mud and peat. The fill consists primarily of silty, gravelly sand with some silt and clay, derived from grading of the adjacent hillside area. The soil density varies from loose to very dense, depending on the method of original fill placement and compaction. The upper one foot of the fill consists primarily of stiff gravelly soils. The fill deposits are partially underlain by soft deposits of peaty silt (DON 1989, 1995b).

Faulting and Seismicity

Earthquakes are caused by geologic processes that produce stresses in the earth. In the Pacific Northwest, oceanic crust is being pushed beneath the North American continent along a major boundary parallel to the coast of Washington and Oregon. This boundary, called the "Cascadia Subduction Zone," lies about 50 miles offshore and extends from the middle of Vancouver Island in British Columbia past Washington and Oregon to northern California.

The location is located within the Seismic Zone 3 risk category, hazardous as defined by the Uniform Building Code. The U.S. Geological Survey (USGS) states that the "earthquake hazards in this region are substantial" (USGS 1996). Approximately 200 earthquakes have been documented in the area since 1840, most of which caused little or no damage. Sizable events occurred in 1882, 1909, and 1939. The two most recent major earthquakes in this area occurred near Olympia in 1949 (Richter magnitude 7.8, Modified Mercalli Intensity VIII) and near Seattle in 1965 (Richter magnitude 6.8, Modified Mercalli Intensity VIII). Epicenters and dates of the largest Pacific Northwest earthquakes that occurred between 1872 and 1987 are shown on Figure 4.1-1



Note: The large symbols are epicenters of earthquakes whose maximum intensities were reported as VIII or greater on the Modified Mercalli Intensity Scale (MM); small symbols are MM intensities of VII. The locations of principal volcanoes in the region are also shown.

Source: Washington Division of Geology and Earth Resources, Information Circular 85, 1988.

Figure 4.1-1. Epicenters and Dates of the Largest Pacific Northwest Earthquakes that Occurred between 1872 and 1987

(WDGER 1988). Based on the history of past earthquakes and present understanding of the geologic history of the Pacific Northwest, damaging earthquakes (magnitude 6 or greater) can be expected in the future (see Volume 4, section 4.1). A maximum credible earthquake (MCE) (maximum earthquake likely to occur) of Richter magnitude 7.5 has been predicted for the area, with a recurrence rate of 500 to 2,500 years and a peak horizontal ground acceleration (an estimation of the ground motion associated with an earthquake) of 0.15 g (COE 1986). The symbol "g" represents acceleration due to gravity.

Surface faulting has not been well-documented in conjunction with earthquakes in the region, most likely due to a thick layer of glacial drift that covers the bedrock where surface faulting occurs. Figure 4.1-2 shows faults with Quaternary (in the last 2 million years) displacement in the Puget Sound area (USGS 1996).

The Seattle fault, an active fault capable of a Richter magnitude 7 earthquake, crosses at depth beneath the southern tip of Bainbridge Island and ends close to Bremerton. However, the projected surface fault trace is located approximately 5 miles north of the project location (USGS 1996) (Figure 4.1-2). The last seismic event associated with the Seattle fault occurred 1,100 years ago (Walsh and Logan 1997). Some geologists have attributed the 1965 earthquake near Seattle, and other smaller earthquakes in the area, to the Seattle fault (personal communication, David Fuller 1998). This fault occurs as a blind thrust, dipping about 70 degrees near the surface. However, common to most blind-thrust faults, this fault is not well exposed at the surface and may consist of multiple strands (Johnson et al 1994, Buckman et al. 1992).

Of all the inferred surface fault locations on Figure 4.1-2, only the Seattle fault has been determined to be active (movement in the last 13,000 years) and potentially capable of producing earthquakes during the lifetime of the proposed project. Little information is known regarding the other inferred surface fault locations. The Quaternary surface fault locations depicted on Figure 4.1-2 illustrate the locations of faults that have demonstrated movement during the Quaternary age (last 2 million years), but are not considered active (movement within the last 13,000 years). Therefore, earthquakes associated with movement along any of these faults would be unlikely during lifetime of the proposed project.

Geologic Hazards

Soft, silty peat deposits beneath the location are subject to deformation and differential settlement when subjected to pressure. In addition, silty, cohesionless fill material is subject to liquefaction. A liquefaction assessment indicated that the upland portion of the location has no potential for liquefaction. However, the filled lowlands are susceptible to liquefaction, depending on the degree of soil saturation at the time of a given earthquake. In addition, differential settlement, which occurs as a result of differential composition and compaction of fill, may occur in the fill areas (DON 1989; see Volume 4, section 4.1).

Tsunamis (seismically induced sea waves) are very long, shallow, high-velocity ocean waves that are usually generated by earthquakes. The potential for tsunami damage to land areas adjacent to Puget Sound and Sinclair Inlet has not been quantified. However, distant or local earthquakes could generate a tsunami that could impact the project area. Offshore earthquakes (in the Pacific Ocean) could generate a tsunami that would likely be manifested as a gradual upswelling of water. It is probable that the height, energy, and damaging effects of a tsunami generated from an offshore earthquake would dissipate as the tsunami traveled the curved path into the interior of

Puget Sound (see Figure 4.1-2). Local earthquakes could also generate tsunamis within the Puget Sound. Along with an upswelling of water, associated currents could damage structures in the water or along the shoreline. The last seismic event along the Seattle fault is thought to have generated a tsunami in the Puget Sound 1,100 years ago (Atwater 1987, Atwater and Moore 1992). In addition, sudden submergence of coastal areas that may accompany great earthquakes might increase the amount of land susceptible to tsunami damage (WDGER 1988).

No 100-year flood plains are present at PSNS. Flooding, to the extent it occurs, is a function of extraordinary tides, tsunamis, and/or wave action. PSNS is generally located in an area of low wave action. Because no low-lying beach fronts are improved at the site, the flooding potential due to high tides and wave action is low (DON 1989).

A seiche is a standing wave in an enclosed or partly enclosed body of water, which is analogous to the sloshing of water that occurs when an adult suddenly sits down in a bathtub. A relatively large earthquake may induce a seiche in the area. More commonly, seiches are caused by wind-driven currents or tides. To date, no significant damage has been reported from seismic seiches in Washington caused by local or distant earthquakes (WDGER 1988).

4.1.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Impacts of the proposed project on the geologic environment would be considered significant if any of the following occurred:

- Unique geologic features of unusual scientific value, for study or interpretation, would be adversely affected.
- Geologic processes such as major landsliding or erosion would be triggered or accelerated.
- Substantially adverse alteration of topography beyond that resulting from natural erosional and depositional processes would occur.
- Substantially adverse disruption, displacement, compaction, or overcovering of the soil would occur. Substantial irreversible disturbance of the soil materials at the location could cause their use for normal purposes in the area to be compromised.

Impacts of the following geohazards on the proposed project would be considered significant if any of the following occurred:

- Ground rupture due to an earthquake on an active fault, causing damage to structures and limiting their use due to safety considerations or physical conditions.
- Earthquake-induced ground shaking causing liquefaction, settlement, or surface cracks at the location and attendant damage to proposed structures, causing a substantial loss of use or exposing the public to substantial risk of injury.
- Historic soil failure (primarily fill) due to liquefaction.

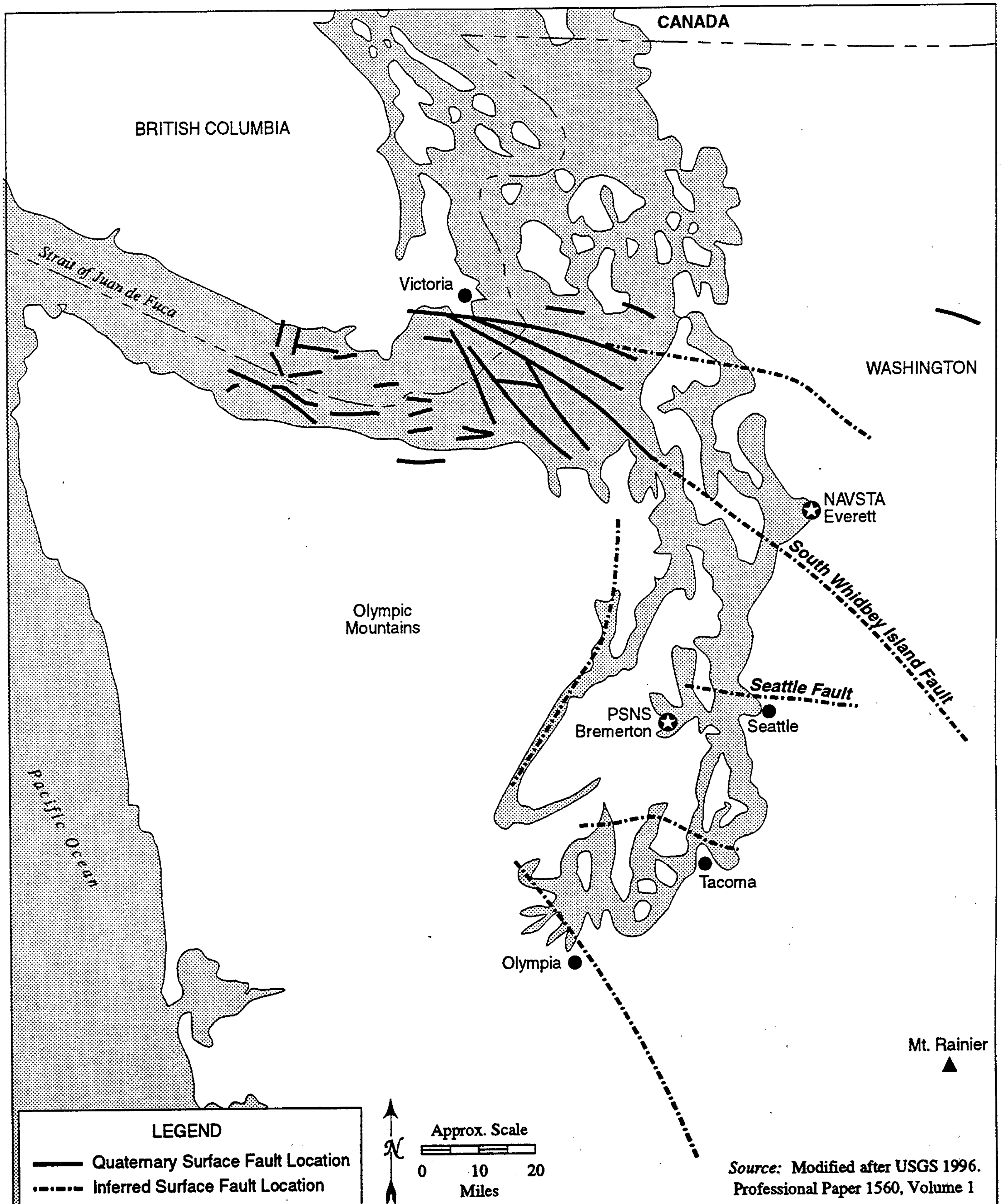


Figure 4.1-2. Faulting in Puget Sound Area

- Slope failure on hillsides or dikes (ship berths area).
- Seiches or tsunamis caused by nearby or distant earthquakes that are likely to occur in the lifetime of the project and are capable of causing substantial damage to structures or exposing the public to substantial risk of injury.
- Flooding caused by 100-year storm events or when combined with an extreme high tide or seismic sea wave occur that are capable of causing substantial damage to structures or exposing the public to substantial risk of injury.

None of the proposed action alternatives would impact geology or seismicity.

4.1.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)*

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Geologic Environment

DREDGING

Approximately 425,000 cubic yards (cy) of sediments would be dredged mostly in the vicinities of piers D and B, with a lesser amount at Pier 3. Considerable dredging has previously been conducted at PSNS along the piers and channel. Dredging would temporarily disrupt underwater depositional processes; however, similar to prior dredging episodes in this area, depositional equilibrium would be reestablished within a short period of time. No regional, long-term depositional disruptions would occur as a result of dredging in this area. Therefore, impacts on geological resources due to dredging are less than significant.

Dredged material determined to be suitable for disposal (estimated at a maximum of 308,000 cy) at a designated Puget Sound Dredging Disposal Analysis (PSDDA) site would be disposed of at the Elliott Bay PSDDA site near Seattle. Unsuitable dredged materials (estimated at a maximum of 117,000 cy) would be disposed of at an existing permitted upland landfill or in a Confined Disposal Facility (CDF) at PSNS. See Figure 2-8 for potential locations of the CDF.

FACILITY IMPROVEMENTS

As explained in Chapter 2, Pier D would be removed and replaced by a wider structure. Topography would not be impacted, however, temporary soil disturbance during construction would occur, resulting in adverse but less than significant impacts to the geologic environment.

OPERATIONS

Operations would not result in additional disturbance or impacts to the geologic environment. Under all alternatives except Alternative 6, propeller wash-induced suspension of bottom sediments would decrease or stay the same. Under Alternative 6, such suspension would increase slightly (approximately 13 percent). See Section 4.3.2.1 for more information.

Geohazards

DREDGING

Geohazard (seismicity, fault rupture, liquefaction, tsunamis, seiches, settlement) impacts during dredging are unlikely and, therefore, less than significant.

FACILITY IMPROVEMENTS

Pier D would be removed and replaced by a wider structure. Pier D, which was built in 1947, would be removed and replaced by a wider structure designed to state of the art seismic, environmental, and geological specifications. Potential impacts due to geohazards (seismicity, fault rupture, liquefaction, settlement, flooding) on facilities and personnel would be mitigated by the project design, as discussed below, and are therefore considered less than significant.

Earthquake-related hazards, such as ground acceleration, ground shaking, liquefaction, and settlement are possible in this active seismic region and, in particular, in the project area where hydraulic fill soils with a high potential for liquefaction are pervasive. A maximum credible earthquake of Richter Magnitude 7.5 may occur at PSNS Bremerton, with a peak horizontal ground acceleration of 0.15 g. Severe ground shaking would occur as a result of an earthquake of this size at Bremerton. Potentially significant impacts could result from these seismic related phenomena.

The design of the new pier would incorporate the criteria for the seismic design of waterfront structures provided in Naval Civil Engineering Laboratory (NCEL) Report R939 and Naval Facilities Engineering Command Design Manual (DM) 26. The design would include requirements and guidelines to safeguard against major failures and loss of life, but would not limit damage or provide for easy repair. Structures designed in accordance with the guidelines are expected to (1) withstand minor earthquake ground motion without damage; (2) resist a moderate earthquake without structural damage, but allow for some nonstructural damage; and/or (3) resist major earthquake ground motion without collapse, but with possible structural damage (DON 1995b).

The new pier would also be designed in accordance with guidelines in the following military design manuals: MIL-HDBK-1025: *Waterfront Facilities Criteria Manuals*, and NACFACDM 26: *Harbor and Coastal Facilities Design Manuals* (DON 1992c). In addition, the design would address the issue of transferring shaking loads from the pier to the ships berthed alongside (DON 1995b).

The CDFs at sites 1 and 2 would be built with sheet pile walls. The layer of unsuitable dredged material would be covered with a layer of appropriate thickness of dredged material that is suitable for unconfined aquatic disposal. The walls of the CAD would be constructed of earthen material, possibly armored with riprap or similar material. Similarly, unsuitable dredged material would be covered with a layer of suitable dredged material thick enough to effectively isolate the underlying unsuitable dredged material from the aquatic material.

A proposed CAD facility would be approved through a comprehensive regulatory process that would entail several permits, including a Section 404/10 permit from the Corps of Engineers and a Section 401 Water Quality Certification from the Washington Department of Ecology. Several other permits would also be required. Relevant federal, state, and local agencies, and Native American tribes would review the permit applications, which would also be available for public review. Engineering and structural aspects of the proposed CAD facility would be reviewed as part of the Section 404/10 and Section 401 processes, and possibly as part of the review for other required permits.

Criteria and guidelines for the design of pile foundations are contained in the American Association of State Highway and Transportation Officials (AASHTO) bridge standards. These guidelines use the MCE as the design seismic event. The AASHTO bridge standards, also based on the MCE, would be used for the design of the pile foundations of the pier (DON 1995b).

Implementation of the above design measures would reduce the effects of seismically induced structural failure. Engineering design criteria incorporated into the project would mitigate the geohazard impacts to a less than significant level.

No 100-year flood zones are located within PSNS Bremerton; therefore, flooding impacts would not occur. In addition, because tsunamis and seiches are extremely rare, are unlikely to occur during construction of the project, and are considered an unavoidable, acceptable risk, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant.

OPERATIONS

Impacts of geohazards (seismicity, fault rupture, liquefaction, settlement) on facilities and personnel during operations would be less than significant because they would be mitigated by the project design as discussed above. In addition, an effective earthquake preparedness plan is in place as part of the *Emergency Management Operations Plan, PP3440.10, Annex M.*

No 100-year flood zones are located within PSNS Bremerton, therefore, flooding impacts would not occur.

Maps indicating areas vulnerable to tsunamis or seiches (strong sea motion induced by seismic events) do not exist for the area. However, tsunamis and seiches could result in upswelling damage along the shoreline and overwashing (i.e., flow of water in restricted areas) of the location, and could cause substantial damage. Because such events are extremely rare, are unlikely to occur during the lifetime of the project, and are considered an unavoidable, acceptable risk, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant.

4.1.2.2 *Facilities for One Additional CVN and Removal of Four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

Geologic Environment

DREDGING

Development of one additional CVN home port at PSNS would require approximately 425,000 cy of dredging, mostly in the vicinities of piers D and B, with a lesser amount at Pier 3. The dredging would permit deeper-draft ships to safely navigate the turning basins and berth at the piers. Considerable dredging has previously been conducted at PSNS along the piers and channel. Dredging would temporarily disrupt underwater depositional processes, however, similar to prior dredging episodes in this area, depositional equilibrium would be reestablished within a short period of time. No regional, long-term depositional disruptions would occur as a result of dredging in this area. Therefore, impacts on geological resources due to dredging are less than significant.

Dredged material determined to be suitable for disposal (estimated at a maximum of 308,000 cy) at a designated PSDDA site would be disposed of at the Elliott Bay PSDDA site near Seattle. Unsuitable dredged materials (estimated at a maximum of 117,000 cy) would be disposed of at an existing permitted upland landfill or in a CDF at PSNS. See Figure 2-8 for possible locations of the CDF.

FACILITY IMPROVEMENTS

Replacement of Pier D to provide a home port for one additional CVN would be required. New electrical upgrades on the east side of the new Pier D would also be required. Replacement of the pier would not modify topography, and the new electrical upgrades would modify topography only slightly. Therefore, impacts to topography would be less than significant.

Construction of the electrical upgrades on the east side of the new Pier D would result in temporary soil disturbance and some temporary soil erosion on land. Because of the relatively flat terrain, short-term erosion resulting from construction would be limited. Standard erosion control measures and pollutant control measures are specified in the Storm Water Pollution Prevention Plan (SWPPP) currently in place. The SWPPP would be amended to incorporate the proposed project, thus further minimizing impacts to the geologic environment to less than significant.

OPERATIONS

Operations would not result in additional disturbance or impacts to the geologic environment at the home port location.

Geohazards

DREDGING

Geohazard impacts during dredging are considered unlikely and, therefore, less than significant.

FACILITY IMPROVEMENTS

Pier D would be replaced and new electrical upgrades on the east side of the new Pier D would be required. Potential impacts due to geohazards (seismicity, fault rupture, liquefaction, settlement) on facilities and personnel would be mitigated by the project design and are, therefore, considered less than significant. Seismic design that would be incorporated into the project design is discussed in section 4.1.2.1. No 100-year flood zones are located within PSNS Bremerton, therefore, flooding impacts would not occur. In addition, because tsunamis and seiches are extremely rare, are unlikely to occur during the lifetime of the project, and are considered an unavoidable, acceptable risk, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant.

OPERATIONS

Impacts of geohazards (seismicity, fault rupture, liquefaction, settlement) on facilities and personnel during operations would be less than significant because they would be mitigated by the project design as discussed in section 4.1.2.1. In addition, an effective earthquake preparedness plan is in place as part of the *Emergency Management Operations Plan, PP3440.10, Annex M.*

No 100-year flood zones are located within PSNS Bremerton, therefore, flooding impacts would not occur. For the same reasons described in section 4.1.2.1, impacts from tsunamis or seiches are less than significant.

4.1.2.3 Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs (Alternative Five)

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

Dredging actions would be the same as in section 4.1.2.2. Therefore, impacts to the geologic environment and impacts from geohazards are expected to be similar to those described in section 4.1.2.2. Impacts to the geologic environment and impacts from geohazards would be less than significant.

Facility Improvements

Facility improvement actions would be the same as in section 4.1.2.2. Impacts to the geologic environment and impacts from geohazards are expected to be similar to those described in section 4.1.2.2. Impacts to the geologic environment and impacts from geohazards would be less than significant.

Operations

Operations would not impact the geologic environment at the home port location. In addition, impacts of geohazards (seismicity, fault rupture, liquefaction, settlement) during operations would be identical to impacts described in section 4.1.2.2 and would, therefore, be less than significant.

4.1.2.4 One Additional CVN: Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Geologic Environment

DREDGING

Because no dredging is proposed for this action, no impacts would occur on the geologic environment.

FACILITY IMPROVEMENTS

Because no construction is proposed for this action, no impacts would occur on the geologic environment.

OPERATIONS

No impacts would occur on the geologic environment.

Geohazards

DREDGING

No dredging is proposed, therefore, there would be no impacts from geologic hazards on dredging.

FACILITY IMPROVEMENTS

Because no demolition or construction is proposed, impacts associated with geologic hazards at the project location would remain unchanged and, therefore, result in no impact.

OPERATIONS

The likelihood of substantial damage to the CVN during earthquakes due to shaking of the existing wharf is minimal; impacts would be less than significant. Tsunamis and seiches are sometimes associated with large seismic events. However, because such events are extremely rare, are unlikely to occur during the lifetime of the project, and are considered an unavoidable, acceptable risk, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant. In addition, an effective earthquake preparedness plan is in place as part of the *Emergency Management Operations Plan, PP3440.10, Annex M.*

4.1.2.5 Mitigation Measures

Impacts on the geologic environment and geohazard are less than significant. No mitigation measures are proposed.

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4.2 TERRESTRIAL HYDROLOGY AND WATER QUALITY

4.2.1 Affected Environment

Surface Water

No perennial streams are located within the PSNS area. Surface runoff is discharged to Sinclair Inlet through a stormwater drainage system (DON 1994b, 1994c, 1995b).

Groundwater

Groundwater is generally present within 100 feet of the ground surface in sand and gravel of the underlying glacial till and alluvium. The depth to groundwater may be locally greater beneath the upland portions of the location (DON 1989). The rate of groundwater recharge in Kitsap County is estimated at approximately 12 inches annually. The coarse sand and gravel at PSNS Bremerton is highly permeable, allowing for significant recharge of the shallow aquifer in unpaved areas. The quality of most groundwater near Bremerton is generally good and comprises approximately 35 percent of the public water supply in the area (DON 1992, 1995b, 1996b). However, iron concentrations often exceed the 0.3 milligrams per liter (mg/L) secondary maximum contaminant level recommended for drinking water (DON 1995b).

Shallow groundwater is present in the western portion of the location, at depths of approximately 2 to 8 feet below ground surface. Local groundwater wells indicate depth to groundwater ranges from 3 to 40 feet in the vicinity of the location. Based on a boring drilled to a depth of 300 feet, less than 100 feet from the shoreline, no confined or potable aquifers are present to a depth of at least 280 feet (URS Consultants 1995). Groundwater flow at the location is toward Sinclair Inlet (DON 1995b). Shallow groundwater is saline due to the proximity of Sinclair Inlet to the proposed project location and therefore most likely would never be utilized as a water supply source.

Soil and Groundwater Contamination

Based on investigations completed as a part of the Installation Restoration (IR) Program, subsurface contamination is present both in upland areas and in sediments in the waterfront area. As part of the IR Program, PSNS has been subdivided into several Operable Units (OUs), including OU A, OU B, and OU NSC. Upland improvements, including utility upgrades and electrical substations associated with the replacement of Pier D, have only been proposed in the vicinity of OU NSC. Therefore, the following affected environment, environmental consequences, and mitigation measures focus on OU NSC.

Soil contamination consists primarily of elevated concentrations of total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and lead. Many of the highest concentrations of TPH and lead were detected in soils in the southwest portion of the location, adjacent to Pier D. Groundwater contamination includes elevated concentrations of TPH, copper, nickel, pesticides, PCBs, arsenic, and silver. These areas are contaminated as a result of leaking underground storage tanks associated with a former gasoline station, leaking fuel oil supply lines and associated pump and storage facilities, battery storage and recycling, and other industrial-related activities (DON 1996a, DON 1994a). The movement of groundwater from PSNS Bremerton to the adjacent waters of Sinclair Inlet may potentially transport dissolved chemicals to the marine environment, but contaminants in groundwater discharging into the marine water does not appear to significantly affect ambient concentrations in Sinclair Inlet. This lack of significant concentrations of contaminants is due to groundwater dilution with Sinclair Inlet water and other groundwater as it enters Drydock 6. Therefore, contaminants entering Sinclair Inlet waters from groundwater do not represent a significant risk to the marine environment (DON 1996a). A Final Record of Decision (ROD), which describes the selected remedial action for Operable Unit NSC, located in the vicinity of Pier D, was signed on December 12, 1996 (see Volume 4, Section 4.2). In summary, contaminated sediments and groundwater will remain in-place, however, public contact will be minimized through paving of unpaved surfaces, prohibition of use of groundwater from beneath the location, and groundwater monitoring. In addition, a management excavation plan will be established to limit potential contact with, and assure appropriate handling and disposal of, soils excavated during future excavations associated with construction activity at the location (DON 1996a).

The lead agency is the U.S. Navy, however, the Washington State Department of Ecology (WDOE), the Suquamish Tribe, and the U.S. Environmental Protection Agency (EPA) participated in the scoping of the site investigations and in evaluating alternatives for remedial action. Ecology and the EPA concur with the selected remedial action. This remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA), of 1986, and to the maximum extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(DON 1996a).

The contaminated sites are addressed in accordance with requirements established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 U.S.C. 9601 *et seq.*), Resource Conservation and Recovery Act (RCRA, 42 U.S.C. 6901), the National Oil and Hazardous Substance Pollution Contingency Plan (NCP, 40 C.F.R. 300, CERCLA Section 105), and/or the UST regulations.

4.2.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Significant impacts on surface water or groundwater in the project area would occur if the project results in the following:

- Degradation of water quality, affecting existing and future beneficial uses of receiving waters.
- Discharge that creates pollution, contamination, or nuisance in violation of applicable federal or state standards.
- Release of substances that would result in substantial toxic effects to humans, animals, or plant life.

4.2.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging

No potable or confined aquifers are present beneath PSNS Bremerton within a depth of 280 feet; therefore, dredging would not potentially intercept, and adversely impact, beneficial groundwater (i.e. to be used for municipal, industrial, or agricultural purposes) beneath the location. In addition, potentially artesian conditions (confined aquifer) would not be disrupted as a result of proposed dredging. Because dredging would only potentially impact marine water quality, dredging of 425,000 cy of sediment would not adversely impact terrestrial surface water or groundwater in the project area.

Dredged material determined to be suitable for disposal (estimated at 308,000 cy) at a designated PSDDA disposal site would be disposed of at the Elliott Bay PSDDA site near Seattle. Unsuitable dredged materials (estimated at 117,000 cy) would be disposed of at an appropriately permitted upland landfill in a manner consistent with standards established by the Regional Water Quality Control Board (RWQCB).

Surface and groundwater impacts associated with disposal in the proposed landfill locations are not addressed as part of this impact assessment. It is assumed that environmental issues associated with an existing landfill have been addressed by the landfill. Upland landfills would include required structures and procedures to prevent contamination of surface water and groundwater, so that water quality impacts of dredged material disposal at this location would be less than significant. Class I, II, and III landfills accept varying types of waste and are constructed accordingly for varying levels of groundwater protection (with Class I landfills having the highest level of groundwater protection). For example, Class III landfills accept only nonhazardous solid waste and inert waste. All wastes at Class III landfills must contain at least 50 percent solids and must not contain moisture in excess of the moisture holding capacity of the individual landfill. Class II landfills also accept only nonhazardous solid waste, but at contaminant concentrations higher than Class III landfills (e.g., nonhazardous petroleum waste). Class I landfills accept solid and liquid hazardous waste.

Alternatively, unsuitable dredged materials could be disposed in a Confined Disposal Facility (CDF) at PSNS. See Figure 2-7 for potential locations of the CDF. Sediments disposed of at the Elliott Bay PSDDA site and CDF would remain in a marine environment, therefore, adverse impacts to terrestrial surface and groundwater would not occur.

Facility Improvements

PSNS operates in accordance with NPDES Storm Water Pollution Prevention Plan (SWPPP) WAR 000.2062. PSNS has prepared a SWPPP in compliance with the NPDES permit, which covers day-to-day operations. A project-specific SWPPP would be prepared that is consistent with the existing PSNS SWPPP. Onshore facility improvements would include replacement of Pier D. Surface and groundwater quality could potentially be impacted by fuel spills or erosion and surface water run-off associated with demolition and construction-related (excavation and grading) activities. However, these potential impacts would be reduced to less than significant levels by the implementation of the existing and the project specific SWPPPs.

The project specific SWPPP would be designed to minimize water quality degradation through establishment of project-specific BMPs, implementation of standard erosion control measures, and implementation of spill prevention and containment measures. In accordance with Navy

Specifications 01575, Temporary Environmental Controls, the SWPPP will be completed in accordance with 40 CFR 122.26, EPA 832-R-92-005. These specifications require that the following be implemented in association with construction and operation of the proposed project:

- Identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharge from the site.
- Describe and ensure implementation of practices that will be used to reduce the pollutants in storm water discharge associated with industrial activity at the construction site.
- Ensure compliance with terms of EPA general permit for storm water discharge.
- Select applicable management practices from EPA 832-R-92-005.
- Provide completed copy of Notice of Intent and Notice of Termination, except for effective date. Submit to the Contracting Officer a minimum of 14 days prior to start of construction the original Notice of Intent, completed and ready for signature, including the SWPPP, a Monitoring Program Plan, and other documents as required by Order No. 92-08-DWQ.

The SWPPP must be approved by the U.S. Environmental Protection Agency prior to initiation of construction and/or grading associated with the project. Additional erosion and sediment control requirements contained in State of Washington and Kitsap County guidance documents would also be followed during construction. The permit must be continually updated as necessary to reflect current and changing conditions on-site. In addition, design and construction would follow all applicable federal, state, and local regulations and ordinances regarding storm water retention and treatment.

Demolition and excavation activities required for the replacement of Pier D and electrical upgrades may encounter subsurface contamination that has been identified in the waterfront area. Specifically, some of the highest concentrations of TPH and lead were detected in soils in the southwest portion of the location, in the vicinity of Pier D. In addition, unknown or undocumented subsurface contamination may also be encountered.

If contaminated soil or groundwater is encountered or disturbed during demolition or construction-related activities, potentially significant impacts on surface water or groundwater could occur as a result of a discharge or accidental release. However, these potential impacts would be reduced to less than significant levels by implementation of the following project actions:

Prior to any demolition, excavation, or construction activities, all known utilities (including fuel, sewer, steam, and electrical) would be identified by the demolition and construction contractor. Remedial actions of contaminants encountered (or expected to be encountered) would be conducted prior to or in conjunction with construction activities. All remedial actions and excavations would be conducted in compliance with all federal and state statutes and regulations pertaining to soil and groundwater contamination. Remedial action of contaminated soil would result in increased sediment quality in the vicinity of construction activities. In addition, soils investigations completed in areas of suspected soil contamination (prior to remediation) will be used in the ongoing multi-agency, NEPA-CERCLA review and coordination process to ensure that all agency and tribal concerns regarding the proposed project are addressed as necessary.

This remedial action would occur on a site listed on the EPA's National Priority List (NPL) and is subject to the requirements of CERCLA. The Navy would coordinate with CERCLA program managers before executing the proposed action to ensure conformance with CERCLA requirements for this location. In addition, construction in contaminated areas would be conducted in accordance with RCRA (42 U.S.C. 6901), NCP (40 C.F.R. 300, CERCLA Section 105), the UST Program, and the following regulations and guidance manuals:

- 29 C.F.R. 1910.120. Addresses hazardous waste releases and health and safety of workers.
- *Navy and Marine Corps Installation Restoration Manual* (February 1997). Methods to evaluate, characterize, and control the potential migration of possible contaminants resulting from past operations and disposal practices at DOD facilities.
- *EM 385-1-1 U.S. Army Corps of Engineers Safety and Health Requirement Manual* (September 1996). Addresses health and safety issues of workers handling potentially contaminated materials and waste.
- *Chief of Naval Operations Instruction (OPNAVINST) 5090.1B, Environmental and Natural Resources Program Manual* (1994).
- Washington State Hazardous Waste Management Act – Model Toxics Control Act (RCW 70.105D, WAC 173-340). Defines cleanup standards for groundwater, surface water, soil, and industrial soil.
- Washington State Dangerous Waste Regulations (WAC 173-303). Addresses procedures to be used to designate waste as dangerous and the standards for handling, transporting, storing, and treating designated waste.
- Washington State Transportation of Hazardous Waste Materials (WAC 446-50). Addresses requirements related to the transportation of hazardous materials/sediment waste using the public highways of the state.

These statutes and regulations are aimed at protecting human health and the environment. These statutes and regulations address worker safety, regulatory notification, clean-up requirements, and handling, storage, treatment, and disposal requirements for hazardous materials and waste. Compliance with all applicable federal, state, and local regulations would reduce the potential for significant adverse impacts from contaminants, if encountered, to less than significant levels.

As previously indicated, unknown or undocumented subsurface contamination could be encountered during facility construction excavations. Soil and/or groundwater remediation completed in association with proposed construction would reduce further impacts associated with exposure of contaminants to on-location workers and the general public. This is a beneficial impact.

Operations

PSNS would retain one homeported CVN. Potential impacts to surface or groundwater quality through the accidental release of chemicals during ongoing operations would be reduced to levels that are less than significant by the ongoing implementation of the existing SWPPP, the existing health and safety programs described in section 4.15, and compliance with federal, state, and local statutes and regulations regarding storm water retention and treatment and soil and groundwater contamination (described above in Facilities). The SWPPP is designed to minimize water quality degradation through establishment of project-specific BMPs, implementation of standard erosion control measures, and implementation of spill prevention and containment measures. In accordance with Navy Specifications 01575, Temporary Environmental Controls, the Stormwater Pollution Prevention Plan will be completed in accordance with 40 CFR 122.26, EPA 832-R-92-005. These specifications require that the following be implemented in association construction and operation of the proposed project:

- Identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharge from the site.
- Describe and ensure implementation of practices that will be used to reduce the pollutants in storm water discharge associated with industrial activity at the construction site.
- Ensure compliance with terms of EPA general permit for storm water discharge.
- Select applicable management practices from EPA 832-R-92-005.
- Provide completed copy of Notice of Intent and Notice of Termination, except for effective date. Submit to the Contracting Officer a minimum of 14 days prior to start of construction the original Notice of Intent, completed and ready for signature, including the SWPPP, a Monitoring Program Plan, and other documents as required by Order No. 92-08-DWQ.

The SWPPP must be approved by the U.S. Environmental Protection Agency prior to initiation of construction and/or grading associated with the project. The permit must be continually updated as necessary to reflect current and changing conditions on-site. The statutes and regulations are aimed at protecting human health and the environment and include release/spill notification and clean-up requirements; and handling, storage, treatment, and disposal requirements for hazardous materials and waste. Implementation of the SWPPP, the existing safety and health programs described in section 4.15, and continued compliance with environmental regulations would reduce the potential for significant adverse impacts to less than significant levels.

4.2.2.2 *Facilities for One Additional CVN and Relocation of four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging

Dredging actions would be the same as in section 4.2.2.1. As described in section 4.2.2.1, dredging impacts would be less than significant.

Facility Improvements

Facility improvements include replacement of Pier D, plus electrical upgrades to enable Pier D to handle two CVNs at the same time. It would have nearly the same impacts (less than significant) on hydrology as those identified in section 4.2.2.1.

Operations

Operations associated with an additional CVN would result in chemicals being handled, stored, and disposed at the home port location, which is the normal condition for PSNS. Therefore, there is a potential for chemical releases to occur, resulting in potential adverse impacts to surface water or groundwater. However, as described in section 4.2.2.1, potential impacts to surface or groundwater quality through the accidental release of chemicals during ongoing operations would be reduced to levels that are less than significant by the ongoing implementation of the existing SWPPP, the existing health and safety programs described in section 4.15, and compliance with federal, state, and local statutes and regulations regarding storm water retention and treatment and soil and groundwater contamination (described above in Facilities). The SWPPP is designed to minimize water quality degradation through establishment of project-specific BMPs, implementation of standard erosion control measures, and implementation of spill prevention and containment measures. Operation-related impacts to water quality would be reduced to levels that are less than significant by the implementation of the existing SWPPP, the existing safety and health programs described in section 4.15, and compliance with federal, state, and local statutes and regulations pertaining to storm water retention and treatment and soil and groundwater contamination, described in section 4.2.1.

4.2.2.3 *Facilities for One Additional CVN and Relocation of two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

Dredging actions would be the same as those described in section 4.2.2.1. As described in section 4.2.2.1, dredging impacts would be less than significant.

Facility Improvements

Facility improvements would be the same as in section 4.2.2.2. As described in section 4.2.2.2, impacts to surface or groundwater would be less than significant.

Operations

Operations associated with an additional CVN would result in additional chemicals being handled, stored, and disposed at the home port location. Therefore, there is an increased potential for chemical releases to occur, resulting in potential adverse impacts to surface water or groundwater. However, as described in section 4.2.2.1, these operation-related impacts to water quality would be reduced to levels that are less than significant by the implementation of the existing SWPPP, the existing safety and health programs described in section 4.15, and compliance with federal, state, and local statutes and regulations pertaining to soil and groundwater contamination, as described in section 4.2.2.1.

4.2.2.4 *One Additional CVN: Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging

Under this action, no dredging would occur; therefore, impacts would also not occur.

Facility Improvements

Because no improvements are proposed, no impacts would occur to surface water or groundwater.

Operations

Operational impacts associated with one additional CVN would be similar to those described in section 4.2.2.3. Impacts to surface water and groundwater would be less than significant.

4.2.2.5 *Mitigation Measures*

Because impacts to terrestrial hydrology and water quality (i.e., surface water and groundwater) are less than significant, no mitigation measures are required.

4.3 MARINE WATER QUALITY

4.3.1 Affected Environment

This section describes the marine waters that could be affected by the proposed project through dredging and construction activities, disposal of dredged material at a confined disposal facility (CDF) or confined aquatic disposal (CAD) facility, or through operation of homeported ships. Marine waters potentially affected by the project are those of the proposed dredging, construction and disposal sites, and the adjacent waters of Sinclair Inlet. For these waters, this section describes circulation, fecal coliform levels, temperature, salinity, dissolved oxygen, and chemical contaminants. The quality of marine waters at PSNS is affected by sediment quality in Sinclair Inlet (section 4.4) and by inputs from terrestrial areas (section 4.2).

The Washington State Department of Ecology (WDOE) classifies the marine surface waters of Sinclair Inlet west of longitude 122°37'W as "Class A." The WDOE, in the Washington Administrative Code [WAC] 173-201A, Water Quality Standards for Surface Waters of the State of Washington, describes Class A marine surface waters as having the general water quality characteristics that meet or exceed the requirements for all, or substantially all, uses, including the following:

- Fish and shellfish; salmonid migration, rearing, spawning, and harvesting; other fish migration, rearing, spawning, and harvesting; clam, oyster, and mussel rearing, spawning, and harvesting; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops) rearing, spawning, and harvesting.
- Wildlife habitat.
- Recreation (primary contact recreation, sport fishing, boating, and aesthetic enjoyment).
- Commerce and navigation

Water quality criteria from WAC 173-201A relevant to this project includes the following:

- Dissolved oxygen (DO) would exceed 6.0 milligrams per liter (mg/L). When natural conditions, such as upwelling, depress the DO to near or below 6.0 mg/L, natural DO levels may be degraded by up to 0.2 mg/L by human-caused activities.
- pH (a measure of acidity or alkalinity) would be within the range of 7.0 to 8.5 (marine water), with human-caused variation within a range of less than 0.5 units.
- Turbidity would not exceed 5 nephelometric turbidity units (ntu) over background when the background turbidity is 50 ntu or less or exceed the background by more than 10 percent when the background turbidity is more than 50 ntu.
- Concentration of toxic, radioactive, or deleterious materials would be below those that have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent on those waters, or adversely affect public health, as determined by the department (see WAC 173-201A-040 and 173-201A-050).

- Aesthetic values would not be impaired by the presence of materials or their effects, excluding those of natural origin, that offend the senses of sight, smell, touch, or taste.

Circulation

Tides in central Puget Sound vary little from those at the reference station in Seattle. The corrections for Sinclair Inlet high tides are +0.4 feet and +42 seconds, and for low tides are 0.0 foot and +12 minutes (DON 1991). Sinclair Inlet tides can be characterized as mixed, semi-diurnal (i.e., four slack tides per day: two high tides of unequal height and two low tides of unequal height). Tidal currents and southwesterly winds are the primary sources of water circulation and transport in Sinclair Inlet. Weak tidal currents move water in and out of the inlet with a maximum velocity of 0.2 to 0.3 knots (DON 1991). The southwesterly winds push surface waters out of the inlet, bringing deep water to the surface for replacement. Wind action also affects the wave-height range (0.5 to 2.5 feet).

Fecal Coliform

Sinclair Inlet has historically been affected by nonpoint source pollution (stormwater runoff, septic tanks, drainage fields, etc.) and wastewater treatment plant discharges. Elevated levels of fecal coliform (human waste) above EPA water quality criteria (40 C..F.R. 131) were detected near the Bremerton wastewater treatment plant and at four of 10 sampling stations near PSNS (Tetra Tech 1988). In 1992, water quality stations along the southern shore of Sinclair Inlet indicated elevated fecal coliform levels above WDOE standards (Bremerton/Kitsap County Health District 1992).

Temperature/Salinity and Dissolved Oxygen

Water column measurement and sampling were conducted at PSNS in 1992 (DON 1992b) and 1996 (DON 1996b). Surface water temperatures ranged from 2°-16°C and mid-depth to near-bottom temperatures ranged from 9°-12°C. Salinity ranged between 28 and 29 parts per thousand (ppt). DO concentrations (6.2 to 15 mg/L) were above the WDOE criteria of 6.0 mg/L (WAC 173-201A-040).

Chemical Contaminants

The levels of chemical contaminants in the marine water of PSNS are affected by the levels of these chemicals present in the marine sediment of the site, which are included in Operable Unit B of the PSNS NPL site (section 4.4). Upland sources are estimated to have little effect on marine water quality through inputs from surface or groundwater at PSNS (DON 1996c).

Three semi-volatile organic compounds (SVOCs) were detected in one or more water samples during the DON (1992b) Study. Bis(2-ethylhexyl)phthalate (BEHP) was detected at Station 135 (56 micrograms per liter [μg/L] in surface waters, 100 μg/L at mid-depth), and at Station 143 (23 μ/L), which exceeds the EPA chronic water quality criteria (3 μg/L) (see Figure 4.3-1 in Volume 4, section 4.3). Station 135 is located between Piers 3 and 4, and Station 143 is located between Piers 6 and 7 at PSNS. Phenol (1 μg/L) and di-n-butyl phthalate (1 μg/L) were detected at Station 118, located offshore and west of Pier B. Both compounds are below EPA water quality criteria. The EPA marine acute criteria for phenol is 5,800 μg/L and the marine chronic criteria for di-n-butyl phthalate is 3.4 μg/L. Phenol was also detected at 1 μg/L at Station 122, located between Piers B and C, near CDF-2.

Several metals were detected in PSNS waters, including aluminum, manganese, arsenic, barium, beryllium, chromium, copper, iron, lead, thallium, vanadium, and zinc. Of all detected chemicals in marine waters, copper was the only chemical where all detected concentrations exceeded the State of Washington marine acute water quality standard (2.5 μg/L for copper). Copper concentrations were between 5.0 and 5.8 μg/L for all stations, with the exception of Station 129 near CDF-1, which contained 17.5 μg/L on December 18, 1990. All other detected metals were below the State of Washington marine chronic and acute water quality standards.

Elevated levels of tributyltin, a compound used to control biological fouling on boat hulls, have been detected in Sinclair Inlet waters, likely due to the proximity of shipyards, marinas, and boat maintenance facilities (Environvision 1991). (Since 1980, the Navy has not used tributyltin in anti-fouling paints.) However, all detected concentrations were below EPA water quality criteria for chronic effects.

Installation Restoration (IR) Sites

The marine components of the PSNS CERCLA site are described in section 4.4, Sediment Quality.

Results of Marine Water Sampling for Radioactivity

To provide additional assurance that procedures used by the Navy to control radioactivity are adequate to protect the environment, the Navy conducts environmental monitoring in harbors frequented by its nuclear-powered ships. The current Navy environmental monitoring program in the Puget Sound area includes analyzing samples of marine water (see below), sediment (see section 4.4), and marine life (see section 4.5.1).

Sampling of marine water in the Puget Sound area in 1996 showed no detectable radioactivity associated with Naval nuclear propulsion plant operation or servicing (NNPP 1997). In addition to Navy sampling, the EPA has conducted detailed environmental surveys of selected U.S. harbors. A previous EPA survey of the Puget Sound area in 1987 detected only naturally occurring radioactivity in marine water samples (EPA 1989b), and trace amount of NNPP radioactivity in a few sediment samples 100 times below levels of comparable naturally occurring radionuclides.

For further discussion on the Navy's radiological environmental monitoring program, see section 7.4.4.

4.3.2 Environmental Consequences and Mitigation Measures

Significance Criteria

An impact would be significant if one of the following occurred:

- Alteration of water circulation in the project site to the extent that substantial adverse effects on water quality, or biological resources result.
- Discharge that creates pollution, contamination, or nuisance in violation of applicable federal or state standards. This would include state water quality standards or objectives, or the EPA National Ambient Water Quality Criteria, outside a permit-specified discharge mixing zone or immediate construction area.

- Creation of turbidity (suspended solids), dissolved oxygen, contaminant, or other conditions that would result in substantial mortality of aquatic organisms.

4.3.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)*

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Under these alternatives, none of the above water quality impact significance criteria would occur or be exceeded. Therefore, water quality impacts would be less than significant. The following sections explain this conclusion.

Dredging and Disposal

The aspect of the proposed project with the greatest potential to impact water quality is dredging and dredged material disposal. Under this action, deepening would occur in berths adjacent to Piers B, D, and 3; the turning basins for Piers B and D; and a portion of the inner channel. The principal water quality impact of dredging is increased suspended solids concentrations in waters near the dredging and disposal sites, including the PSDDA, CDF, and CAD sites. Increased suspended solids concentration leads to other water quality changes, such as reduced light transmittance, increased oxygen demand leading to reduced DO, increased nutrients levels, and increased levels of toxic chemicals associated with suspended particulates. Studies (COE 1976) have shown that the effects of dredging on temperature, salinity, and pH are minor and transient.

Dredging would be carried out in compliance with permits issued by the responsible regulatory agencies. These permits would include conditions to protect water quality; these conditions are expected to include the following:

1. Dredging would be done with a clamshell dredge, and would be carried out in a manner that minimizes spillage of excess sediments from the bucket. A hydraulic dredge might be used to dredge and place clean cap material at the CAD site.

2. Water quality monitoring would be conducted to ensure that applicable standards are not exceeded outside specified dilution zones (size to be determined by WDOE; 300-foot radius is the present expectation). Monitoring results would be reported to the WDOE regularly.

3. Barges used to transport the dredged material to the disposal or transfer sites would not be filled beyond their capacity to completely contain the dredged material.

4. Care would be taken to prevent any petroleum products, chemicals, or other toxic or deleterious materials from entering the water. During dredging operations, booms would be placed around the dredging area to contain oil or other floating material that may be released from sediments or from dredging equipment and vessels.

5. Disposal operations and material effects would be in conformance with PSDDA management standards.

6. Other conditions may be included in the Section 401 Certification issued by the WDOE for this project.

Because much of the sediment that would be dredged at PSNS for this project is chemically contaminated, additional measures would be used to minimize the suspension of sediment into the water column. Dredging would employ a shrouded, or closed, bucket that minimizes water flow through the bucket and the resulting introduction of sediment into the water. Precision dredging (placement of the bucket on the seafloor) would also be used, so that the desired post-dredging contours could be achieved without using the bucket to "smooth" the bottom.

Effects of dredging on water quality can occur at the site of dredging and transfer to the barge, barge overflow or decant water discharge, and at the disposal site. The dredging for this project would be accomplished with a clamshell dredge. At the dredging site, sediments may be resuspended into the water column through lowering of the clamshell bucket, impacting the bottom with the bucket, closing the bucket, and raising the bucket through the water column and onto the haul barge. Water quality effects at the dredging site would be localized, and temporary but not significant. During dredging, water quality objectives for suspended solids, DO, and chemical contaminants could be exceeded within the dilution zone. However, Washington State water quality regulations allow for temporary exceedances of water quality standards within a specified dilution zone around the point of activity. Dilution zones and other water quality-related conditions for the project would be specified in the Water Quality Certification issued by the WDOE under Section 401 of the Clean Water Act.

The effect of dredging on suspended solids levels has been measured for several dredging projects using clamshell dredges. For example, during channel deepening in San Francisco Bay using a clamshell dredge, the Corps of Engineers determined that total suspended solids (TSS) concentrations 50 meters (m) down-current from the dredge were generally less than 200 mg/L, and averaged 30 to 90 mg/L (COE 1976). Background levels outside the plume averaged 40 mg/L. TSS concentrations decreased with increasing distance down-current from the dredging site. The near-bottom sediment plume extended approximately 450 m down-current. Lunz (1987) reported that TSS levels in dredging plumes are generally less than 100 mg/L, and that the plumes can extend up to 300 m down-current at the surface and 500 m down-current near the bottom. Studies have shown that adverse biological effects occur at much higher TSS levels (several thousand mg/L) than typically measured in dredging plumes (see section 4.5.2.1). Sediments at PSNS are primarily fine-grained, which tend to remain suspended in the water column longer than coarser sediments. Currents at PSNS are primarily tidal and are not particularly strong (0.2 to 0.3 knots maximum). Based on the above information, turbidity plumes caused by dredging would be expected to extend beyond a 300-foot radius dilution zone, but TSS levels outside the dilution zone would be well below levels needed to cause adverse biological effects. Resulting impacts would be less than significant. The use of special "environmental" dredging methods described above would serve to further reduce TSS. If additional analysis conducted during the permitting process indicates that applicable standards or levels expected to cause adverse biological effects would be exceeded outside the dilution zone, or if the dredge monitoring indicates such exceedances, the Navy, in consultation with permitting agencies, would develop additional control measures to prevent adverse impacts. If additional analysis conducted during the permitting process indicates that applicable standards or levels expected to cause adverse biological effects would be exceeded outside the dilution zone, or if dredge monitoring indicates such exceedances, the Navy, in consultation with permitting agencies, would develop additional control measures to prevent adverse impacts.

DO concentrations tend to decline in the vicinity of dredging operations when the suspension of anoxic sediments creates high biological and chemical oxygen demand. In the San Francisco Bay study previously mentioned, DO decreased in four of 12 measurements made. Depressions in DO were greatest in the lower 2 m of the water column. The greatest measured drop in DO concentration (from 9.0 to 5.5 mg/L) was near the bottom within 50 m of the dredging site. In all cases, background levels in DO were regained within 10 minutes of the sampling event (COE 1976). Lunz (1987) estimated that typical depressions in DO concentrations were usually less than 0.05 mg/L. Therefore, reductions in DO levels as a result of the proposed dredging project are expected to be localized and temporary; DO effects outside the dilution zone would be minimal. Consequently, impacts on DO levels in the water column would be less than significant.

Nutrient enrichment caused by potential elevated concentrations of phosphorus, nitrogen, and silica in the dredged material may increase water turbidity by enhancing primary production. LaSalle (1984), in a literature review, reported elevated quantities of phosphate, ammonia (as nitrogen), and silica have been measured within 180 m of a working dredge, exceeding background levels by two to nine times. However, when compared with ambient levels as a whole, the dredging operations would cause increased concentrations of nutrients by a maximum of 2 percent for ammonia, 1 percent for phosphate, and 0.5 percent for silica. Impacts would be near-field and transient. Therefore, nutrient enrichment impacts would be less than significant.

Increased suspended solids levels resulting from dredging would also increase the water column concentration of contaminants associated with the suspended sediments. The majority of heavy metals, nutrients, and petroleum and chlorinated hydrocarbons are typically associated with the fine-grained and organic components of the sediment (Burks and Engler 1978). However, available data suggest that a biologically significant release of these constituents during dredging has not been routinely observed (Francinques et al. 1985). Water quality monitoring data collected during dredging of a metals-enriched site at the Kings Bay, Georgia, Naval Base demonstrated elevated metals concentrations were present in the water column but that metals contamination was not a long-term problem (Alvarez, Lehman & Associates 1985). Laboratory studies describing the behavior of metals and chlorinated hydrocarbons revealed that 70 percent of the copper released by disturbances of bottom sediments was adsorbed onto clay and organic particles, effectively removing it from the water column. In the same way, 97 percent of the mercury and 50 percent of the mercuric nitrate/mercury chloride were adsorbed onto fine-grained and organic components of the sediments (Stern and Stickle 1978). Chlorinated hydrocarbons were noted to be strongly bound to the solid phase, but with increasing suspended solids concentrations, greater soluble forms of hydrocarbons were detected. These factors would reduce the potential for contaminants being released into dissolved form from the dredged material to less than significant levels.

Field measurements of direct metals releases to the water column have been made in the immediate vicinity during past dredging operations. Three examples are relevant to this project because the dredging sites are metals enriched. The three dredging projects took place in the Duwamish Waterway in Seattle (Havis 1988), San Francisco Bay (Wakeman 1977), and Black Rock Harbor, Connecticut (Havis 1988). The projects reported by Havis (1988) were performed using a clamshell bucket. Direct measurements were summarized in LaSalle (1984) and are presented in Table 4.3-1.

Metals concentrations from the three studies shown do not exceed applicable water quality objectives (with the exception of copper in heavily contaminated Black Rock Harbor). Measurements were compared to screening criteria intended to adequately protect water quality (and thus aquatic organisms) immediately following release of the effluent/dredged material. Because the suspended sediment load would be relatively small (i.e., 500 mg/L or less) in the

Table 4.3-1. Comparison of Historical Contaminants Release Data during Dredging State of Washington Water Quality Standards (Acute Marine) (all values in mg/L)

Metal	Acute Marine Standard (1-hr Average)	EXAMPLE DREDGING PROJECT		
		Duwamish Waterway[1]	Black Rock Harbor[2]	San Francisco Bay[3]
Arsenic	69	-	10	-
Cadmium	43	-	1	
Chromium	1,100	-	1	30 surface/ 50 bottom
Copper	2.9[4]	2	10	-
Lead	140	7	3	10
Mercury	2.1	-	0.01	-
Nickel	15	-	10	10 surface/ 80 bottom
Selenium	300	-	-	-
Silver	2.3[5]	-	-	-
Zinc	95	20	30	30

Notes: - Not Available
1. Havis 1988.
2. Wakeman 1977.
3. Havis 1988.
4. Copper toxicity depends on complexing capacity. Bay background varies from 1 to 4 mg/L.
5. An instantaneous concentration not to be exceeded at any time.

vicinity of the dredging operation, the concentration of toxic chemicals from suspended sediment in the water would not be expected to have adverse effects on the biological community (LaSalle 1984). In addition, dilution at most dredging sites would occur quickly. Most metals and organic compounds are not available in a soluble form because they are complexed with iron, manganese, organic matter, and clay particles (LaSalle 1984). The use of special "environmental" dredging methods described above would serve to further reduce the introduction of chemical contaminants into the water. Considering these factors, water column impacts due to the release of toxic substances would be less than significant.

DISPOSAL AT PSDDA SITE

Dredged material determined to be suitable for disposal at an unconfined aquatic site would be disposed of at the Elliott Bay PSDDA site near Seattle (see Figure 1-2). The volume of this material is estimated to be 308,000 cy. The Elliott Bay PSDDA site is designated for disposal of dredged material from the Puget Sound region, and the impacts of this use have been addressed and mitigated for in the EIS for site designation (COE 1988). Material would be disposed of at the site in accordance with PSDDA program requirements.

LANDFILL DISPOSAL

Dredged material to be taken to a landfill for disposal would be dewatered at a paved site along the PSNS shoreline. This site would be surrounded by a berm or other structure to contain all excess water. This water would be treated (removal of suspended particulates at least) to meet permit requirements prior to discharge to Sinclair Inlet. Resulting water quality impacts would be minor and localized increases in suspended solids at the point of discharge to Sinclair Inlet, and associated water quality effects as described above for dredging. These impacts would not be significant.

DISPOSAL IN CDF AND CAD SITES

An alternate means for disposal of material that is not suitable for disposal at a PSDDA site is disposal in one or both of two CDF sites, and/or a CAD site, at PSNS (see Chapter 2). Disposal of dredged material at these sites would result in temporary elevations in suspended solids levels, resulting in turbidity and the other water quality effects described above for dredging, including minor reductions in DO, minor nutrient enrichment, and potentially increased levels of toxic constituents. The potential for increases in toxic constituents during disposal is greater for unsuitable material than for suitable material. As discussed above for dredging, however, the tendency for toxic constituents to remain associated with suspended sediment particles would reduce both the solubility and bioavailablility of these constituents to levels below which toxic effects are expected. Placement of unsuitable material at these sites would be followed within a few days by placement of suitable material. This would limit the exposure of the water column to unsuitable sediments. Therefore, significant toxic effects would not occur during or following disposal at these sites.

Unlike dredging, disposal would occur within the confines of the constructed disposal facility. This would limit the greatest suspended solids levels and related water quality effects to the immediate disposal site, with much smaller effects outside the site. Therefore, water quality effects would be more localized than for dredging. At the CDF(s), the walls of the facility would extend above the water line. Within the CDF, water quality criteria for suspended solids, DO, and some chemical contaminants could be exceeded for a time immediately following disposal. At the CDF(s), disposal would force water (decant water) out of the site. The decant water would be clarified (sediment allowed to settle out) within the CDF prior to discharge to Sinclair Inlet; this water is expected to meet applicable standards. If additional analysis or monitoring indicates that applicable standards are not met, additional treatment such as filtration and flocculent aids would be used to meet standards. At the CAD site, it will not be possible to control the water within the site as completely as at the CDF. The top of the berm walls would be submerged and would extend to within a few feet of the water surface. A "notch" would be left in one berm for the disposal vessel to move into and out of the site; this notch would be covered by a silt curtain when not in use. This arrangement would largely contain the water within the site and allow settling out of most of the sediment before water flowed out of the site. If additional analysis during permitting indicates that this approach would not be adequately protective of water quality, another method of material placement, such as loading from a barge outside the CAD, would be developed. In addition, special disposal practices such as slow release of dredged material from the barge, low propeller speeds, and minimal use of propellers over deposited material, would be used to minimize the suspension of deposited sediment. These factors are expected to prevent exceedance of applicable standards outside the disposal site and the associated dilution zone. In addition, significant toxic effects are not expected to occur, for the reasons discussed in the preceding paragraph. Therefore, the water quality impacts of dredged material disposal at the CDF or CAD sites would be less than significant.

In the long term, there would be little effect of the CDF or CAD sites on marine water quality. When properly designed and constructed, these types of facilities can be very effective in immobilizing the sediment contaminants contained within them. Several CDF and CAD facilities for the containment of contaminated sediment have been constructed in the Puget Sound region.

Long-term monitoring of the performance of these facilities has shown that they are very effective in immobilizing contaminants associated with sediments contained within them (Boatman and Hotchkiss 1994 and 1997, COE et al. 1994, Converse Consultants 1992, Parametrix 1998). Site monitoring and related modeling studies for these sites have clarified the mechanisms for this effectiveness. These studies have shown that hydraulic flow parameters are less important in influencing contaminant loss than are adsorption of contaminants to sediment particles and biodegradation when contaminated leachate is moving from the anaerobic to aerobic areas of a well-flushed and oxygenated berm. For the CDFs and CAD sites at PSNS, appropriate tests of the leachability/mobility of the contaminants in the proposed dredged material would be performed, and the results incorporated into the design of the containment facilities. The facility would be designed to not release its contents during a seismic event. These factors and procedures would ensure that these facilities would be effective in containing the sediment contaminants within them. If monitoring indicated less than acceptable containment of contaminants, appropriate additional control measures would be implemented. Related impacts to marine water quality would be less than significant.

Radioactivity. Dredged material may contain trace amounts of radioactivity as a result of past Navy operations. These trace amounts, however, are far below the levels of comparable naturally occurring radionuclides, and would have no significant effect on the environment during or after the dredging operation or in the disposal of sediment, regardless of the location selected for disposal of the sediment. There is also scientific evidence that cobalt-60 from Naval nuclear propulsion plants does not buildup in marine life (NNPP 1997). Thus, there would be no short-term dredging-related impacts on water quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

Facility Improvements

Pier D would be removed and replaced by a wider structure. Both pier removal and construction of the new pier (which would entail pile driving) would result in disturbance the bottom of Sinclair Inlet. This would cause resuspension of bottom sediments, which would increase TSS concentrations in the water column, with related reductions in DO, and potential increases in nutrients and toxic constituents of the suspended sediments. Such effects, however, would be limited to the construction area and would dissipate soon after bottom disturbance ends. During facility construction, the Navy would comply with applicable permit conditions to protect water quality; these conditions are expected to include the following:

1. Care would be taken to prevent any petroleum products, chemicals, or other toxic or deleterious materials from entering the water.

2. Wash water would not be discharged into surface waters except as authorized by an National Pollutant Discharge Elimination System (NPDES) or state waste discharge permit. Wash water could contain oils, grease, or hazardous materials from washdown of surfaces including equipment or working areas.

3. All construction debris would be properly disposed of (contained and treated as required) on land so that it cannot enter the waterway or cause water quality degradation.

4. All construction activities would be conducted in conformance with the PSNS hazardous waste management plan, oil and hazardous substance spill contingency plan, and oil and hazardous substance spill prevention, control, and countermeasures plan.

As a result, toxic or adverse physical effects to biota would not occur (section 4.5.2). Therefore, these water quality impacts would be less than significant.

Operations

Homeporting of ships at PSNS could result in water quality impacts through fuel spills, ship maintenance, accidental discharges of wastewater or other wastes from the ships, and discharge of stormwater from PSNS. Under this action, PSNS would retain its one homeported CVN and four AOEs. Since the number of vessels homeported at PSNS would not change, any water quality impacts resulting from ship homeporting would not change from current conditions. Water quality impacts resulting from homeporting of ships at PSNS would be less than significant, as explained in the following paragraphs.

Accidental fuel spills can occur during ship fueling at PSNS. Such spills are unlikely and would be small in quantity because fueling equipment and procedures are designed to minimize the occurrence of spills. When in berth, all homeported ships receive all utilities, including discharge of wastewaters and other wastes, from landside (PSNS). This arrangement minimizes discharge of wastewaters or other wastes into the surface waters of PSNS. All homeported ships are surrounded by a surface boom when in berth, which serves to contain any spilled fuels, wastewater, or other hazardous materials and facilitate their cleanup. Spill response measures in place at PSNS are addressed below.

No operationally induced effects on marine waters, other than those associated with normal ongoing operations of PSNS, are expected as a result of this project. A change in the number or type of homeported ships would not affect the management of wastewater or hazardous materials at PSNS. Effects from PSNS operations (e.g., hazardous materials spills, stormwater runoff) are covered under standard operating procedures related to these subjects. PSNS has operational instructions that cover hazardous waste management (NAVSHPYDPUGETINST P5090.5), oil and hazardous substance spill contingency (NAVSHPYDPUGETINST P5090.1), and oil and hazardous substance spill prevention, control, and countermeasures (NAVSHPYDPUGETINST P5090.9). These plans delineate responsibilities and actions required during hazardous material handling or in the event of a spill and are a required part of PSNS operations.

PSNS operates under an NPDES permit (Number WA-000206-2) for all discharges into Sinclair Inlet, including stormwater discharges from PSNS. A best management practices (BMPs) plan prepared by the Navy in consultation with the WDOE and EPA is in effect. This plan includes specific actions to meet objectives to minimize release of pollutants, ensure proper operation of treatment facilities and equipment, and to control pollutants through waste minimization. In addition, PSNS is using oil/water separators and metal precipitators to treat bilge discharged from berthed ships. The treated water is discharged to the sanitary sewer system. Oil collected from this system is either recycled or disposed of to a permitted upland facility. The sludge from the metal precipitation is disposed of to a permitted upland disposal facility. These standard procedures would apply to any CVN berthed at PSNS and ensure that impacts would be less than significant.

Navy policy and requirements for controlling ship discharges to the environment are presently contained in OPNAVINST 5090.1B. These requirements are applicable to all home port sites assessed in this EIS (NASNI, PSNS, NAVSTA Everett, and PHNSY). These requirements, along with local instructions at each project site, ensure that discharges as a result of the operation of Naval vessels are in compliance with the Federal Water Pollution Control Act (or "Clean Water Act") and present no significant impact to the environment.

Also, the National Defense Authorization Act of 1996 amended Section 213 of the Clean Water Act to require that the Secretary of Defense and the Administrator of the EPA jointly develop Uniform National Discharge Standards (UNDS) for discharges incidental to the normal operation of vessels of the Armed Forces. The intent of this act is to establish a consistent set of effluent standards that improves environmental protection while enhancing the operational flexibility of Armed Forces vessels that visit various ports as part of their missions. The Navy and EPA are currently working together and in consultation with states and other stakeholders in a three-phase process to (1) determine those discharges that have the potential to cause environmental effects and that can be practically controlled with a marine pollution control device (MPCD); (2) set performance standards for the MPCDs; and (3) publish regulations governing the MPCD design, installation, and use. Completion of the UNDS regulatory development process is anticipated in late 2001. All vessels of the Armed Forces, including CVNs at NASNI, PSNS, NAVSTA Everett, and PHNSY, will operate in compliance with the requirements on the effective dates set forth in the final rules.

PROPWASH EFFECTS

During scoping for the EIS, concern was raised about the potential for propeller wash from movements of homeported ships (and associated tug boats) at PSNS to suspend contaminated bottom sediments from the PSNS vicinity, with resulting adverse impacts to water quality and biota. The level of chemical contaminants in PSNS sediments is described in section 4.4, Volume 4. A study of such effects was conducted as part of the Remedial Investigation (RI) for Operable Unit B at PSNS, which includes the marine sediments of the site (DON 1996b). This study was inconclusive, due largely to the variable results of the numerical model employed, in the absence of model calibration. To clarify this issue, the Navy conducted an additional study of the potential for propeller wash from deep-draft ships (CVNs and AOEs) at PSNS to cause suspension of bottom sediments, and of the effects of changing the complement of ships homeported at PSNS on this phenomenon (Volume 4, section 4.3). The study used a combination of field measurements and computer simulations of propeller-generated currents under various conditions. The study focused on the effects of tug boats, which produce the large majority of propeller-generated energy during docking and undocking of deep-draft vessels. CVNs do not use their propellers in the berth area during these movements, and AOEs use them minimally. This analysis considered vessel draft; propeller diameter, angle, and RPM at various power settings used by the tugs; water depth; and tide stage. It addressed both directional and turbulent currents.

The study found that maximum near-bottom current speed generated by tug boat propellers during these maneuvers was approximately 15-20 cm/sec, which is sufficient to suspend bottom sediments at the site. The estimates of propeller-generated currents from the field and modeling studies were used in a sediment transport model to estimate the mass of bottom sediment that would be suspended by currents of various speeds. This analysis assumed sediment grain size and cohesion typical of Puget Sound embayments, and both directional and turbulent currents. To estimate the mass of sediment suspended under each of the homeporting alternatives, the study also considered the frequency of ship movements and the duration of the various power settings used by tugs during these movements. The analysis focused on changes that would occur under the proposed homeporting alternatives, and did not address possible existing effects on sediment contamination patterns or bottom topography. The effect of resuspended sediment on water quality at PSNS was also beyond the scope of this study.

Table 4.3-2 presents the resulting estimates of the mass of sediment that would be resuspended under existing conditions, and under each of the CVN homeporting alternatives, based on the recent history of CVN and AOE movements at PSNS. As shown in the table, the combined movements of the one CVN and four AOEs presently homeported at PSNS are estimated to result in the suspension of 110 kg of bottom sediment per month. All of the homeporting alternatives, except one, would result in the same or smaller number of deep-draft ships being homeported at PSNS. For these alternatives, there would be no impact (Alternatives 2, 3 and 4) or a beneficial impact (Alternatives 1 and 5) regarding the suspension of bottom sediment (Table 4.3-2). Under Alternative 6 (No Action), one additional CVN would be homeported at PSNS, with an estimated 13 percent increase in the suspension of sediment. This small increase is not likely to result in significant degradation of water quality from existing conditions.

Table 4.3-2. Estimated Mass of Bottom Sediment Suspended per Month by Movements of Deep-Draft Ships at PSNS

			ALTERNATIVE					
	Avg. No. of Movements/ Ship/Month	*Existing*	*1*	*2*	*3*	*4*	*5*	*6 (No Action)*
Homeported Ships								
CVNs	1.2	1	2	1	1	1	2	2
AOEs	1.7	4	0	4	4	4	2	4
Bottom Sediment Suspended								
Suspended by CVN(s), kg/mo.	—	15	29	15	15	15	29	29
Suspended by AOEs, kg/mo.	—	95	0	95	95	95	47	95
Total Suspended, kg/mo.	—	110	29	110	110	110	76	124

4.3.2.2 *Facilities for One Additional CVN and Relocation of four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

Under this alternative, none of the above water quality impact significance criteria would occur or be exceeded. Therefore, water quality impacts would be less than significant. The following sections explain this conclusion.

Dredging

Dredging actions and corresponding water quality impacts of dredging and dredged material disposal would be the same (not significant) as described in section 4.3.2.1.

Facility Improvements

Facility improvement actions would be nearly the same as described in section 4.3.2.1. Therefore, the water quality impacts of facility improvements would be the same as described in section 4.3.2.1. The only difference is that under this action, an upgrade of electrical utilities suitable for a CVN would be added to the east side of new Pier D; this upgrade would have no water quality impacts.

Operations

Water quality impacts resulting from operations of ships homeported at PSNS would be less than significant, as described in section 4.3.2.1. With the addition of one CVN and relocation of four AOEs, these impacts would not be increased, because the number of ships homeported at PSNS would be reduced.

Navy policy and requirements for controlling ship discharges to the environment are presently contained in OPNAVINST 5090.1B. These requirements are applicable to all home port sites assessed in this EIS (NASNI, PSNS, NAVSTA Everett, and PHNSY). These requirements, along with local instructions at each project site, ensure that discharges as a result of the operation of Naval vessels are in compliance with the Clean Water Act and present no significant impact to the environment.

RADIOACTIVITY. Since the early 1970s, the Navy has prohibited intentional discharges of even negligible NNPP radioactivity into harbors. Stringent, long-standing NNPP controls have proven effective in protecting the marine environment from radioactivity. The total amount of long-lived gamma radioactivity released into harbors and seas within 12 nautical miles of shore has been less than 0.002 Curie during each of the last 26 years. This is from the Naval nuclear-powered ships and from the supporting nuclear-capable shipyards, tenders, and operating bases, and at other U.S. and foreign ports that were visited by Naval nuclear-powered ships. To put this small quantity of radioactivity into perspective, it is less than the quantity of naturally occurring radioactivity in the volume of saline harbor water occupied by a single nuclear-powered submarine (NNPP 1997). Because these controls would continue, there would be no significant long-term onshore maintenance facilities or vessel-related operational impacts on water quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.3.2.3 *Facilities for One Additional CVN and Relocation of two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five consists of dredging turning basins plus Pier D replacement.

Under this alternative, none of the above water quality impact significance criteria would occur or be exceeded. Therefore, water quality impacts would be less than significant. The following sections explain this conclusion.

Dredging

Dredging actions and corresponding water quality impacts of dredging and dredged material disposal would be the same (not significant) as described in section 4.3.2.1.

Facility Improvements

Facility improvement actions would be nearly the same as in section 4.3.2.1. Therefore, the water quality impacts of facility improvements would be the same as described in section 4.3.2.1. The only difference is that under this action, an upgrade of electrical utilities suitable for a CVN would be added to the east side of new Pier D; this upgrade would have no water quality impacts.

Operations

Water quality impacts resulting from operations of ships homeported at PSNS would be less than significant, as described in section 4.3.2.1. With the addition of one CVN and relocation of two AOEs, these impacts would not be increased, because the number of ships homeported at PSNS would be reduced.

Navy policy and requirements for controlling ship discharges to the environment are presently contained in OPNAVINST 5090.1B. These requirements are applicable to all home port sites assessed in this EIS (NASNI, PSNS, NAVSTA Everett, and PHNSY). These requirements, along with local instructions at each project site, ensure that discharges as a result of the operation of Naval vessels are in compliance with the Clean Water Act and present no significant impact to the environment.

As described in section 4.3.2.2, NNPP controls for protecting the marine environment from radioactivity have been shown to be effective. Because the controls would continue, there would be no significant long-term onshore maintenance facility or vessel-related operational impacts on water quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.3.2.4 *One Additional CVN: Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging, Facility Improvements, and Operations

Under this alternative, no dredging or pier construction would occur, so that the water quality impacts of these actions would not occur. Because measures are in place to control the water quality effects of ships homeported at PSNS, as described in section 4.3.2.1, the addition of one CVN would not result in significant water quality impacts.

4.3.2.5 *Mitigation Measures*

Project actions (including dredging, disposal, pier reconstruction, and CDF/CAD construction) would be implemented in conformance with permit conditions intended to protect water quality (see section 4.3.2.1). Dredging would employ a shrouded dredge bucket and precision dredging to minimize suspension of sediment into the water.

4.4 SEDIMENT QUALITY

Regulatory Setting

The two major sets of regulations that govern sediment issues at PSNS are those of the Puget Sound Dredge Disposal Analysis (PSDDA) program, which imposes constraints on the disposal of dredged sediments based on sediment contaminant levels and toxicity; and the State Sediment Management Standards (SMS), which regulate the cleanup of contaminated sediments in Washington State (COE 1988). This section presents an overview on these regulations and their implications to dredging sediments at selected sites at PSNS.

PSDDA Criteria

PSDDA regulations establish disposal criterion for sediments, based on the results of chemical and biological testing of sediments, and assessments of the relative chemical contamination and biological toxicity. The selection of dredged material disposal sites and options depends on the degree of contamination associated with the dredged material. Sediments that meet PSDDA criteria may be approved for disposal at an unconfined open-water site in Puget Sound. Sediments with contaminant concentrations below the PSDDA screening level (SL) can be disposed of at an unconfined open-water site without further testing. Sediments with contaminant concentrations above the PSDDA maximum level (ML) cannot be disposed of at an open-water site. Sediments with contaminant concentrations between the SL and ML must undergo biological toxicity testing to determine their suitability for open-water disposal. Sediments that exceed the PSDDA criteria for open-water disposal, but are below the Dangerous Waste Standards (WAC 173-303), may be further considered for confined disposal.

Sediments that exceed Dangerous Waste Standards must be treated or disposed of in a certified dangerous waste landfill.

Sediment Management Standards (SMS)

The Washington SMS (Chapter 173-204 WAC) establish sediment quality standards, source control standards, and define the sediment cleanup decision process and standards. The sediment cleanup process and standards are required under the State Model Toxics Control Act (MTCA), and for the cleanup study (i.e., remedial investigation/feasibility studies [RI/FS]) conducted by the Navy, and were the regulatory criteria used to evaluate potential cleanup at the PSNS CERCLA site. The data presented in the RI/FS (DON 1996b) indicate that sediments in most of Sinclair Inlet exceed the cleanup screening level for one or more chemicals (e.g., mercury). However, bioassay toxicity testing results indicate that these contaminants may not be impacting the biological community. The SMS will not likely be used to decide the disposal fate of dredged material at PSNS.

4.4.1 Affected Environment

The Bremerton Naval Complex, including PSNS, was designated by EPA for the National Priorities List (NPL) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1994. Two of the operable units (OU) designated for the site (OU A and OU B) include areas affected by the proposed CVN homeporting (Figure 4.4-1). OU A includes shoreline areas at the southwest end of PSNS, while OU B includes essentially all of the remaining

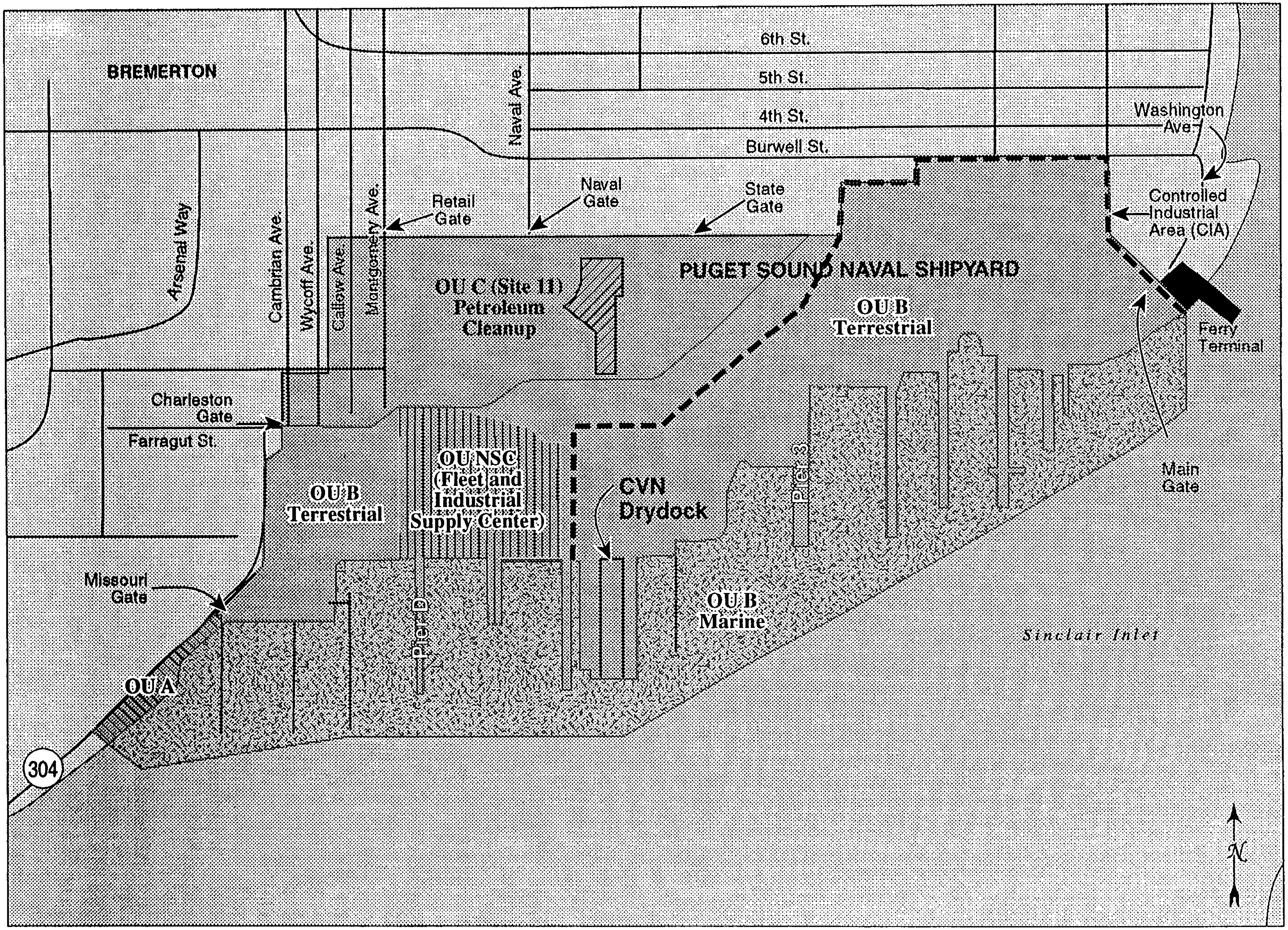

Figure 4.4-1. CERCLA Operable Units at Bremerton Naval Complex

shoreline and marine areas of PSNS. OU NSC includes the upland areas of the Naval Supply Center, which is surrounded by PSNS. Much of the area (berths and turning basins) that is proposed for dredging under the CVN homeport project lies within the marine sediment component of OUB. Proposed dredging and disposal of dredged material for the home port project is being coordinated with possible dredging and disposal for remediation of marine sediments in OUB.

Marine sediments potentially affected by the project include those in proposed dredging and filling areas (Chapter 2) and immediately adjacent areas. The marine sediments at PSNS have been affected by past shipyard operations and other activities in Sinclair Inlet, and are part of the NPL/CERCLA site at PSNS, Operable Unit B in particular. Most of the sediment quality data presented in this section derives from studies under the CERCLA program for the site. Coordination of the present homeporting project with the CERCLA program at PSNS is discussed in section 4.2. Sediment samples from PSNS were collected during five sampling events as part of a CERCLA Site Inspection Study (March 1990 and April 1991) and RI/FS (May/June 1993, March-July 1994, and July-November 1995) with results presented by the DON (1996b). Sediment samples were generally collected from the upper 4 to 10 cm at each station location using a grab sampler or box coring device (little deep sediment coring has been done to date at PSNS). Samples were tested for conventional and contaminant chemistry, bioassay toxicity, and benthic infauna. Surface sediments from control and reference sites were also collected for each sampling event and used for comparison for determining sediment toxicity and the population and diversity of the benthic community. Sediment samples were collected from approximately 120 locations during the CERCLA studies. Thirty-three of these sediment sampling locations were in areas potentially affected by the present CVN homeporting project through dredging or dredged material disposal. Sediment data for these 33 locations (9 locations for bioassay data) is presented in the following sections and in Volume 4, Section 4.4.

The volume of dredged material generated by the proposed project that would be suitable or unsuitable for open-water disposal at a designated site in Puget Sound, presented in Section 2.3.3.2, was estimated based on available sediment data for PSNS, as summarized in this section. This includes data from actual recent dredging to deepen berths at Pier D in 1993-4. Final sediment volumes and dredging/disposal plans will be based on an ongoing detailed sediment characterization designed to meet regulatory requirements. The design of this detailed sediment characterization was based on existing knowledge of sediment quality conditions and patterns at PSNS. This program includes coring at approximately 80 locations in the proposed dredging areas, with testing of approximately 80 surface (0-4 feet) samples and 20 subsurface samples (SAIC 1998). The program also includes supplemental sediment sampling (six 6-foot cores) for the CERCLA program, and approximately 40 cores for contaminant mobility testing related to possible disposal of contaminated sediment in a confined aquatic disposal (CAD) facility. A related supplemental CERCLA investigation is collecting approximately 100 surface sediment samples for testing, under-pier core samples, and samples representative of newly deposited sediment within the CERCLA site (SAIC 1998). Should the ongoing sediment characterization result in a change in the volumes of dredged material that would be suitable and unsuitable for open-water disposal, all material, suitable and unsuitable, would still be disposed of in accordance with all applicable regulations and guidelines, and with the procedures described in sections 2.3.3.2 and 4.3.2. As a result, environmental impacts would not differ substantively from those described in this EIS.

Implementation of the CVN homeporting project is being coordinated with alternative remedial responses under CERCLA at PSNS, with the objective of maximizing environmental benefit and minimizing construction cost. Since the summer of 1998, the Navy has met regularly with representatives of the EPA, Washington Department of Ecology, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Washington Department of Natural Resources, Washington Department of Fish and Wildlife, Suquamish Tribe, City of Bremerton, and other entities to coordinate the two programs in a consolidated sediment management effort. The focus of this effort is the conduct of dredging and disposal of dredged material. Dredging is proposed for navigation purposes (deepening) for the CVN homeporting, and for remediation of contaminated sediments for the CERCLA program. This coordinated effort is expected to develop a joint approach for dredging and disposal of dredged material for both programs. For the disposal of material that is not suitable for open-water disposal at a designated site in Puget Sound, the Navy and agencies are reviewing several options, including disposal in a permitted upland landfill; one or more confined disposal facilities (CDF) at PSNS, including facilities that would create new fastland and a confined aquatic disposal (CAD) facility; and various beneficial re-uses. These options are assessed in this EIS. The evaluation process is considering a wide range of issues, including short-term and long-term effectiveness, protection of human health and the environment, compliance with relevant regulations, technical feasibility and implementability, state and community acceptance, and cost. The evaluation process will develop design and habitat mitigation details for the selected option or combination of options.

The existing sedimentation rate at PSNS is approximately 2 cm/yr (DON 1996b).

Organic Carbon and Grain Size

The physical and chemical characteristics of the PSNS proposed dredge area sediments from all five sampling efforts are presented in Volume 4, section 4.4, Table 4.4-1 (as summarized from DON 1996b). Physical and chemical characteristics from the proposed CAD site and stations near CDF-1 are also presented in Table 4.4-1, Volume 4, section 4.4.

Sediments collected in the proposed turning basins were primarily fine-grained (≥ 82 percent silt and clay) with an average total organic compound (TOC) content of 3.14 percent. The sediments from the piers were coarser grained by comparison, with fine-grained material ≥ 55 percent and TOC content ≥ 1.46 percent. Sediments at stations 129 and 480, near CDF-1, had TOC levels of 2.9 and 3.0 percent, respectively. Station 129 had 54 percent fines and 480 had 77 percent fines. TOC levels ranged from 3.5 to 7.8 percent at stations within the area proposed for the CAD site. Percent fines ranged from 31 percent to 95 percent, with less fines at stations closest to shore.

Contaminant Chemistry

The concentrations of metals were generally higher in the vicinity of the piers than the turning basins. Cadmium, copper, lead, mercury, and zinc were detected at relatively high concentrations for most stations in each area. Some of the highest metal concentrations were detected in the vicinity of Pier 3; the average concentration of mercury was 2.2 milligrams per kilogram (mg/kg) at Pier 3 compared with approximately 1 to 2 mg/kg in all other areas, including the CAD site. Mercury was reported at elevated concentrations throughout most of Sinclair Inlet.

Phthalates, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) were the typical organic compounds detected in sediments of PSNS. The highest organic concentrations were reported in the vicinity of Pier B. Organic compounds were generally lower in turning basin, CDF, and CAD site sediments.

Contaminant concentrations are compared to PSDDA SL and ML criteria in Volume 4, section 4.4, Table 4.4-1. For the dredging area, the highest metal and organic concentrations, with the most SL exceedances, were observed in the pier areas, close to shore. For each pier area, SL exceedances were generally observed for metals (i.e., cadmium, copper, lead, mercury, and zinc), phthalates, PAHs, total dichlorodiphenyltrichloroethane (DDT), and total PCBs. The only ML exceedances were observed for total DDT at Pier B and total mercury at Pier 3. Concentrations are lower, with fewer PSDDA exceedances, in sediment located in the vicinity of the proposed turning basins. In addition to most heavy metals, only average concentration values for total PCBs and total high molecular weight polycyclic aromatic hydrocarbons (HPAHs) were above the corresponding SL criteria in sediments of the proposed turning basins. In the vicinity of Pier D, contaminant concentrations were higher (prior to dredging) in the top 4 feet of sediment than in subsurface sediment (Table 4.4.2, Volume 4).

In addition to the dredging area, average contaminant concentrations for the proposed CDF and CAD sites are also provided in Table 4.4-1. No stations were sampled within CDF2, although levels are expected to be comparable to those measured for Pier B dredge locations. Two stations adjacent to the CDF1 site were used to estimated conditions at the CDF1 site. Twelve stations within the proposed CAD site were averaged to determine chemical concentrations at the CAD site.

Similar to the dredging areas, PSDDA screening levels were exceeded for most metals, PAHs, and total PCBs at the CDF and CAD sites. However, with the exception of the turning basin, PAH levels tended to be lower at the CDF1 site than at the other dredging, CDF2, and CAD sites. The total DDT average value at the CAD site exceeded PSDDA ML, and was higher than average concentrations measured at the dredge and CDF sites.

The WDOE has monitored sediment conditions at a station In Sinclair Inlet since 1989. This station is located in about 30 feet of water southwest of PSNS, a little less than a mile from the end of Pier D (Figure 4.4-1, Volume 4). The outfall from the City of Bremerton's wastewater treatment plant is also located in this general area. This monitoring has shown this station to be one of ten within Puget Sound with concentrations of chemical contaminants consistently above levels expected to cause adverse biological effects (Llansó 1998). The most consistently elevated chemicals at this station were arsenic, mercury, benzyl alcohol, and PCBs.

Toxicity

Sediment bioassays were conducted on selected samples at PSNS to evaluate the apparent acute and chronic toxicity to sediment-dwelling marine organisms (DON 1996b). Nine of these samples were from locations potentially affected by the CVN homeporting project. Bioassay test results are presented in Table 4.4-3, Volume 4, section 4.4. There were several exceedances of the SMS criteria for the amphipod bioassay: Station 456 (Pier B), and Stations 468 and 469 (Pier D turning basin). These data have not been evaluated according to PSDDA criteria. Station 456 is also located near Pier B. No exceedances were observed at Station 480, which is located near, but not within, CDF-1. Bioassays were not conducted at stations within the proposed CAD site. Determination of the suitability of these sediments for open-water or other types of disposal will require new sampling, testing, and PSDDA evaluation of the sediments proposed for dredging.

Benthic Infauna

Sediment samples were collected at selected stations during the Site Inspection Study (DON 1996b) to evaluate the taxonomic identification and enumeration of the benthic community. One station each representing Pier B (Station 122) and Pier D (Station 112) were reported for the proposed dredge areas at PSNS (see Figure 4.4-1 in Volume 4, section 4.4). Station 122 is also located near CDF-2. No exceedances of the SMS benthic community criteria were identified for these stations. Similarly, no exceedance of the SMS benthic community criteria were observed at Station 129, located near CDF-1.

Results of Sediment Sampling for Radioactivity

Sampling of sediments in the PSNS project area in 1996 showed no detectable radioactivity associated with Naval nuclear propulsion plant operation or servicing (NNPP 1997). The detectable level of cobalt-60 for Navy radiological surveys is approximately 0.1 pCi/g. The actual value varies depending on the amount of naturally occurring radioactivity in the survey sample. A previous EPA radiological survey of the Puget Sound area in 1987 (EPA 1989b) showed a trace of cobalt-60 in one sediment sample at a concentration of 0.04 ± 0.01 pCi/g dry. This concentration is less than 1 percent of the concentration of comparable naturally occurring background radioactive materials in the harbor sediment. This cobalt-60 activity is a result of releases of low-level radioactivity from nuclear-powered ships in the 1960s. These levels are well below the naturally occurring radioactivity levels in the harbor, and have no radiological impact on the area. Since the early 1970s, the Navy has prohibited intentional discharges of radioactivity to the harbor, and the level of radioactivity in the sediments has significantly decreased due to radioactive decay. Cobalt-60 decays with a half-life of 5.2 years. Therefore, in 50 years the amount originally present is reduced by a factor of approximately 1,000, and in 100 years, by a factor of approximately 1,000,000. Otherwise, only naturally occurring radioactivity and traces of cesium-137 from nuclear weapons testing fallout were observed in the sediment samples.

4.4.2 Environmental Consequences and Mitigation Measures

Elements of the proposed actions that could affect sediment quality include (1) dredging, (2) dredged material disposal at an established or new aquatic site, (3) demolition and reconstruction of Pier D, and (4) operational and/or accidental discharges or releases from Navy vessels. None of the actions would result in effects on terrestrial soils or water resources that in turn would result in adverse impacts to marine sediments.

Significance Criteria

An impact would be significant if the following occurred:

- A discharge of dredged material occurs at the surface of a disposal site or sediments are exposed at a dredging site, which would cause substantial toxicity or bioaccumulation of contaminants in aquatic biota.

4.4.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging and Disposal

The aspect of the proposed project with the greatest potential to affect sediment quality is dredging and dredged material disposal. Under this action, dredging would occur at berths adjacent to Piers B, D and 3; the turning basins for Piers B and D; and a portion of the inner channel, as described in Chapter 2. The direct effect of this dredging on site sediments would be removal of surface sediments and exposure of the underlying sediments. The thickness of the layer removed during dredging would range from about 6 feet to less than 1 foot in the berth areas, and from 1 feet to 4 feet in the turning basins. Surface sediments are most important because they are the sediments to which the surface water and biological community are exposed. Not much change in grain size would occur, because past studies have shown grain size at the surface to be similar to that at depth in the sediments (primarily fine-grained) (DON 1996b; GeoEngineers 1991). TOC, which is biologically important, could be slightly lower in the newly exposed sediments. The amount of food or organic matter available for benthic infauna would be slightly reduced. These studies (DON 1996b; GeoEngineers 1991) have also shown that the sediments with elevated levels of toxic chemicals are limited to surface layers considerably shallower than the dredging depths proposed for this project (Table 4.4-2, Volume 4). This indicates that dredging would result in removal of contaminated sediments in the dredged areas, resulting in an improvement in surface sediment quality, at least with regard to toxic chemicals.

While an improvement in surface sediment quality is likely to occur to some extent, it would be limited by the tendency for surface sediments to be suspended into the water column during dredging, and then to be redeposited on the newly exposed sediment surface following dredging. The result is that the quality of the new surface sediments is more similar to the old surface sediment quality than would be expected otherwise. This was shown to occur during the dredging of Pier D in 1994 (Beak Consultants 1995). Following dredging, therefore, surface sediments are still likely to exceed PSDDA SLs and the Washington State SMS for some chemicals. In conclusion, dredging would result in minor changes in physical and conventional characteristics of the surface sediments of the dredging sites, and could result in slightly lower concentrations of toxic chemicals in these sediments. Toxicity of site sediments, and their potential to provide bioaccumulation of contaminants, would not increase. Therefore, the overall impact to the sediment quality of these sites would be less than significant.

DISPOSAL AT PSDDA SITE

Only dredged material determined through chemical and toxicological testing to be suitable for unconfined aquatic disposal would be disposed of at the Elliott Bay PSDDA disposal site (Figure 1-2). The impacts of this disposal would be minor and within the accepted impacts of normal use of the site, as addressed in the EIS for site designation (COE 1988). Therefore, no significant impacts attributable to the homeporting project would occur at this site.

DISPOSAL AT CDF AND CAD SITES

Disposal of dredged material at the CDF and CAD sites (Chapter 2) would replace the existing marine sediments with upland area (CDF sites) or a submerged containment facility made of imported clean earthen material, suitable dredged material, rip-rap, cobble, and gravel (CAD site). In both cases, existing sediments would effectively be removed from the marine environment. Sediments in these sites, particularly the CAD site, have elevated levels (above the PSDDA SLs) of mercury and other metals, and some organic contaminants (section 4.4.1). Therefore, the effective removal of these sediments, and their replacement as described above, would result in an improvement in environmental quality at these sites. Exposure of marine organisms to potentially toxic sediment contaminants would be reduced. Therefore, disposal at the CDF and CAD sites would result in beneficial, or at the least insignificant, impacts to sediment quality.

LANDFILL DISPOSAL

Disposal at a landfill would not affect marine sediments. Potential impacts to soils and surface/groundwater are discussed in sections 4.1 and 4.2 respectively.

Facility Improvements

Under this action, Pier D would be removed and replaced by a wider and longer structure. This construction would result in considerable disruption and resuspension of bottom sediments of the site. During non-construction periods, and following the end of construction, the resuspended sediments would be deposited on the bottom in the construction area and in adjacent areas. This would modify the characteristics of the bottom sediments, but the effect would be minor because the quality of the redeposited sediments would be similar to the existing bottom sediments in the deposition areas. If sediments from depth are brought to the surface in the process, there might be a resulting small reduction in the concentration of toxic chemicals in the surface sediments, as discussed above for the dredging site. If anoxic sediments are brought to the surface from depth, there would be a temporary reduction in dissolved oxygen in surface sediments. This effect would be minor and short term. Therefore, pier construction would have less than significant impacts on marine sediments.

Operations

Any fuel or other hazardous substances discharged from ships or the shipyard could be incorporated into marine sediments at PSNS and degrade the quality of those sediments. Discharged organic matter could result in reduced oxygen content of sediments. With the relocation of four AOEs, the probability of such discharges would be reduced. PSNS implements a series of hazardous material and water quality protection plans to minimize and respond to such spills. As discussed for water quality in section 4.3.2, such discharges would be infrequent and small, and/or could be contained and cleaned up, so that the water quality impacts would be less than significant. Therefore, sediment quality impacts would also be less than significant.

4.4.2.2 *Facilities for One Additional CVN and Relocation of four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging

Under this action, less than significant sediment quality impacts from dredging and disposal would be the same as described in section 4.4.2.1.

Facility Improvements

Under this action, less than significant sediment quality impacts from facility improvements would be the same as described in section 4.4.2.1.

Operations

Operations impacts on sediment quality would be slightly greater than described in section 4.4.2.1, because two CVNs would be homeported at PSNS. These impacts would be reduced relative to existing conditions, however, because the total number of ships homeported at PSNS would be reduced. As a result, and based on the reasons given in section 4.4.2.1, the sediment impacts of operations under this action would be less than significant.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 4.3.2 would continue, there would be no significant impacts on sediment quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.4.2.3 *Facilities for One Additional CVN and Relocation of two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

As described in section 4.4.2.1 under this action, sediment quality impacts from dredging and disposal would be less than significant.

Facility Improvements

As described in section 4.4.2.1 under this action, sediment quality impacts from dredging and disposal would be less than significant.

Operations

Operations impacts on sediment quality would be slightly greater under this action than described in section 4.4.2.2, because an additional CVN would be homeported at PSNS and only two AOEs would be removed. As explained in section 4.4.2.1, the sediment quality impacts of ship homeporting at PSNS are insignificant. Therefore, the operations impacts of this action on sediment quality would be less than significant.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 4.3.2 would continue, there would be no significant impacts on sediment quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.4.2.4 *One Additional CVN: Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging

No facility improvements would occur under this action.

Facility Improvements

Under this action, no sediment quality impacts from facility improvements would occur.

Operations

Operations impacts on sediment quality would be slightly greater under this action than described in section 4.4.2.1, because an additional CVN would be homeported at PSNS. As explained in section 4.4.2.1, however, the sediment quality impacts of ship homeporting at PSNS are not significant, because of standard practices and control measures in place. Therefore, the operations impacts of one additional CVN on sediment quality would be less than significant.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 4.3.2 would continue, there would be no significant impacts on sediment quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.4.2.5 *Mitigation Measures*

Permit conditions to minimize water quality impacts would be adhered to during project implementation, as described in section 4.3.2. These measures would also serve to minimize sediment impacts. No other mitigation measures are proposed.

4.5 MARINE BIOLOGY

4.5.1 Affected Environment

This description of biological resources applies to all potentially affected marine sites at PSNS, including dredging sites and CDF/CAD sites. This section describes the biological community at PSNS that would be affected by dredging and construction activities for the proposed project, and by creating a CDF at two proposed locations and/or a CAD site at one location. Biological communities addressed in this section include plankton, eelgrass, and algae, invertebrates, fishes, birds, and marine mammals. This section also discusses threatened and endangered species occurring in the PSNS area and the results of marine life sampling for radioactivity. The general descriptions apply to all locations at PSNS that would be affected by the proposed project.

Plankton

Phytoplankton and zooplankton form the basis of the food chain for aquatic organisms. Planktonic populations vary according to seasonal changes in the environment. In Puget Sound, phytoplankton blooms occur throughout the growing season (May through September), with an initial bloom of diatoms, followed by dinoflagellates, and then diatoms again. Phytoplankton tend to be distributed throughout the Puget Sound, with relatively minor site-specific differences with respect to the species present. However, densities and species ratios may vary (DON 1992c). Some of the predominant phytoplankton species present in Puget Sound include the diatoms *Skeletonema costatum, Chaetoceros* spp., *Nitzschia* sp., and *Thalassiosira* spp., and the dinoflagellates *Peridinium* spp., *Gymnodinium* spp., and *Ceratium fusus* (DON 1992b).

Zooplankton abundances generally reflect phytoplankton changes in abundance. Typical zooplankton include cladocerans, various small crustaceans such as copepods, and early development stages of fish, crabs, shrimp, gastropods, barnacles, and polychaetes. Little specific information is available for zooplankton at PSNS. Zooplankton observed in Puget Sound have included the copepods *Acartia clausi, Corycaeus affinis, Pseudocalanus minutus, Oithona* spp., *Evadne* sp., and the tunicate *Appendicualaria* sp. (DON 1992b, 1992c).

Eelgrass and Algae

Marine vegetation present at PSNS occurs along the shoreline attached to riprap, concrete bulkheads, and old wooden piers. Predominant species include sea lettuce (*Ulva* sp.), rockweed (*Fucus distichus*), and debris algae that have been dislodged from their subtidal habitat and carried toward the shore (DON 1992c). Stands of brown kelp (*Laminaria* sp.) were reported on a riprap bulkhead at the western part of PSNS (Parametrix 1995). There are no eelgrass beds, kelp beds, or similar habitat at PSNS or elsewhere in Sinclair Inlet (DON 1992c).

Invertebrates

The benthic community at PSNS is typical of harbor areas. Some of the most dominant species found during surveys conducted within or in the vicinity of PSNS include the polychaetes *Aphelochaeta* spp., *Lumbrineris* spp., and *Paraprionospio pinnata*; the bivalves *Acila castrensis, Axinopsida serricata*, and *Psephidia lordi*; the cumacean *Eudorella pacifica* (crustacean); and the crab *Cancer gracilis* (Llansó et al. 1998, SAIC 1998, DON 1996, and Weston 1990). Other abundant invertebrates occurring at PSNS include the brittle star *Amphiodia urtica/periercta*, the gastropod

Odostomia sp., and the anemones *Metridium* spp. (SAIC 1998, R2 Resource Consultants 1998). Various shrimp, nudibranches, sponges, sea cucumbers, kelp crabs (*Pugettia producta*), and Dungeness crabs (*Cancer magister*) were also observed in low numbers in trawl surveys conducted at PSNS in January and May 1998 (R2 Resource Consultants 1998). Other types of species present at PSNS include barnacles and mussels found on rocky or other hard intertidal substrata, and hydroids, tube-building polychaetes, large anemones (*Metridium* sp.), and tunicates found on riprap, docks, or pilings (DON 1994c).

Predominant species found at the proposed CAD site during a benthic infauna survey conducted in May 1998 were similar to those described above, although *Aphelochaeta* spp. abundances tended to be higher at the CAD site locations than in the turning basin, Pier B, and Pier 3 locations. Abundances of *Aphelochaeta* spp. were also particularly high at most locations sampled near Pier D. There was no consistent pattern in the benthic community observed in relation to depth or previously dredged vs. non-dredged areas in the locations sampled near the berthing areas, with the exception of Pier D, which had been dredged more recently than other locations (dredged in 1994/95). In general, the communities observed in the berthing areas appeared to be more related to grain size than water depth. Shell hash and wood debris were present in the turning basin locations, which tended to have lower abundances and number of taxa than the CAD site and most pier locations. (SAIC 1998).

An evaluation of benthic infauna conducted at PSNS locations, compared to PSAMP and reference locations within Sinclair Inlet indicated that the PSNS stations samples were stressed with respect to diversity, evenness, and number of pollution-tolerant species (DON 1993 and 1996). However, species richness tended to be similar to the PSAMP locations and high compared to the reference location. The reference station used to assess the biological conditions at the PSNS locations was found to have a moderate level of disturbance. However, it is possible that the reference location may have been influenced by other sources of contamination or organic enrichment from the Bremerton municipal sewage discharge, which is located approximately 0.3 miles from the reference location (DON 1993). Other studies conducted at a PSAMP location near the boundary of PSNS, and an evaluation of a survey conducted at PSNS in May 1998 have also indicated high dominance of pollution-tolerant species (Llansó et al. 1998, SAIC 1998). Factors that may have contributed to the stress on the community at PSNS in addition to the presence of chemical contaminants include organic enrichment and, due to the shallowness of the inlet, physical disturbance by storms, and vessel movements (DON 1996).

Geoducks (*Panope generosa*) are not expected to be a significant resource within Sinclair Inlet or PSNS, although limited survey data were available for this area. There is anecdotal information that a geoduck bed is present near the mouth of the Point Washington Narrows, the passage between Sinclair Inlet and Dyes Inlet (Sizemore et al. 1998). In addition, clam siphons that were tentatively identified as geoducks were observed beneath a pier during surveys conducted at the Bremerton Ferry Terminal (Antrim 1996). Geoducks were also observed in low numbers during dive surveys conducted west of the Bremerton Ferry Terminal and east of Pier 8 at PSNS, and have been observed during surveys for other projects at the Port of Bremerton (Parametrix 1995, Hueckal 1987).

Fishes

Fish found in Sinclair Inlet are common throughout Puget Sound. Those found along the shoreline of PSNS include sculpins (Cottidae), surf perch (Embiotocidae), and various flatfish

(Pleuronectidae). Fish captured during trawl surveys conducted in January and May 1998 at PSNS included sand sole (*Psettichthys melanostictus*), rock soles (*Lepidopsetta bilineata*), staghorn sculpins (*Leptocottus armatus*), and other sculpins (Cottidae) (R2 Resource Consultants 1998). Species that migrate through the area include various salmon species (*Oncorhynchus* spp.), Pacific tomcod (*Microgadus proximus*), sea-run cutthroat trout (*Oncorhynchus clarki*), steelhead trout (*Oncorhynchus mykiss*), Pacific cod (*Gadus macrocephalus*), Pacific herring (*Clupea harengus pallasii*), rockfish (*Sebastes* spp.), and migratory smelt (Osmeridae) (DON 1992c). In the spring of 1998, beach seine surveys were conducted in near-shore habitats in the area immediately west of PSNS and within the proposed CAD site (R2 Resource Consultants 1998). The seine catches were composed primarily of juvenile chinook salmon smolts, although sockeye, chum, and coho salmon smolts, and steelhead trout smolts were also captured in small numbers. Other fish caught included striped surfperch (*Embiotoca lateralis*), Pacific staghorn sculpin, buffalo sculpin (*Enophrys bison*), candlefish (*Thaleichthys pacificus*), rock sole, and pipefish (Syngnathidae). Salmon are addressed further under Threatened and Endangered Species.

Herring have been observed in the vicinity of the PSNS from late January to mid-April (DON 1992c). No herring spawning areas are known to exist in Sinclair Inlet at the present time, and the preponderance of evidence indicates that herring have not spawned in Sinclair Inlet in the historical past (personal communication, Pentilla 1998). Sinclair Inlet presumably serves as a nursery area for young-of-the-year herring from adjacent grounds.

Two other species of forage fish that may be present in the vicinity of PSNS include surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*). Both species spawn in areas of Sinclair Inlet, specifically on upper intertidal beaches above approximately +5 feet mean lower low water (MLLW) (Pentilla 1997, Lemberg et al. 1997). Most of these beaches are on the south shore of Sinclair Inlet, especially in the Ross Point area. Surf smelt spawning generally takes place in the fall-winter period, although smelt spawning activity has occurred throughout the year near Ross Point. Much of the surviving spawning habitat for these species is impacted by shoreline fill, seawalls, and armoring structures. Surf smelt spawning maps from the 1930s depicted smelt spawning on the north shore of the inlet, west of PSNS. This habitat appears to have been lost due to subsequent shoreline development and railroad construction (personal communication, Pentilla 1998). There is no suitable habitat for surf smelt or sand lance spawning within PSNS itself.

Birds

Puget Sound provides an important habitat for various birds and waterfowl, including year-round residents and migratory species. Due to the mild climate, food availability, and abundance of protected bays and coves, many species overwinter in Puget Sound (DON 1992c). Aerial surveys conducted by the Puget Sound Ambient Monitoring Program during the summer of 1996 and winter of 1997 indicate higher densities of bird species within Sinclair Inlet during the winter than in the summer (PSAMP aerial survey database, WDFW 1998). The highest densities of birds during the summer surveys tended to be associated with estuarine wetland (tideflat) habitats at the western end of the inlet, and near Port Orchard at the mouth of the Blackjack Creek tributary (PSAMP aerial survey database, WDFW 1998). These areas also had dense populations of bird species in the winter, although the high density of birds was more widespread.

Common birds and waterfowl occurring in Sinclair Inlet and likely occur at PSNS include various gulls, grebes, cormorants, scaups, scoters, loons, wigeons, geese, osprey, and mallards. Although several gull species occur within Sinclair Inlet, glaucous-winged gulls (*Larus glaucescens*) were the most common gulls observed during Kitsap Audubon Society birds counts, and are abundant along the waterfront areas of PSNS. Mew gulls (*Larus canus*) were also common. Glaucous-winged gulls have been known to breed in the vicinity of the Bremerton ferry dock (Priority Species Habitat database, WDFW 1998). The various gulls forage mainly along the shore, and feed on fish, dead seabirds, seals, starfish, clams, and mussels, or scavenge on garbage.

Abundant waterfowl species include greater scaups (*Aythya marila*), lesser scaups (*A. affinis*), ring-necked ducks (*A. collaris*), surf scoters (*Melanitta perspicillata*), white-winged scoters (*M. fusca*), American wigeons (*Anas americana*), Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), common goldeneye (*Bucephala clangula*), mergansers (*Mergus* sp. and *Lophodytes* sp.), and bufflehead (*Bucephala albeola*). Other species that were abundant during these surveys include western grebes (*Aechmophorus occidentalis*), double-crested cormorants (*Phalacrocorax penicillatus*), Pacific loons (*Gavia pacifica*), American coots (*Fulica americana*), and pigeon guillemots (*Cepphas columba*). Pigeon guillemots have been known to breed in the vicinity of PSNS (Priority Species Habitat database, WDFW 1998). Shorebirds observed during the Audubon Society surveys include sandpipers (Scolopacidae), dunlins (*Calidris alpina*), and snipe (*Gallinago gallinago*).

Bald eagles (*Haliaeetus leucocephalus*) and marbled murrelets (*Brachyramphus marmoratus*) were also observed in Sinclair Inlet, and are discussed further in Section 4.6. There are bald eagle nests in the vicinity of Sinclair Inlet (refer to Section 4.6). In addition, great blue heron (*Ardea herodias*) nests are located on the south side of the inlet, and osprey (*Pandion haliaeetus*) nests are located to the west of the inlet near Alexander Lake and to the east of Port Orchard. The great blue heron likely forages on fish and other aquatic organisms in the shallows of the inlet. Bald eagles and osprey have been observed foraging within Sinclair Inlet.

Marine Mammals

Marine mammals that are found within Puget Sound include the Pacific harbor seal (*Phoca vitulina*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatas*), orca (*Orcinus orca*), gray whale (*Eschrichtius robustus*), Dall's porpoise (*Phocoenoides dalli*), and harbor porpoise (*Phocoena phocoena*). The whales are not known to breed and rarely feed in or near Sinclair Inlet. However, in 1996 and 1997, a gray whale and 19 orcas were observed feeding in or near Sinclair Inlet. Steller sea lions have been observed in Sinclair Inlet, although not in the area immediately adjacent to PSNS (DON 1995b). There are no pinniped haul-out sites within Sinclair Inlet. The closest haul-out sites are located in Dyes Inlet and in Rich Passage (personal communication, Snyder 1998). Pinnipeds occurring within Sinclair Inlet primarily forage in the area.

Threatened and Endangered Species

As part of the scoping process for this EIS, the USFWS provided a letter indicating the concerns of both the USFWS and the NMFS regarding the potential impacts of the proposed project on biological resources, including threatened and endangered species. That letter indicated that the EIS analysis should address impacts to the bald eagle (both breeding and wintering) and the marbled murrelet, and that impacts to several depleted stocks of anadromous fish in Puget Sound should also be considered. In March 1999, chinook salmon in Puget Sound were listed as a threatened species under the Endangered Species Act by the NMFS. Therefore, the EIS analysis focuses on these species to the extent they are present in the project area or potentially affected by the project. Other relevant salmon species are also addressed here because one or more of these species may be proposed for listing in the future. The bald eagle and marbled murrelet are addressed under Terrestrial Biology (section 4.6).

Chinook, coho, and chum salmon and steelhead and sea-run cutthroat trout are found in the various streams that drain into Sinclair Inlet. Salmonid use of these streams depends on the available habitat and stream flows. Most of the streams are relatively small and produce primarily coho salmon, although two streams, Gorst Creek and Blackjack Creek, are used by a significant number of fish. Near PSNS, chinook salmon are found in Gorst Creek and its tributary Heines Creek; chum salmon occur in Gorst Creek, Anderson Creek with unnamed tributary, Ross Creek, and Blackjack Creek with its tributaries Ruby and Square Creeks; and coho salmon are found in Anderson, Ross Creek, and Blackjack Creek and associated tributaries (DON 1994c). Steelhead are known to use Blackjack Creek, Ross Creek, Anderson Creek, and Gorst Creek as spawning and/or rearing habitat. Sea-run cutthroat trout are also known to use Blackjack and Gorst Creeks as spawning and/or rearing habitats, and it is assumed that they use or could potentially use Anderson Creek and Ross Creek as spawning or rearing habitat (DON 1999).

The majority of the salmonid runs occurring within Sinclair Inlet are wild populations. However, the population of chinook from the Gorst Creek hatchery is much larger than the populations of all the wild runs combined. The Suquamish Tribe's Gorst Creek chinook salmon-rearing facility is located at the west end of Sinclair Inlet and releases over 2 million chinook juveniles per year. In addition, there are chum salmon enhancement projects on Blackjack Creek and its tributary, Ruby Creek (Don 1994c, 1995b).

Coho, chum, and chinook salmon and steelhead and sea-run cutthroat trout differ in life history in the amount of time spent in freshwater. Chinook and chum salmon migrate soon after emergence from the gravel and feed in shallow nearshore waters. These salmon move offshore and out into more marine waters as they grow. Coho salmon and steelhead overwinter for one to two years in the freshwater stream after hatching before migrating to marine waters. Therefore, they tend to be larger than chum or chinook salmon during their outmigration and tend to be less dependent on nearshore habitats (DON 1994c). The principal juvenile migration season is March through June.

The shoreline at PSNS is highly altered and there is a lack of productive shallow-gradient intertidal areas. This area would tend to be unsuitable for juvenile salmon, particularly chinook and chum salmon. During January 1998, a one-day trawl survey was conducted at PSNS in order to obtain data on the presence or absence of salmonids in the study area during the winter (R2 Resource Consultants 1998). No salmonids were captured during this survey, which is consistent with the premise that use of the PSNS shoreline by salmonids is limited during winter. During similar trawl surveys conducted at PSNS in May 1998, no salmon were captured in the trawls. However, salmon smolts were captured during beach seine surveys conducted within the same time period (May 1998) in relatively shallow areas at the southwest end of PSNS, including the proposed CAD site (R2 Resource Consultants 1998). The results of the beach seining indicated the presence of juvenile salmon (primarily chinook, but also chum, coho, sockeye, and steelhead trout) in the area surveyed during the spring.

In addition to the above species, Stellar sea lions (*Eumetopias jubatus*), which are listed as threatened, have occasionally been observed within Sinclair Inlet. None of these sightings have been in the vicinity of PSNS (DON 1995b). There are no haul-out sites for sea lions within Sinclair Inlet (personal communication, Snyder 1998), and food resources are limited to seasonal salmon migrations. Both of these factors discourage long-term residence of sea lions in the area, and the occurrence of Stellar sea lions within the inlet is likely rare.

Results of Marine Life Sampling for Radioactivity

Sampling in the Puget Sound area in 1996 of mollusks, crustaceans, and marine plants showed no detectable radioactivity associated with Naval nuclear propulsion plant operation or servicing (NNPP 1997). These results demonstrate that no bioaccumulation of NNPP radioactivity has occurred. A previous EPA radiological survey of the Puget Sound area in 1987 (EPA 1989b) detected only naturally occurring radioactivity and radioactivity attributed to fallout from past nuclear weapons tests.

4.5.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Significant impacts would occur if the project results in the following:

- There would be a substantial adverse effect on threatened or endangered species, including state and federally listed or proposed species. A substantial adverse effect would include destruction or adverse modification of critical habitat or reductions in the abundance or long-term viability of the species. Such an effect may result from direct harm to individuals, or through effects on the competitors, predators, prey, or habitat of the species that could result in increased mortality or reduced reproductive success. Consideration would also be given to "species of concern" that could meet criteria for listing.

- The impact would violate applicable federal or state laws with respect to the protection of biological resources.

- Consideration would be given to impacts involving the loss or long-term degradation of sensitive habitat, defined as habitat that (1) provides essential resources that are otherwise limited on a regional scale; (2) serves as a concentrated breeding, nursery, or foraging area; or (3) supports substantial concentrations of one or more sensitive species.

- Consideration would also be given to effects resulting from interference with the movement of resident or migratory fish and wildlife, to the extent that substantial adverse impacts threatened the survival or reproductive success of a population.

4.5.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four consist of dredging turning basins and berths at Piers B, D, and 3, plus replacement of Pier D.

Dredging

Impacts to the biological communities associated with dredging activities at PSNS and disposal at the PSDDA Elliott Bay disposal site are described below. Overall, significant impacts to the biological communities at PSNS and the disposal site would not occur as a result of the proposed dredging and disposal activities. The biological communities occurring at PSNS and the disposal site would be initially impacted by the dredging and disposal activities, although impacts are expected to be localized and temporary. It is expected that maintenance dredging of the deepened areas would not be needed, or needed very infrequently, since exiting berth areas at PSNS do not require maintenance dredging. Therefore, significant maintenance dredging impacts to the biological community would not occur. No significant loss or long-term degradation of habitat for the biological communities would occur. No adverse effect on the population status of proposed, threatened, or endangered species, or adverse effect on the prey, foraging habitat, or breeding habitat of these species would occur. However, juvenile salmon could be negatively impacted should dredging occur during their period of outmigration. Impacts could be avoided by limiting dredging to times outside of the peak salmonid outmigration period (mid-March to mid-June).

Plankton

Impacts resulting from the proposed dredging at PSNS would be characterized by increased suspended solids, attenuated light penetration, reduced dissolved oxygen concentrations, and possible release of contaminants into the water column. Potential impacts on the planktonic community associated with the turbidity increase may include a decrease in primary productivity of phytoplankton due to reduced light in the water column, clogging of gills and feeding appendages of zooplankton, and possible toxic effects to the plankton. Clogged gills and feeding appendages would reduce the zooplanktonic organisms' ability to feed, and consequently could reduce the survival, growth, and biomass of the zooplankton. However, the increased turbidity conditions are expected to be localized and temporary, lasting only while dredging occurs. Therefore, reduced productivity and physical impacts to the plankton community would not be significant.

Potential toxic effects on plankton associated with suspension of contaminated sediments would not be significant. As described in section 4.3.2, biologically significant release of contaminant constituents during dredging has not been routinely observed. Studies reported by LaSalle (1984) indicated that dilution at most dredging sites occurred quickly, so that substantial releases of contaminants is not expected. Several measures would be used to control sediment suspension during dredging, such as use of a closed dredge bucket, to minimize water quality impacts. In addition, any contaminated sediments removed during this project would be placed in barges to a level that would not cause overflow or spillage, thus reducing the potential for contaminants being released from the dredged material. Therefore, significant toxic impacts to the biota in the water column would not occur.

Eelgrass and Algae

As described in section 4.5.1, there are no eelgrass beds, kelp beds, or similar habitat at PSNS (DON 1992c). Marine vegetation at PSNS occurs along the shoreline attached to rip-rap, concrete bulkheads, old wooden piers, and bits of shell or other debris on the bottom sediment. Impacts to macrophytic algae occurring near the dredge sites would include physical removal of any macrophytic algae attached to shell or other debris on the bottom sediment, and inhibited primary production as a result of decreased light attenuation associated with suspended particulates in the water column or settling of the material on the plants. Existing depths at Pier D (approximately 40 feet MLLW) and the soft bottom do not normally support aquatic vegetation (DON 1994c). Therefore, direct removal of macrophytic algae by dredging would not be significant. Because turbidity increases associated with dredging are expected to be localized and temporary, impacts to the productivity of the algaes would not be significant.

INVERTEBRATES

Dredging activities would initially eliminate the benthic community present in the areas to be dredged. As a result, productivity would be temporarily reduced in the dredged areas. Recolonization of benthic invertebrates would occur by larval recruitment or immigration of organisms from nearby unaffected areas. The community that first develops would consist of small, near-surface dwelling opportunistic species. The community that currently exists at the site appears to be more stressed than other locations surveyed in Puget Sound, and is likely adapted to frequent disturbance from previous dredging projects and various harbor activities. A similar community is expected to develop relatively rapidly (within a year) following completion of dredging and construction activities (DON 1994c). The benthic invertebrate community existing in areas near the turning basin that had not previously been dredged would be altered and would be expected to be similar to the community that currently exists within the turning basin. However, the benthic communities observed in non-dredged areas within PSNS and other locations within Sinclair Inlet tended to be dominated by pollution-tolerant, opportunistic species. Therefore, it is unlikely that there would be a significant change from the type of community that currently exists in these areas. Direct impacts to the benthic infauna are expected to be temporary and minimal. Loss or long-term degradation of the benthic habitat would not occur.

In addition to direct removal of organisms in the dredge area, the increased suspended solids resulting from dredging activities may affect benthic organisms in the vicinity of the dredge site, particularly filter or suspension feeding organisms. The suspended solids could clog gills and feeding appendages, reducing the organisms ability to feed, and consequently reducing the survival, growth, and biomass of the organisms. The bivalves *Tapes japonica, Mytilus edulis,* and *Mytilus californianus* showed variable responses when exposed to 100,000 mg/L kaolin clay for 10 days. The three species demonstrated little significant mortality (*T. japonica*), 10 percent mortality (*M. edulis*), and 50 percent mortality (*M. californianus*) during this study (Peddicord et al. 1975, cited in O'Connor 1991). However, as described in section 4.3.2.1, total suspended solids levels during dredging operations are expected to be much lower than those used in the study (generally less than 100 mg/L). The adverse biological impacts tend to occur at much higher levels of suspended solids. Therefore, impacts on the benthic infauna associated with increased suspended solids in the water column would be less than significant.

Results of solid-phase acute toxicity tests using various benthic invertebrates (echinoderms, polychaetes, and amphipods) conducted for sediments slated for dredging met sediment quality standard criteria for all locations for both polychaete and echinoderm larval tests. However, sediment quality standards were exceeded for the amphipod test at Pier B and two locations in the turning basin (refer to section 4.4.1). During investigations of the marine habitat adjacent to PSNS, in situ bioassays were conducted using caged blue mussels for studying impacts of water- and sediment-borne chemicals (DON 1996). Tissue sample levels of several chemicals (e.g., dibutyltin chloride, magnesium, manganese, mercury, nickel, selenium, sodium, zinc, and PCB Aroclor 1254) were significantly elevated over reference tissue samples. Elevated tissue levels of PAHs in sea cucumbers collected from Sinclair Inlet were also observed (DON 1996). Therefore, there is a potential for toxic effects to occur as a result of dredging these sediments and exposing organisms to contaminated suspended sediments. However, as described in section 4.3.2.1, substantial releases of contaminants into the water column during dredging activities are not expected, so that toxic impacts associated with the suspended particulates would be minimal. In addition, analysis of subsurface sediments collected adjacent to Pier D indicated subsurface sediments were generally cleaner than surface sediments, so that a healthier environment for benthic infauna compared to existing conditions may result in at least some of the dredge prism area (DON 1994c).

FISHES

The dredging in the project area could affect fish occurring in the area as the increase in suspended solids could result in decreased levels of dissolved oxygen in the water column, decreased visibility for foraging activities, and impaired oxygen exchange due to clogged or lacerated gills. Impacts would be greatest on fish eggs, larvae, and juveniles (COE 1992). Peddicord et al. (1975) and Morgan et al. (1973) measured biological effects of suspended sediments for fishes. Delayed development of white perch and striped bass eggs was noted for concentrations of suspended sediment greater than 1,500 mg/L. Hatching of demersal white perch eggs was delayed by one day at suspended sediment concentrations of 4,000 mg/L. Egg mortality occurred for striped bass at 3,400 mg/L and for whiter perch at 3,600 mg/L (Morgan et al. 1973, cited in O'Connor 1991). However, these studies demonstrate direct biological effects of suspended sediment caused by extremely high concentrations extending for long periods of time. As described in section 4.3.2.1, increased TSS levels from dredging would be well below levels indicated above that have significant adverse biological effects on fish. In addition, the turbid conditions would be temporary, and most adult fish would be able to avoid the area during dredging operations. Various measures would be used during dredging to limit, in time and space, the resuspension of sediments. Although most bottom fish would be able to avoid the area of disturbance during operations, small numbers may be lost if caught in the dredge bucket.

Another impact of concern would be the loss of prey species and altered benthic habitat as the sediments are removed. However, the benthic community at PSNS is dominated by opportunistic, surface-dwelling, pollution tolerant species that recolonize disturbed areas quickly, so that the loss of prey species would be temporary. This type of community would not provide high-quality foraging habitat for fish. In addition, the habitat for fish at PSNS is already diminished as a result of frequent disturbances from previous dredging and other harbor activities. Additional dredging would not have a significant impact on the fish or their habitat.

Fish studies conducted in Sinclair Inlet have indicated bioaccumulation of contaminants from the sediments such as pesticides, PCBs, mercury, and chromium in fish tissues (DON 1994c, 1996). However, toxic effects on fish associated with contaminated particulates suspended in the water column due to dredging activities would be minimal. The presence of these sediments suspended in the water column would be limited to the immediate dredging area and fish would likely avoid the area. Food-chain transfer of the contaminants may already occur with sediments present at the site. Dredging in at least some of the locations would remove some of the more contaminated surface layer, so that sediment conditions at the dredge site may actually improve for a period. Therefore, toxic effect associated with dredging would not be significant.

BIRDS

Potential impacts to shorebirds and waterfowl at the PSNS dredging sites include disturbance during dredging, increased turbidity that may inhibit foraging, reduced food availability, and bioaccumulation of contaminants. The expectation is that the birds would likely avoid the area during disturbance associated with operations and forage elsewhere, thus reducing the birds' exposure to potentially contaminated prey. The area to be avoided represents a very small part of the birds' normal foraging or resting habitat. Dredging is not expected to result in large numbers of benthic invertebrate prey organisms on the water surface. The benthic community is dominated by very small organisms, and any mollusk species would sink back to the bottom relatively quickly. Dredging would also employ techniques to minimize the suspension of sediments and associated organisms. Therefore, if any birds are attracted to the dredging site, the prey available to them would be limited. In addition, the exposure of the prey fish species to contaminants is expected to be temporary and limited in extent. Once dredging is complete, interference with bird activity in the area would end, although food for marine birds in the immediate vicinity of dredging and construction activities may be reduced until the benthic community is re-established in these areas. Therefore, both physical and toxic effects of turbidity and disturbance by these operations would be localized and temporary. No loss or long-term degradation of sensitive habitat for birds would occur and the survival and reproductive success of the birds would not be adversely affected.

MARINE MAMMALS

Impacts on marine mammals occurring in the vicinity of the PSNS dredging site would result primarily from turbidity caused by the dredging operations, disturbance from operation of dredging equipment, and effects on food resources such as fish and invertebrates. The effects of turbidity and disturbance by the dredging operations would be localized and temporary. Because the mammals are mobile, they would likely avoid the immediate site during dredging operations. This should have a minor effect on foraging and other behavior, because the area to be avoided would be a very small part of the normal foraging, resting, or transit habitat for these species. There would be no significant reduction in short-term food availability for these species due to temporary avoidance of the immediate sites. In dredged areas, food may be reduced until the benthic community becomes re-established. However, these effects would be minor because they would be limited to the dredged areas that make up a small part of the total foraging range of the mammals. No significant loss or long-term degradation of habitat for marine mammals would occur as a result of this project.

In addition to physical effects, the suspension of sediment at the immediate dredging site would expose the mammals' prey species (e.g., fish and invertebrates) to any contaminants contained in the sediments. However, measures would be taken to minimize suspension of sediments in the water column and the exposure to contaminants would be temporary and limited in areal extent. In addition, mammals and fish, one of the principal foods of marine mammals, would avoid the immediate dredging site, thus further reducing their exposure to contaminants. Thus, toxic effects or bioaccumulation resulting from exposure to contaminated suspended sediments and prey would be negligible for marine mammals.

THREATENED AND ENDANGERED SPECIES

As described in section 4.5.1, chum, coho, and chinook salmon runs and steelhead and cutthroat trout runs occur in streams that empty into Sinclair Inlet, and the Suquamish Tribe's Gorst Creek chinook salmon-rearing facility, located at the west end of Sinclair Inlet, releases over 2,000,000 chinook juveniles per year. Juvenile salmon are present along the Sinclair Inlet shoreline during their outmigration between mid-March and mid-June (DON 1992c). The juveniles would be less likely to avoid the disturbance associated with dredging activities than would adult salmon, and could be negatively impacted should operations occur during their outmigration period. To avoid impacts to the survival or reproductive success of the salmon, dredging activities would be limited to periods outside of the salmon outmigration window (DON 1994c). Adult salmon are not expected to be adversely affected during their migration upstream to spawn.

The Navy has requested and received from the NMFS and USFWS lists of threatened and endangered species potentially affected by the proposed project. The Navy has also engaged in initial discussions with these agencies regarding impacts to listed and proposed species. A Biological Assessment for the proposed project will be submitted to the NMFS and USFWS in the spring of 1999 to initiate formal consultation under Section 7 of the Endangered Species Act.

Disposal at the PSDDA Site

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Dredged material determined, through chemical and biological testing, to be suitable for unconfined aquatic disposal would be disposed of at the Elliott Bay PSDDA disposal site (Figure 1-2). The volume of this material is estimated to be approximately 300,000 cy. The impacts of this disposal to the marine biological community at the PSDDA disposal site would be within the accepted limits of normal use of the site, as addressed and mitigated for in the EIS for site designation (COE 1988). Material would be disposed of at the site in accordance with PSDDA program requirements. Therefore, no significant impacts associated with the homeporting project at PSNS would occur at this site.

Disposal in CDF and CAD Sites

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

The main impact to the marine biological communities at the CDF sites would be elimination of the marine communities existing there, as the CDF sites would be changed from a marine to a terrestrial environment. However, initially eliminated marine macroalgae and invertebrates attached to the piers and shoreline would recolonize the walls of the CDF1 and CDF2, although the surface area to be colonized by macrofauna and algae at CDF2 would be reduced. The CDF Site 1 would cover an area of approximately 2.3 acres, and Site 2 would encompass approximately 1.5 acres of existing marine deep-water habitat, which is degraded by sediment contamination. This area represents a small portion of the plankton, fish, marine mammal, and bird community habitats at PSNS. In spite of these factors, there would still be a permanent loss of marine deep-water habitat, which would be a significant impact.

Similar to the CDF sites, the main impacts to the marine biological community at the CAD site would be elimination of the existing benthic and epifaunal community. The area of the existing habitat that would be affected is approximately 10 acres. Once the facility were completed, the new surface sediment type would differ considerably from the existing surface, as it would consist of gravel, cobble, and rip-rap material. The benthic community that recolonizes the site would differ from the existing community, and would be more characteristic of shallow-water, hard-bottom habitat. With the addition of a floating or fixed breakwater to the berm of the CAD, the CAD surface could support a sediment surface that might support eelgrass or other type of vegetation and the associated biological community.

As described in section 4.4.5, the sediments at the CAD site have elevated levels of PAHs, PCBs, DDT, mercury, and other metals. This contaminated material would be covered by clean material, so that exposure of marine benthic organisms to potentially toxic sediment would be reduced. Similarly, potential toxic effects to demersal fish and bioaccumulation of contaminants in other organisms consuming contaminated prey items would be reduced.

The change in habitat associated with the CAD site would have long-term beneficial impacts to the biological community at PSNS. In addition to the cleaner surface sediments, the new shallow habitat would be more productive than the existing deep-water habitat. The shallow-water, hard-bottom habitat is less common at PSNS than soft-bottom habitats. The addition of the CAD site would add to habitat and species diversity in the area. The new habitat would also enhance feeding and refuge habitat for juvenile salmon in the area. These enhancements and removal of contaminated sediments at the site would compensate for the loss of relatively unproductive, degraded deep-water habitat at the CDF sites. Habitat evaluation and enhancement at the CAD site would be developed in consultation with the relevant resource agencies and Native American tribes, as part of the Section 404 compliance process.

In addition to the change in habitat once the CDF and CAD sites are constructed, there are potential impacts associated with construction of the sites. One is the increased suspended solids as material is disposed at the site. Impacts to the various organisms would be similar to those described for dredging impacts. As described in section 4.3, the increased suspended solids levels would be temporary and localized, so that effects on the biological community would not be significant. In addition, the majority of the suspended particulates during disposal of the unsuitable and cap materials would be contained by the CDF walls. The tendency for toxic constituents to remain associated with suspended sediment particles would reduce both the solubility and bioavailability of these constituents to levels below which toxic effects are expected. Exposure of benthic organisms to toxic sediment as the unsuitable material is placed at the site would not be significant as the clean cap material would be placed over the unsuitable material within days to a few weeks. Therefore, significant toxic effects would not occur during disposal at the sites.

Landfill Disposal

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Landfill disposal would not affect marine biological resources. Potential impacts to terrestrial biological resources are discussed in section 4.6.2.1.

Facility Improvements

Impacts to the biological community as a result of construction activities at PSNS, which would be similar to impacts described for dredging activities, are described below. Impacts to the biological community including plankton, macrophytic algae, invertebrates, fish, birds, marine mammals, and threatened and endangered species would be temporary and localized. Overall, impacts to the biological community would not be significant. However, juvenile salmon could be negatively impacted should construction occur during their period of outmigration. In order to avoid impacts to the survival and reproductive success of the salmon, in-water construction activities would be limited to periods outside of the salmon outmigration window (March 15 to June 15). Adult salmon are not expected to be adversely affected during their migration upstream to spawn.

PLANKTON

Impacts to the phytoplankton community during destruction of Pier D and construction of a new pier would be similar to those described for dredging operations. The impacts would characterized by increased suspended solids, attenuated light penetration, reduced dissolved oxygen concentrations, and possible release of contaminants into the water column. Because the increased turbidity conditions are expected to be localized and temporary, the reduced productivity and physical impacts to the plankton community would not be significant. As described above, a biologically significant release of contaminant constituents as a result of construction activities is not expected, so that potential toxic effects associated with suspension of contaminated sediments would not be significant.

EELGRASS AND ALGAE

As described in section 4.5.2.1, existing depths in the vicinity of Pier D (approximately 40 feet MLLW) and the soft bottom do not normally support aquatic vegetation (DON 1994c). Therefore, shading impacts on aquatic vegetation from widening and lengthening Pier D would not be significant. Impacts to macrophytic algae from facility improvements at PSNS include elimination of any macrophytic algae attached to Pier D, during destruction of the pier. However, macrophytic algae should recolonize the newly constructed pier within a couple of years. Impacts associated with increased suspended particulates and disturbance to the sediment during the construction of the new pier would be similar to those described for dredging at the site. Impacts to the aquatic vegetation at PSNS would be minimal.

INVERTEBRATES

Impacts to the benthic invertebrate community associated with the destruction of Pier D and construction of a new pier would be similar to those described for dredging at the site. The invertebrate community attached to the Pier D would be eliminated, and the bottom community would be disrupted or lost in some areas. Widening the dredging prism associated with construction of a new pier would disrupt previously non-dredged areas in the vicinity of Pier D. The community that would recolonize the site (both the dredged areas and disrupted areas underneath the existing pier) would be expected to be similar to that already occurring at Pier D. This would include organisms within the substrate and attached to the pilings of the pier. As described in section 4.5.1, there were not consistent patterns between previously dredged and non-dredged locations within the berthing areas of PSNS. In addition, all stations sampled were dominated by opportunistic, pollution tolerant species. Although the species composition may change slightly in new areas dredged when widening Pier D, the type of community present (e.g. stressed) would not be expected to be very different. In addition, substantial releases of chemicals in the water column are not expected during construction activities, so that toxic impacts to the invertebrates are not expected. Overall, impacts to the benthic invertebrates would be temporary and minimal.

FISHES

Impacts to the fish community associated with construction activities at PSNS would be similar to those described for dredging activities. Most adult fish would be able to avoid the area during the pier demolition and construction activities, and the turbid conditions would be temporary. Noise from the pile-driving during reconstruction of the pier would cause a temporary disturbance of fish in the vicinity. There would be an initial loss of prey for demersal fish in the immediate dredge area and fish would be temporarily displaced. Within 1 to 2 years, the benthic community is expected to recover and fish would recolonize the area. Toxic effects on fish associated with contaminated particulates suspended in the water column due to dredging activities would be minimal.

BIRDS

Potential impacts to shorebirds and waterfowl at PSNS during demolition of Pier D and construction of a new pier would be the same as those described for the dredging activities. Impacts may include disturbance during demolition and construction activities, increased turbidity that may inhibit foraging, reduced food availability, and bioaccumulation of contaminants. As described above, both physical and toxic effects of turbidity and disturbance by these operations would be localized and temporary. However, noise associated with pile driving during pier construction could disrupt nesting of birds in the area. Although this would be an adverse impact to these particular birds, it would not have a significant impact on these species as a whole (see also Threatened and Endangered species for impacts to bald eagles and marbled murrelets). Construction impacts would not be significant.

MARINE MAMMALS

As described for dredging activity impacts, impacts on marine mammals occurring in the vicinity of PSNS would result primarily from turbidity caused by the construction operations, disturbance from demolition and construction equipment, and effects on food resources such as fish and invertebrates. Toxic effects or bioaccumulation resulting from exposure to contaminated suspended sediments and prey would be negligible for marine mammals. Therefore, significant impacts associated with construction activities would not occur.

THREATENED AND ENDANGERED SPECIES

Impacts to threatened and endangered species occurring in the vicinity of PSNS as a result of construction activities would be the same as those described for dredging operations. Bald eagles and marbled murrelets would be able to avoid the area during construction activities, and the effect on feeding success for these species would not be significant.

As described above, the noise associated with pile driving for the reconstruction of Pier D would cause a temporary disturbance of fish and wildlife in the vicinity of the construction site. The noise would likely cause fish to avoid the area, and could disturb nesting of birds in the area. The occurrence of marbled murrelets in the vicinity of PSNS is rare, and these birds do not nest in the area. The nearest active bald eagle nest is approximately 3 miles to the southwest of Pier D. This distance is too great for noise from construction of Pier D to have significant adverse impacts on nesting eagles. Similar to dredging activities, in-water construction operations would occur outside the salmon outmigration period (March 15 to June 15) in order to avoid potential impacts to juvenile salmon migrating through the area. Compliance with this "fish window" imposed by the regulatory agencies would avoid noise and other short-term impacts to juvenile salmon.

The development projects proposed at PSNS could further degrade the migratory pathway of juvenile salmonids. Juvenile salmon use shallow-gradient intertidal and shallow subtidal areas for feeding and avoidance of predators. The deepening of berths and widening and extending of Pier D could cause migrating juvenile to move into deeper water, with greater risk of predation. Considering the large numbers of piers and drydocks at PSNS, and the lack of shallow-water habitat, the additional degradation of the habitat for juvenile salmon caused by the project would be less than significant. Adult salmon are not expected to be significantly impacted by the pier replacement. Possible mitigation of these impacts is discussed in Section 4.5.2.5.

Operations

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Homeporting ships at PSNS could result in impacts to the biological community through fuel spills, ship maintenance, accidental discharges of wastewater or other wastes from the ships, and discharge of stormwater from PSNS (refer to section 4.5.2.2). However, for this alternative, no additional CVNs or other ships would be homeported there. Therefore, the probability of impacts associated with ship operations would not change. No significant impacts to the biological community at PSNS associated with ship operations would occur.

4.5.2.2 *Facilities for One Additional CVN and Relocation of four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Impacts to the marine biological community occurring at PSNS under this action would be similar to those described in section 4.5.2.1. Therefore, impacts to the biological community as a result of dredging would not be significant. To avoid impacts to salmon, dredging would be avoided during their principal period of outmigration (mid-March to mid-June). There would be a significant loss in deep-water habitat as a result of creating CDF sites for the disposal of unsuitable material. However, construction of the CAD site would create more productive shallow-water habitat at PSNS and compensate for loss of the deep-water habitat.

Facility Improvements

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Impacts to the marine biological community associated with the demolition and construction activities at PSNS for this alternative would be similar to impacts described for the first alternative component in section 4.5.2.1. Impacts to the biological community would be temporary and localized. Overall, impacts to the biological community would not be significant. However, juvenile salmon could be negatively impacted if demolition and construction operations occurred during their period of outmigration. These operations should be limited to periods outside of the salmon outmigration window (March 15 to June 15).

Operations

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Impacts to the marine biological community under this action resulting from ship operations could include impacts associated with fuel spills, ship maintenance, accidental discharges of wastewater or other wastes from the ships, and discharge of stormwater from PSNS. Oil and fuel spills could adversely affect plankton, macrophytes, benthic infauna, fish, and birds, although organisms in water more than 10 feet deep would probably not be significantly impacted (DON 1985). Impacts could range from mortality of some invertebrate, macrophytic, and planktonic species to bioaccumulation of various hydrocarbons in predator species. As described in section 4.3.2.1, the chance of accidental oil spills are minimal, and any spills would be small in quantity because fueling equipment and procedures are designed to minimize the occurrence of spills. Spill response measures in place at PSNS are designed to prevent, control, and provide countermeasures for oil spillage, so that impacts to the biological community would be minimized. In addition, significant bioaccumulation and biomagnification are not likely occur, because the fuels of concern are lighter-weight fractions and do not have the tendency to sink, as slowly degrading fractions of crude oil have (DON 1985). Most animal groups are also able to metabolize xenobiotic hydrocarbons so that impacts to these species would be temporary (DON 1985).

Additional potential impacts include possible "graywater" (e.g., soaps, detergents, surfactants) discharges, and paint scrapings landing in the water during maintenance painting of the superstructure and hulls above water. Graywater is generally not particularly toxic to the biological community (DON 1985). Discharges would generally be unlikely as all homeported ships receive all utilities, including discharge of wastewaters and other wastes, from landside. In addition, all homeported ships are surrounded by a surface boom when in berth to contain any spilled fuels, wastewater or other hazardous material, and to facilitate in their cleanup. During maintenance painting of the superstructure above water, the paint chips would be collected for disposal by procedures designed to collect chips, such as use of skirts surrounding the work area. Although some paint chips may not be collected and would sink and accumulate on the bottom, most would be collected. Impacts would be minimal.

In summary, impacts to the marine biological community occurring at PSNS as a result of ship operations would not be significant in the long term. Although there would be an additional CVN homeported at PSNS under this alternative, four AOEs would no longer be homeported. The probability of oil spillage, graywater discharge, and possible release of paint scrapings would not increase. In addition, spillage response measures are in place to minimize any impacts to the biological community.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 4.3.1 would continue, there would be no significant impacts on marine biology due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.5.2.3 *Facilities for One Additional CVN and Relocation of two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five consists of dredging turning basins plus Pier D replacement.

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Dredging

Impacts to the biological community as a result of dredging at PSNS under this action would be similar to those described in sections 4.5.2.1 and 4.5.2.2. With the exception of salmon, impacts to the biological community would not be significant. Impacts to salmon could be significant if dredging occurred during the salmonid period of outmigration (mid-March to mid-June). Dredging during this period would be avoided. Construction of the CDF sites for disposal of unsuitable material would result in significant loss of deep-water habitat. However, the new shallow-water habitat created at the CAD site would compensate for the loss of deep-water habitat.

Facility Improvements

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Impacts to the marine biological community associated with facility improvements at PSNS for this action would be similar to impacts described in sections 4.5.2.1 and 4.5.2.2. Impacts to the biological community would be temporary and localized. Overall, impacts to the biological community would not be significant. However, to avoid potentially significant impacts to juvenile salmon, demolition and construction operations would be limited to periods outside of the salmon outmigration window (March 15 to June 15).

Operations

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

The probability of oil spillage is increased under this action, since there would be two more vessels homeported at PSNS, than for the alternative component described in section 4.5.2.2. However, as described above, measures are in place to minimize any impacts to the biological community associated with fuel spillage and discharges.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 4.3.1 would continue, there would be no significant impacts on marine biology due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.5.2.4 *One Additional CVN: Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Under the no action alternative, none of the impacts resulting from dredging described above would occur; therefore, no significant impacts would occur.

Facility Improvements

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Under the no action alternative, none of the impacts resulting from construction activities described above would occur; therefore, no significant impacts would occur.

Operations

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Although none of the impacts associated with dredging and construction would occur, there are still potential impacts associated with increased vessel activity and disturbance, increased probability of oil spillage, and other potential discharges. These potential impacts would be minimized by spillage prevention, control, and countermeasure plans already in place.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 4.3.1 would continue, there would be no significant impacts on marine biology due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.5.2.5 *Mitigation Measures*

Overall, impacts associated with dredging and construction activities for the proposed project, with the exception of construction of the CDF sites, would not result in significant long-term adverse effects on the biological community at PSNS. However, juvenile salmon could be negatively impacted should dredging and construction activities occur during the peak period of their outmigration (March 15 to June 15 or as designated by the WDFW). To avoid impacts to the survival and reproductive success of the salmon, dredging and construction would be limited to periods outside of the outmigration window. Adult salmon are not expected to be adversely affected during their migration upstream to spawn. In addition, permit conditions to minimize water quality impacts and impacts to the biological community would be adhered to during implementation of the project. The use of environmental dredging methods such as a closed dredge bucket and precision dredging would minimize impacts to water quality and biota during dredging. These measures are described in section 4.3.2.1. The loss of marine habitat at the two CDF sites would be compensated for by habitat enhancement at the CAD site, as described in section 4.5.2.1. Habitat evaluation and design of the habitat enhancement at the CAD site, and the need for additional mitigation, if any, would be accomplished in consultation with the relevant resource and Native American tribes and tribal trust agencies.

The widening and extension of Pier D could incrementally degrade migratory habitat for juvenile salmonids, including the threatened chinook salmon. The Navy is currently preparing a Biological Assessment under the Endangered Species Act to evaluate the impacts of all aspects of the proposed project on chinook salmon and other listed and proposed species, and to propose mitigation of any adverse impacts from the pier replacement and other project actions. The Navy will consider an appropriate range of mitigation options and coordinate with the NMFS and USFWS regarding project effects and related mitigation. Following submittal of the Navy's Biological Assessment, the NMFS and USFWS will issue a Biological Opinion that will establish mitigation needs. This Biological Opinion must be a No Jeopardy opinion in order for the proposed project to proceed.

In collaboration with the Washington Department of Ecology, EPA, NMFS, USFWS, WDFW, WDNR, the Suquamish Tribe, the City of Bremerton, and other entities, the Navy is currently evaluating the feasibility of disposing of dredged material in a CAD and/or CDF at PSNS. This evaluation is considering the joint disposal of contaminated material from the navigation dredging proposed for CVN homeporting and of material dredged to achieve sediment remediation at PSNS under CERCLA. The evaluation is addressing the ability of such sites to effectively contain sediment-associated contaminants, the potential for incorporating habitat enhancement into such facilities, and related design parameters. It is expected that a CAD could be designed to be self-mitigating in terms of habitat impacts. The general approach is to cover the existing contaminated, mostly deep habitat with shallow, clean habitat of a biologically productive type. The impacts of pier extension and turning basin dredging would be relatively minor, so that any mitigation that may be required for these actions could be incorporated into the CAD design. If the CDF option is ultimately proposed and it is not feasible to incorporate mitigation for the related habitat impacts into the CAD, opportunities for additional habitat enhancement would be evaluated in coordination with the relevant resource and permitting agencies. The same approach would be used for any impacts of pier extension that could not be mitigated at the CAD site. It is expected that project approvals would not be issued until concerns regarding habitat and other impacts have been addressed to the satisfaction of these agencies.

4.6 TERRESTRIAL BIOLOGY

4.6.1 Affected Environment

This section addresses terrestrial biology at PSNS, which is bordered on three sides by Bremerton, the largest city in Kitsap County. Vegetation and wildlife at PSNS are limited to open, noncontiguous, undeveloped areas that comprise approximately 46 acres (13 percent) of the entire Bremerton Naval Complex (DON 1990). Most of these areas have been previously disturbed and are currently landscaped with native and ornamental trees and shrubs. There are no streams, rivers, ponds, lakes, or freshwater wetlands located within PSNS (DON 1986). The majority of the site is developed and covered with impervious surfaces.

Salt marsh and brackish marsh communities formerly existed along portions of PSNS prior to its construction and the original landform has been greatly altered to accommodate its continuing development. Some marsh areas have been filled in and the shoreline has been extended with quay walls and landfill. The current shoreside of PSNS consists primarily of riprap, concrete bulkheads, and piers.

Plants

Natural vegetation of the undeveloped areas and of the region are the result of plant adaptation to a variety of factors such as climate, soil, physiography, and human activity. The proposed project site is located in the Western Hemlock Zone, Puget Trough Province, Puget Sound Basin (Franklin and Dyrness 1969). Tree species include western hemlock (*Tsuga heterophylla*), Douglas fir (*Pseudotsuga menziesii*), vine maple (*Acer circinatum*), big leaf maple (*Acer macrophyllum*), western red cedar (*Thuja plicata*), and madrone (*Arbutus menziesii*). There are various types of thick underbrush present such as salal (*Gaultheria shallon*), sword fern (*Polystichum* spp.), Oregon grape (*Berberis nervosa*), salmonberry (*Rubus spectabilis*), blackberry (*Rubus* spp.), and willows (*Salix* spp.) (DON 1986).

Successional stages typically include a weed stage or shrub-dominated period and a sapling stage. Common successional species include woodland groundsel (*Senecio sylvaticus*), fireweed (*Epilobium angustifolium*), and Scotch broom (*Cytisus scoparius*).

Animals

Because of its location on the Pacific flyway, Puget Sound exhibits a diverse avifauna from an influx of seasonal migrants. Many of the migrants, particularly waterfowl, remain and overwinter in Puget Sound because of the mild climate, abundance of bays and coves, and the availability of food. Over 100 different species of birds have been reported from the area (DON 1985).

Due to the extensive industrial nature of PSNS, its resident bird community is characterized by species typical of urban areas. Resident bird species include Steller's jay (*Cyanocitta stelleri*), starling (*Sturnus vulgaris*), flicker (*Colaptes* spp.), American crow (*Corvus brachyrhynchos*), black-capped chickadee (*Parus atricapillus*), goldfinch (*Spinus tristis*), pigeon (*Columba fasciata*), robin (*Turdus migratorius*), golden-crowned kinglet (*Regulus satrapa*), and evening grosbeak (*Hesperiphona vespertina*) (DON 1986).

The highly developed shoreline provides only limited resting areas for shorebirds and waterbirds. As described in section 4.5.1, numerous glaucous-winged gulls (*Larus glaucescens*) have been seen along these waterfront areas. Some of the more common waterbirds observed in the vicinity include double-crested cormorants (*Phalacrocorax auritus*), western grebes (*Aechmophorus occidentalis*), red-necked grebes (*Podiceps grisegena*), and mallard ducks (*Anus platyrhynchos*).

Although abundant mammal populations originally existed in the Puget Sound area, the current populations of mammals at PSNS are extremely limited. The only mammals reported are gray squirrels (*Sciurus griseus*), mice (*Peromyscus* spp.), and shrews (*Sorex* spp.) (DON 1990).

With few exceptions, reptiles and amphibians are not abundant in the Puget Sound area. The lack of suitable habitat at the site restricts the population of many reptiles and amphibians. Only garter snakes (*Thamnophis sirtalis*), salamanders (*Ambystoma macrodactylum*), newts (*Taricha* spp.), and frogs (*Hyla regilla*) have been observed (DON 1990).

Threatened and Endangered Species

Two terrestrial bird species that may occur within the vicinity of PSNS were identified as being of concern by the USFWS. These include bald eagles (*Haliaeetus leucocephalus*) and marbled murrelets (*Brachyramphus marmoratus*), which are both listed as threatened species at the state and federal levels. The occurrence of these species in the vicinity of Sinclair Inlet and PSNS are described below.

Adult, subadult, and juvenile bald eagles have been observed foraging within Sinclair Inlet. There are recurring sightings of bald eagles in the vicinity of PSNS, although it is not likely that they feed near PSNS on a regular basis because of the high level of human activity and the variability of prey. Perching and roosting trees are located near the Naval hospital on Ostrich Bay, but not near the waterfront (DON 1992b). However, bald eagles have been observed perched on the masts of ships on occasion. Detailed surveys on perching sites around Sinclair Inlet have not been conducted (personal communication, Ament 1998).

Bald eagles breed in the vicinity of Sinclair Inlet. Two bald eagle nests are located on the southwest side of the inlet. One of these two nests, located within one mile of PSNS near the town of Port Orchard, was active in 1994 and 1995, but has been unoccupied since 1995. The other nest, located farther southwest within approximately 3 miles of the shipyard, was discovered in 1996, and was active in 1996, 1997, and 1998. It is possible that the pair of eagles that occupied the newer nest were the same pair that occupied the first nest, although this has not been confirmed (personal communication, Ament 1998). In addition, there are three bald eagle nests to the north of Sinclair Inlet near Kitsap Lake and Dyes Inlet. These eagles likely forage within Sinclair Inlet. Other nests near Sinclair Inlet are located near Port Orchard (the waterbody), Rich Passage, and on Blake Island (Priority Species Habitat database, WDFW 1998).

In addition to the eagles that are residents or breed in the area, wintering eagles also forage within the inlet. Wintering eagles would be present from late October to late March.

Marbled murrelets are rarely seen in Sinclair Inlet. Two murrelets were observed on the south side of Sinclair Inlet during Kitsap Audobon Society surveys conducted in 1995. A few have been sighted in winter surveys conducted by WDFW in 1997 near Agate Pass, Rich Passage, and Liberty Bay, and low numbers have been observed near Blake Island (personal communications, Nysewander 1998 and Evanson 1998). Marbled murrelets feed on small fish and invertebrates by diving in pursuit of prey. The murrelets also roost on the water, although they nest in mature forests. Marbled murrelet nest sites have not been observed in the vicinity of Bremerton or PSNS.

4.6.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Significant impacts would occur if the project results in the following:

- There would be a substantial adverse effect on threatened or endangered species, including state and federally listed or proposed species. A substantial adverse effect would include destruction or adverse modification of critical habitat or reductions in the abundance or long-term viability of the species. Such an effect may result from direct harm to individuals, or through effects on the competitors, predators, prey, or habitat of the species that could result in increased mortality or reduced reproductive success. Consideration would also be given to "species of concern" that could meet criteria for listing.

- The impact would violate applicable federal or state laws with respect to the protection of biological resources.

- Consideration would be given to impacts involving the loss or long-term degradation of sensitive habitat, defined as habitat that (1) provides essential resources that are otherwise limited on a regional scale; (2) serves as a concentrated breeding, nursery, or foraging area; or (3) supports substantial concentrations of one or more sensitive species.

Consideration would also be given to effects resulting from interference with the movement of resident or migratory fish and wildlife, to the extent that substantial adverse impacts threatened the survival or reproductive success of a population.

4.6.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)*

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging

Dredging-related activities and associated noise could disturb some bird species in the immediate work area and result in their temporary displacement. Most bird species would return to the area upon completion of dredging. Sight feeders such as cormorants could be hindered by increased turbidity in the immediate area of the dredge and, if so, would temporarily avoid this area.

Disposal into a CDF or CAD disposal site would not affect any upland bird species. Some open-water species of waterfowl (e.g., loons, grebes, and mergansers) could be temporarily impacted if the dredging occurs during their winter migration season. This effect would not be significant because of the extensive amount of other open-water habitats available. Gulls and similar species could be attracted to the disposal area for feeding purposes.

Dredged material may be disposed of at the Elliott Bay PSDDA disposal site or a CDF or CAD site, or Landfill. Dredging and disposal of dredged materials would not impact terrestrial biological resources.

Facility Improvements

Most of the PSNS site is developed with very little terrestrial habitat for wildlife. Buildings, piers, and roadways dominate the area, and the habitat is limited to a few landscaped trees, shrubs, and curbside lawn. The waterfront area of PSNS consists primarily of riprap, concrete bulkheads, and old wooden piers where the proposed pier would be built. There are no streams or wetlands adjacent to the facility or at a permitted landfill (e.g., Olympic View). Consequently, populations of birds, mammals, reptiles, and amphibians at PSNS are low. Homeporting no additional CVNs would result in no additional impacts to wildlife, upland vegetation, and coastal wetlands than existing conditions.

Operations

Impacts to terrestrial biological resources could include impacts associated with fuel spills or accidental discharges of wastes from ships or facility equipment. A chemical or oil spill during material transfer or ship fueling in the project area, although unlikely, has the potential to reach sensitive feeding areas of shallow waters and wildlife habitats. Such a spill could have a direct effect on birds that feed exclusively on fish. It could also affect the food chain and food sources upon which other species are dependent. Generally, impacts to terrestrial wildlife and birds from fuel spills are temporary. The Navy has spill contingency plans in place to minimize the potential for spills and provide proper measures for containment and clean up.

Homeporting of no additional CVNs would not affect the threatened bald eagle or marbled murrelets. Although bald eagles winter throughout the Puget Sound area from about October 31 through March 31, there are no nesting areas that would be impacted because they are far removed from proposed dredging areas or facility improvements. In general, eagles typically avoid the area of PSNS because of the human activity already occurring there As described for marine birds in general, bald eagles and marbled murrelets are likely to avoid the immediate area during dredging activities, with an insignificant effect on feeding success for this species. The food supply for the birds in this area is expected to return to normal soon after dredging activities conclude. No significant bioaccumulation of contaminants in birds associated with the dredging project would occur. Thus, this project would not affect local populations of bald eagle or marbled murrelets in Puget Sound.

4.6.2.2 *Facilities for One Additional CVN and Relocation of four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging, Facility Improvements, and Operations

Impacts to terrestrial biological resources from dredging and facility improvements would be the same as those described in section 4.6.2.1. Operations impacts under this action would be less than those described in section 4.6.2.1. A net loss of three ships moving in and out of PSNS would result in fewer impacts to terrestrial resources than under the existing condition.

4.6.2.3 *Facilities for One Additional CVN and Relocation of two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging, Facility Improvements, and Operations

Impacts to terrestrial biological resources from dredging and facility improvements would be the same as those described in section 4.6.2.1. Operations impacts under this action would be less than those described in section 4.6.2.1, but greater than described in section 4.6.2.2. A net loss of one ship moving in and out of PSNS would result in fewer impacts to terrestrial resources than the existing condition.

4.6.2.4 *One Additional CVN: Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging, Facility Improvements, and Operations

Because dredging and facility construction would not occur under this action, no impacts to terrestrial wildlife would occur. Operational impacts to terrestrial biological resources occurring under this action are expected to be the same as those described in section 4.6.2.1.

4.6.2.5 *Mitigation Measures*

Impacts associated with dredging, facility improvements, and operations for the proposed project would not result in significant effects on terrestrial biological resources. Only short-term temporary displacement during construction activities may occur for some species. No mitigation measures are proposed.

4.7 LAND USE

4.7.1 Affected Environment

This section describes existing land uses and land use plans for PSNS, for the general region, and for the City of Bremerton.

4.7.1.1 PSNS

PSNS is an intensively developed naval installation with various activities competing for a limited amount of space. PSNS includes 344 acres of developed upland area and 336 acres of submerged tidelands for a total of 680 acres. A separate Naval installation, the Fleet and Industrial Supply Center (FISC), consists of approximately 28 acres surrounded by PSNS. The FISC is located on the PSNS waterfront between Piers B and D. Together, PSNS and FISC (and their numerous remote sites and tenant activities) are referred to as Bremerton Naval Complex (DON 1989, 1995b).

Master Plan – Bremerton Naval Complex (DON 1989) identifies three functional areas at PSNS: the Controlled Industrial Area (CIA), the Military Support Area (MSA), and the Industrial Support Area (ISA). Each area includes a variety of land uses, which are summarized below.

The CIA is in the waterfront area of the eastern half of PSNS. This is the high-security portion of PSNS where most industrial production takes place. The CIA includes waterfront areas, piers, drydocks, production shops, administration, and some public works and supply functions.

The MSA is in the upland area of the northwestern portion of PSNS. The MSA provides a wide range of community services to military personnel including housing, retail goods and services, recreation, counseling, dental care, and other support services.

The ISA, which is located in the southwestern portion of PSNS, contains an assortment of industrial support functions including the power plant, warehousing, steel yard, public works shops, and parking. The ISA also contains the Naval Inactive Ship Maintenance Facility (NISMF), which occupies the southwestern waterfront area including moorings E, F, and G.

The additional CVN homeporting site at PSNS site is located along the waterfront in the western portion of PSNS at Pier D adjacent to the ISA and the FISC. Pier D was previously part of the NISMF, but was recently upgraded to serve as an AOE home port (DON 1995b).

Explosive Safety Quantity Distance (ESQD) considerations do not create major siting constraints at PSNS, because DON and PSNS directives require all munitions except those required for security and safety at sea (pyrotechnics) to be off-loaded prior to arrival at shipyards for overhaul. To off-load and on-load small quantities of security and safety munitions, 100-foot-radius ESQD arcs are designated. Buildings designed to be occupied by humans cannot be constructed within these arcs. The ESQD arcs at PSNS are located on Pier B, Piers 3 through 7, and Drydock #6.

4.7.1.2 City of Bremerton

The *City of Bremerton Comprehensive Plan – Land Use Element* (1995) designates the planned land use for the PSNS as "Heavy Industrial." Current PSNS land uses, except for housing and other support services in the MSA, are consistent with that designation. The city, however, does not have jurisdiction over land use decisions on federal lands.

Various Bremerton neighborhoods border the landside boundary of PSNS. The Bremerton central business district lies adjacent to the northeastern portions of PSNS. Urban land uses in this area of Bremerton are largely commercial. Other Bremerton neighborhoods adjacent to PSNS are residential to the north and a combination of commercial and mixed use to the west. Zoning in these areas is compatible with current land uses (City of Bremerton 1991).

The nearest portions of the City of Bremerton to the proposed action at Pier D in the southwestern portion of PSNS are the commercial areas west of State Highway 304 and north of Farragut Street located along the PSNS boundary, approximately 1,500 feet west and northwest of Pier D.

4.7.1.3 Regional Land Use

Those most involved in land use planning for the region are the Puget Sound Council of Governments (PSCOG) and the planning departments of Kitsap County and the City of Bremerton. Regional planning for the Puget Sound area is the responsibility of the PSCOG, which includes representatives of local governments from Kitsap, King, Pierce, and Snohomish counties.

PSNS is located in Kitsap County, which is predominately rural in character. Approximately 80 percent of Kitsap County's total area is either forested, farmed, or undeveloped. The developed lands are confined primarily to cities, surrounding unincorporated areas, and shorelines. Most development is clustered around Bremerton, Port Orchard, Winslow, Poulsbo, Gorst, Silverdale, Keyport, and Kingston. Although residential land uses predominate in developed areas, other land uses include industrial, commercial, parkland, and public facilities.

Under the State of Washington's Growth Management Act, Kitsap County has prepared a comprehensive plan that seeks to concentrate future development in urban areas and preserve rural and forest lands. PSNS and surrounding lands are well within the urban growth boundaries established by the plan. The plan proposes future commercial and residential developments around existing cities and towns including Silverdale, Bremerton, Port Orchard, and Poulsbo. Some residential land is also designated in Kingston and other smaller communities and along the shore of the Hood Canal and Puget Sound. Forest and rural land in the extreme north section of the county, as well as the southern and southwestern sections, are to be preserved.

The Navy has several installations in Kitsap County in addition to the Bremerton Naval Complex, including Submarine Base Bangor, Naval Undersea Warfare Engineering Station in Keyport, Jackson Park Housing, Naval Hospital Bremerton, Camp Wesley Harris, and Camp McKean at Kitsap Lake.

The federal *Coastal Zone Management Act* (CZMA) of 1972 requires, that "Any federal agency which shall undertake any development project in the coastal zone of a state shall insure that the project is, to the maximum extent practicable, consistent with the enforceable policies of approved State management programs." (Chapter 33 Title 16, U.S.C. Section 1456(c)) The State of Washington's *Shoreline Management Act* (SMA) of 1971 (Chapter 90.58 RCW), which was approved under the CZMA in 1974, established a generalized set of shoreline environments and developed standards for evaluating shoreline uses for consistency with those environments. In accordance with the State SMA, the City of Bremerton adopted a *Shoreline Master Program* (SMP) in 1976 (last amended, 1992), which includes goals, policies, and regulations relating to development in all shoreline areas within Bremerton's jurisdiction.

Federal actions on federal lands are exempt from state or local permitting requirements. The U.S. Navy, however, would ensure that all actions at PSNS are consistent with the State SMA and the Bremerton SMP to the maximum extent practicable. To document the degree of consistency, preparation of a Coastal Consistency Determination (CCD) is required when a federal project could have a direct effect on the coastal zone. The CCD provides a description of the proposed action, identifies each relevant policy of the State SMA, discusses the proposed action's consistency with each of those policies, and, where applicable, describes measures, which when implemented would result in project consistency with the policies.

4.7.2 Environmental Consequences and Mitigation Measures

Significance Criteria

A land use impact is significant if one or more of the following result:

- Inconsistency and/or conflict with environmental goals, objectives, or guidelines of the *Master Plan - Bremerton Naval Complex* (DON 1989);
- Incompatibility with existing land uses on site; or
- Incompatibility with surrounding land uses.

4.7.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)*

Alternatives Two, Three, and Four would include dredging of turning basins plus Pier D replacement.

Dredging

As explained in Chapter 2, approximately 425,000 cy of dredging would be required. The dredging, which would be mostly in the vicinities of Piers D and B with a lesser amount at Pier 3, would permit deeper-draft ships to safely navigate the turning basins and berth at the piers. The presence of deeper-draft ships would not constitute a significant change in use of the berthing facilities. Therefore, no dredging-related land use impacts would occur.

Facility Improvements

As explained in Chapter 2, replacement of Pier D would be required. The existing pier, which is 60 feet wide and 1,150 feet long, serves as home port for two AOEs and as an alternate CVN berth. The new Pier D, which would be up to 150 feet wide and 1,310 feet long, would be designated as the CVN home port berth. This change in size of the pier and the resulting change in the class of ship homeported at the pier would not constitute a significant change in land use. Therefore, construction would result in a less than significant adverse land use impact.

Operations

No change in operations would result. Therefore, no operational land use impacts would occur.

4.7.2.2 *Facilities for One Additional CVN and Relocation of four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One would include dredging of turning basins plus Pier D replacement.

Dredging

Development of one additional CVN home port at PSNS would require approximately 425,000 cy of dredging, mostly in the vicinities of Piers D and B, with a lesser amount at Pier 3. The dredging would permit deeper-draft ships to safely navigate the turning basins and berth at the piers. The presence of deeper-draft ships would not constitute a significant change in use of the berthing facilities. Therefore, the dredging would result in a less than significant adverse land use impact.

Facility Improvements

Replacement of Pier D to provide a home port for one additional CVN would be required. The existing pier, which is 60 feet wide and 1,150 feet long, serves as home port for two AOEs. The new Pier D, which would be up to 150 feet wide and 1,310 feet long, would provide two CVN home port berths. This change in size of the pier and the resulting change in the class of ships able to use the pier would not constitute a significant change in land use. Therefore, construction would result in a less than significant adverse land use impact.

Operations

Elimination of the AOE home port function at Pier D and replacement of the pier to create a CVN home port would be a change in operations, but it would not constitute a significant change in use. Furthermore, it would not result in any incompatible land uses in the vicinity of Pier D, and it would be consistent with *Master Plan - Bremerton Naval Complex* (DON 1989). Therefore, the change in operations at Pier D would not constitute an adverse land use impact.

The AOE berthing function at Pier 4, which is used whenever more than two AOEs are in PSNS at the same time, would also be eliminated. Pier 4 is within the CIA, which is a high-security maintenance area not intended for ship berthing or homeporting. Removal of all four AOEs from PSNS would eliminate the need to berth AOEs within the CIA and would make Pier 4 available for its intended industrial function. This would bring use of Pier 4 into accord with its designated use as specified in *Master Plan - Bremerton Naval Complex* (DON 1989). This would be considered a beneficial land use impact.

4.7.2.3 *Facilities for One Additional CVN and Relocation of two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five would include dredging of turning basins plus Pier D replacement.

Dredging

Development of one additional CVN home port at PSNS would require approximately 425,000 cy of dredging, mostly in the vicinities of Piers D and B, with a lesser amount at Pier 3. The dredging would permit deeper-draft ships to safely navigate the turning basins and berth at the piers. The presence of deeper-draft ships would not constitute a significant change in use of the berthing facilities. Therefore, dredging would result in a less than significant adverse land use impact.

Facility Improvements

Replacement of Pier D to accommodate one additional CVN home port would be required. The existing pier, which is 60 feet wide and 1,150 feet long, provides home port berths for two AOEs. The new Pier D, which would be up to 150 feet wide and 1,310 feet long, would provide home port berths for two CVNs. This change in size of the pier and the resulting change in class of ships able to use the pier would not constitute a significant change in land use. Therefore, construction would result in a less than significant adverse land use impact.

Operations

Elimination of the AOE home port function at Pier D and replacement of the pier to create two CVN home port berths would be a change in operations, but it would not constitute a significant change in use. Furthermore, it would not result in any incompatible land uses in the vicinity of Pier D; and it would be consistent with *Master Plan - Bremerton Naval Complex* (DON 1989). Therefore, the change in operations at Pier D would not constitute an adverse land use impact.

Currently, two AOE home port berths are provided at Pier D for the four AOEs homeported at PSNS. When more than two AOEs are in port, one or two AOEs are berthed at Pier 4 in the CIA. With one additional CVN and relocation of two AOEs, Pier D or Pier 4 would be the designated AOE home port. This however, would not necessarily increase use of Pier 4 by AOEs, because two AOEs could still be berthed at Pier D whenever one of the CVNs was not in home port. Even though actual use of Pier 4 by AOEs may not be more frequent than at present, designation of Pier 4 as an AOE home port conflicts with *Master Plan - Bremerton Naval Complex* (DON 1989), which includes Pier 4 as part of the CIA, a high-security maintenance area not intended for berthing of homeported ships. This conflict with the Master Plan, however, is not different from the existing situation. Therefore, it would not be a significant land use impact of this action.

4.7.2.4 One Additional CVN: Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

No dredging would be required. Therefore, no dredging-related land use impacts would occur.

Facility Improvements

No construction would be required. Therefore, no construction-related land use impacts would occur.

Operations

Homeporting two CVNs and four AOEs at PSNS with no new construction would utilize existing berthing facilities to their limit, but the ships themselves could be berthed without significant land use impacts. PSNS, however, does not have the infrastructure capacity to properly accommodate two CVNs, four AOEs, and their crews without construction of additional land-based facilities (electrical power, parking, and crew quality-of-life amenities). Furthermore, PSNS does not have available undeveloped land to build the necessary facilities. This is an important consideration, but it would not be a land use impact, because construction of additional facilities is not proposed. If no construction occurs, no impact on land use would occur. Please refer to section 4.14 (General Services/Access) and section 4.16 (Utilities) for additional consideration of this issue.

4.7.2.5 *Mitigation Measures*

Because land use impacts would be less than significant, no mitigation is provided.

4.8 SOCIOECONOMICS

4.8.1 Affected Environment

PSNS is located in Kitsap County, Washington, bordered by the City of Bremerton. Kitsap County is located at the northern end of the Kitsap Peninsula, across the Puget Sound from the City of Seattle. Bremerton is the largest city in Kitsap County. Other regional cities include Port Orchard, Poulsbo, Silverdale, and Winslow.

Kitsap County is part of the Central Puget Sound Region that includes King, Kitsap, Pierce, and Snohomish counties. The population of this region reached 3.05 million in 1996. In the first half of the 1990s, the population grew at an average of 1.9 percent, significantly slower than the growth rate of 2.6 percent per year in the previous 5 years (U.S. Bureau of Economic Analysis, Regional Economic Information System 1995).

Historically, the population of Kitsap County has fluctuated with the number of ships being repaired at PSNS. In 1995, Kitsap County had a net in-migration of 5,700 persons, increasing the population to an estimated 220,600. Between 1991 and 1995, the population in Kitsap County grew at 3.06 percent per year.

Local Economy

Over the last year the economy of Kitsap County has remained depressed. Non-farm employment in the first quarter of 1997, approximately 69,400 workers, has remained unchanged from 1996 (U.S. Department of Housing and Urban Development, Economic Report, First Quarter 1997). The military and federal government activities in the county are the largest component of its economy. PSNS has been downsizing its civilian force over the last 4 years, resulting in a loss of 4,000 jobs. The federal government employment represented 38.2 percent of total employment in 1996, and is currently 36.7 percent as it continues to downsize. Manufacturing jobs are approximately the same as the previous year. The unemployment rate is currently at 6.8 percent, which is higher than the statewide average of 5.4 percent.

Of total non-farm employment in Kitsap County, the share contributed by military personnel has fluctuated over the period 1970 through 1995. In 1970, military personnel comprised 19.1 percent of the total county employment. This share fell to 13.5 percent in 1980, rose to 15.1 percent in 1990 and fell again to 14.6 percent in 1995. The contribution made to total employment by federal civilian employment fell over this same time period: 31.5 percent in 1970, 26.7 percent in 1980, 20.5 percent in 1990, and 15.6 percent in 1995.

Housing

The Bremerton housing sales market reflects the weak economy. The number of sales are declining and prices are down. In the first quarter of 1997, the median sales price was $128,000. Housing permit activity declined slightly in 1996 from the previous year. A total of 1,540 residential permits were issued in Kitsap County in 1996; 1,280 in 1995; and 1,585 in 1994.

There was a high availability of rental housing in the first part of 1997 due to the construction of 800 new Navy housing units, with 560 units for Navy families. As a result, rental prices have only increased 1 percent since 1996. Housing prices did not increase from the previous period. The overall vacancy rate is 8.5 percent, up slightly from the last quarter of 1996. The vacancy rate was 6 percent in 1996. Only 250 multi-family housing units were permitted in the county in 1996, compared to 274 units in 1995.

Government-owned family housing assets for personnel stationed at Naval Complex Bangor/Bremerton numbered 1,623 military family housing (MFH) units in 1996. Of these units, 191 were designated officer housing with the remaining 1,432 designated for enlisted personnel. Of the 1,623 units, 677 were one- and two-bedroom units, 646 were three-bedroom units and the remaining 300 were four-bedroom units.

The military family housing deficit stood at 993 units in 1996 and is anticipated to decline to 917 by the year 2001.

Schools

The U.S. Department of Education provides federal impact aid in the form of basic support payments for school districts where there are at least 400 federally connected students or where 3 percent of the average daily attendance is federally connected. Basic support payments are made for dependents living with military or civilian employees who are working for or assigned to federal military installations. The minimum eligibility requirement for funding off-base civilian students is 1,000 students and at least 10 percent of average daily attendance.

Kitsap County contains five school districts: Central Kitsap, North Kitsap, South Kitsap, Bremerton, and Bainbridge Island. Military dependent students attend schools throughout the county. Table 4.8-1 presents summary data for these five districts.

Table 4.8-1. Fall Enrollments and Federal Impact Aid for School Districts

School District	*Enrollment 1995*	*Enrollment 1996*	*Enrollment 1997*	*Navy Dependents* [1]	*Federal Impact Aid Funding*
Central Kitsap School District	13,162	13,652	13,712	3,874	$2,592,095
North Kitsap School District	6,833	6,879	6,953	1,835	$539,889
South Kitsap School District	11,413	11,686	11,713	1,063	$195,924
Bremerton School District	5,969	5,962	5,986	1,534	$105,000
Bainbridge Island School District	3,241	3,445	3,545	105	none

Note: 1. Navy dependents are reported for 1996, except for Bainbridge Island School District where they are reported for 1995, the last year in which the school district completed a federal impact aid survey.

Central Kitsap School District has 13 elementary schools, three middle schools, three senior high schools, and one secondary school (grades 7-12). Total enrollment in autumn 1997 was 13,712 students. The school district projects that enrollments will increase by 2 percent annually over the next 5 years. The district is currently operating its elementary schools at 115 percent of capacity, middle schools at 100 percent of capacity, senior high schools at 114 percent of capacity, and its secondary school at 103 percent of capacity. Navy dependents comprised 3,874 students or 28.4 percent of total enrollments in 1996. Federal impact aid comprised $2,592,095 in the 1996-97 school year, including $310,752 for special education.

North Kitsap School District has seven elementary schools, two middle schools, and two high schools, including one alternative high school. Total enrollment in autumn 1997 was 6,953 students. The school district projects that enrollments will increase by 2.5 percent annually over the next 5 years. The district is currently operating at approximately 117 percent of capacity for elementary schools, is at 100 percent of capacity for middle schools, and is at 118 percent of capacity for high schools. Navy dependents comprised 1,835 students or 26.7 percent of total enrollments in 1996. The district received $539,889 of federal impact aid in 1996.

South Kitsap School District has 10 elementary schools, three junior high schools, one senior high school, and three alternative education schools. Total enrollment in autumn 1997 was 11,713 students. The school district estimates that enrollments will increase by 1 percent to 3 percent annually over the next 5 years. The district is currently operating at approximately 109 percent of capacity for elementary schools, 118 percent of capacity for junior high schools, and 114 percent of capacity for high schools. Navy dependents comprised 1,063 students or 9.1 percent of total enrollments in 1996. Federal impact aid comprised $195,924 in 1996.

Bremerton School District has seven elementary schools, two middle schools, and two high schools. Total enrollment in autumn 1997 was 5,986 students. The school district projects that enrollments will increase by 2 percent annually over the next 5 years. The district is currently operating its elementary schools at approximately 89 percent of capacity, middle schools at 103 percent of capacity, and its high schools at 81 percent of capacity. Navy dependents comprised 1,534 students or 25.7 percent of total enrollments in 1996. Federal impact aid comprised $105,000 in 1996.

Bainbridge Island School District has three elementary schools, one middle school, and one high school. Total enrollment in autumn 1997 was 3,545 students. The school district anticipates that enrollments will increase by 2.3 percent annually over the next 5 years. The district is currently operating at approximately 137 percent of capacity for elementary schools, 121 percent of capacity for middle schools, and 126 percent of capacity for high schools. The most recent year for which the school district completed the federal impact aid survey was 1995, when there were 105 Navy dependents (approximately 3.2 percent of total enrollments). The school district received no federal impact aid in 1996.

4.8.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Socioeconomic impacts would be significant if one or more of the following occur as a result of project implementation:

- Direct and indirect civilian jobs created by the action cannot be filled by the current population and cause a major in-migration of new residents.
- Changes in demand in the housing market are substantial enough to cause dislocation in the market, reflected by accelerated price increase and decrease and vacancy rates below or above historic levels.
- Educational resources are burdened to the point that the overall quality of these services declines.

4.8.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging

EMPLOYMENT

The dredging and disposal of approximately 425,000 cubic yards (cy) of sediment would take place over approximately 10 months and involve an estimated 25-person workforce drawn from the existing local labor market. Impacts on regional employment would be less than significant.

POPULATION

Labor requirements would be drawn from the existing local labor market and would not involve in-migration of additional workers. Thus, no change in regional population would occur and impacts on regional population levels would be less than significant.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian housing market.

SCHOOLS

Dredging and mitigation site construction would be temporary. Local labor would be used for this activity, so no increase in school enrollments or impacts to schools would occur.

Facility Improvements

EMPLOYMENT, POPULATION, AND HOUSING

The labor requirement associated with the demolition and replacement of existing Pier D and required upgrades to the electrical system would be drawn from the existing local labor market. Impacts on regional employment would be less than significant.

SCHOOLS

Facility improvements construction would be temporary. Local labor would be used for this activity, so no increase in school enrollments or impacts to schools would occur.

Operations

EMPLOYMENT

The decommissioning of two CGNs currently stationed at PSNS, though not a part of the proposed action under consideration here, will have a direct effect on base loading capacity related to this project. The effects on personnel levels of this decommissioning are included in the analysis for completeness.

The decommissioning of the two CGNs could have either a beneficial or adverse effect when considered with the various actions under assessment. Where an action results in additional activity at PSNS and increased employment, the decommissioning action would dampen the potential surge in growth. Alternatively, where there would be a reduction in activity levels and employment at PSNS, the decommissioning could exacerbate potential adverse effects.

This action would not see the addition or removal of vessels other than the decommissioning of the two CGNs (with 1,200 military personnel) planned in 1998 and 1999.

Permanent staff at PSNS numbered 13,921 in 1996 and are projected to reach 15,496 by the year 2001. A decrease of 1,200 personnel would represent 8.6 percent of the 1996 personnel level and 7.7 percent of the 2001 personnel level. Such a net future decrease of 1,200 personnel represents 1.1 percent of the full- and part-time employment in 1995 in Kitsap County. From 1990 through 1995, employment in the county increased by 1,475 jobs per year. A potential reduction of 1,200 military jobs represents less than 1 year's worth of employment growth. A decrease of this magnitude in military personnel could also be accompanied by a reduction in the federal civilian workforce at PSNS, which could create further reductions in secondary civilian employment. This reduction in regional employment could create dislocations in the local labor market. Although such dislocations could have adverse impacts, they are not dissimilar to ones that have occurred in the past and are not considered significant.

POPULATION

The net decrease of 1,200 assigned military personnel resulting from this action and CGN decommissioning would also result in a decrease in an estimated 1,141 dependents, resulting in a direct population loss of 2,341 persons.

The departure of 2,341 military personnel and their dependents would represent 1.0 percent of the estimated population of Kitsap County in 1996. Further, this reduction would amount to about one-third of the average annual gain in population that occurred in the county between 1990 and 1996. When potential reductions in civilian employment are taken into consideration with the possible out-migration of workers and their families, fluctuations in regional population would occur. Although potentially adverse impacts could be associated with such fluctuations, they would not be significant.

HOUSING

With a potential decrease in the number of both accompanied and unaccompanied personnel, both government- and civilian-owned housing units would be vacated. The departure of unaccompanied personnel would result in a lower occupancy rate in BOQ and BEQ facilities and especially apartment buildings in the surrounding communities.

Accompanied military personnel would occupy both military family housing and housing in surrounding communities. The decrease in demand for family housing would result in an estimated 528 vacant units. Vacated military family housing units would be filled by personnel who currently reside in surrounding communities but who prefer to live in military family housing. Should this potential shift be inadequate to fill all military family housing vacancies, it is possible that other personnel currently residing in civilian housing would be assigned to government housing. Thus, the major effect of the reduction in housing demand would be experienced in the private housing market.

If the entire reduction in demand for housing would be concentrated in the civilian housing market, the vacating of 528 units would increase the 1996 vacancy rate in the region from 10.0 percent to 10.3 percent. From 1990 through 1996, the number of housing units in Kitsap County increased annually by an average of 2,816 units. The availability of 528 units would reduce the need for new construction, but not substantially. This potential decrease in demand would be a less than significant change and impact.

SCHOOLS

Under this action, in association with projected baseline conditions (decommissioning of two CGNs), enrollments would be potentially reduced by 276 students, including a loss of 127 students in the Central Kitsap School District, 60 students in the North Kitsap School District, 35 students in the South Kitsap School District, 50 students in the Bremerton School District, and 4 students in the Bainbridge School District. These potential net future losses would be offset by projected baseline growth within 1 to 2 years in all districts, slightly reducing the rate of growth in the school districts. Net future enrollment reductions would be a beneficial impact, especially since schools in all five districts are or are expected to be operating at or over capacity, with the exception of Bremerton School District elementary schools and high schools that are currently operating at 89 and 81 percent of capacity, respectively. Table 4.8-2 presents enrollment effects for the PSNS homeporting actions.

Table 4.8-2. Projected Enrollment Changes by School District

Action	*Central Kitsap School District*	*North Kitsap School District*	*South Kitsap School District*	*Bremerton School District*	*Bainbridge Island School District*	*Total Change*
No Additional CVN	(127)	(60)	(35)	(50)	(4)	(276)
One Additional CVN and Relocation of four AOEs	(41)	(19)	(11)	(16)	(1)	(88)
One Additional CVN and Relocation of two AOEs	87	41	24	34	2	188
No Action Alternative: One Additional CVN	214	101	59	85	6	465

Note: Parentheses indicate a net future reduction of students with implementation of an alternative.

4.8.2.2 *Facilities for One Additional CVN and Relocation of four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging

EMPLOYMENT

The dredging and disposal of approximately 425,000 cy of sediment would occur over approximately 10 months and involve an estimated 25-person workforce. These workers would be drawn from the existing local labor market. Impacts on regional employment would be less than significant due to the relatively small numbers of employees.

POPULATION

Labor requirements would be drawn from the existing local labor market and would not involve in-migration of additional workers. Therefore, no change in regional population is anticipated and no adverse impacts on regional population levels would occur.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian housing market.

SCHOOLS

Dredging and mitigation site construction would be temporary. Local labor would be used for this activity, so no increase in school enrollments or impacts to schools would occur.

Facility Improvements

EMPLOYMENT

Facility improvements would include the demolition and replacement of existing Pier D and electrical upgrades to new Pier D. This construction activity would employ approximately 100 workers from the existing local labor market for approximately 20 months. Impacts on regional employment would be less than significant due to the relatively small number of employees.

POPULATION

Labor requirements would be drawn from the existing local labor market and would not involve in-migration of additional workers. Therefore, no change in regional population would occur and no adverse impacts on regional population levels would result.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian housing market.

SCHOOLS

Facility improvements construction would be temporary. Local labor would be used for this activity, so no increase in school enrollments or impacts to schools would occur.

Operations

EMPLOYMENT

This action's addition of one CVN (with 3,217 military personnel), relocation of four AOEs (with 2,400 military personnel) and the simultaneous decommissioning of two CGNs (with 1,200 military personnel) from 1998 through 1999 would result in a net decrease of 383 military personnel.

Permanent staff in the Naval Complex Bremerton numbered 13,921 in 1996 and are projected to reach 15,496 by the year 2001. A net future decrease of 383 military personnel would represent only 2.8 percent of the 1996 personnel level and 2.5 percent of the 2001 personnel level. Such a net future decrease of 383 personnel represents only 0.4 percent of the full- and part-time employment in 1995 in Kitsap County. From 1990 through 1995, employment in the county increased by 1,475 jobs per year. A potential net future reduction of 383 military jobs represents less than 1 year's worth of employment growth. This net future decrease in military personnel could also be accompanied by a reduction in the federal civilian workforce at PSNS that could create further reductions in secondary civilian employment. The potential magnitude of such net reductions in the civilian workforce would not create major dislocations in the local labor market. No significant impacts would occur.

POPULATION

The net future decrease in the number of 383 assigned military personnel would be associated with a decrease of 364 accompanying dependents, resulting in a direct population loss of 747 persons.

The departure of 747 military personnel and their dependents would represent less than 1.0 percent of the estimated population of Kitsap County in 1996. Further, such a reduction represents only 10.7 percent of the average annual gain in population that occurred in the county between 1990 and 1996. Even when potential reductions in civilian employment are taken into consideration with the possible out-migration of workers and their families, impacts to population in the county would be less than significant.

HOUSING

With a decrease in the number of both accompanied and unaccompanied personnel, both government- and civilian-owned housing units would be vacated. The departure of unaccompanied personnel would result in a lower occupancy rate in BOQ and BEQ facilities and especially apartment buildings in surrounding communities.

Accompanied military personnel would occupy both military family housing and housing in surrounding communities. The decrease in demand for family housing would result in an estimated 169 vacant units. Vacated military family housing units would be filled by personnel who currently reside in surrounding communities but who prefer to live in military family housing. Should this potential shift not be adequate to fill all military family housing vacancies, other personnel currently residing in civilian housing would potentially be assigned to government housing. Thus, the major effect of the reduction in housing demand would be experienced in surrounding civilian communities.

Assuming that the entire reduction in demand for housing would be concentrated in the civilian housing market, the vacating of 169 units would increase the 1996 vacancy rate in the region from 10.0 percent to 10.1 percent. From 1990 through 1996, the number of housing units in Kitsap County increased by an annual average of 2,816 units. The availability of 169 units would reduce the necessity for new construction, but not to a major degree. This relatively small decrease in demand would be a less than significant change and impact.

SCHOOLS

Under this action, in association with projected baseline conditions (decommissioning of two CGNs), enrollments would be reduced by an estimated 88 students, which includes a loss of 41 students in the Central Kitsap School District, 19 students in the North Kitsap School District, 11 students in the South Kitsap School District, 16 students in the Bremerton School District, and one student in the Bainbridge School District. These net future potential losses would be minimal, and would have a negligible affect on the rate of growth in these districts. Impacts would be less than significant.

4.8.2.3 *Facilities for One Additional CVN and Relocation of two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

EMPLOYMENT

The dredging and disposal of approximately 425,000 cy of sediment would take place over approximately 10 months and involve an estimated 25-person workforce drawn from the existing local labor market. In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian employment market.

POPULATION

Labor requirements would be drawn from the existing local labor market and would not involve in-migration of additional workers. In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional population levels.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian housing market.

SCHOOLS

Dredging and mitigation site construction would be temporary. Local labor would be used for this activity, so no increase in school enrollments or impacts to schools would occur.

Facility Improvements

EMPLOYMENT

Effects would not be significant and would be identical to those described in section 4.8.2.2.

POPULATION

Labor requirements would be drawn from the existing local labor market and would not involve in-migration of additional workers. In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional population levels.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian housing market.

SCHOOLS

Facility improvements construction would be temporary. Local labor would be used for this activity, so no increase in school enrollments or impacts to schools would occur.

Operations

EMPLOYMENT

The addition of one CVN (with 3,217 military personnel) and loss of two AOEs (with 1,200 military personnel) resulting from this action and associated with decommissioning of two CGNs (with 1,200 military personnel), would result in a net future increase of 817 military personnel.

Permanent military personnel in the Naval Complex Bremerton numbered 13,921 in 1996 and are projected to reach 15,496 by the year 2001. A net future increase of 817 personnel would represent only 5.9 percent of the 1996 personnel level and 5.3 percent of the 2001 personnel level. Such a net future increase of 817 personnel represents only 0.8 percent of the full- and part-time employment in 1995 in Kitsap County. From 1990 through 1995, employment in the county increased by 1,475 jobs per year. A potential increase of 817 military jobs represents less than 1 year's worth of employment growth. An increase in military personnel could also be accompanied by a rise in the federal workforce at PSNS, which could create further increases in secondary civilian employment. The potential magnitude of such increases in the civilian workforce would result in less than significant impacts to the local labor market.

POPULATION

The net future increase of 817 assigned military personnel would also result in an increase in accompanying dependents. This net increase would be an estimated 777 persons, resulting in a direct population gain of 1,594 persons.

A net future increase of 1,594 military personnel and their dependents would represent less than 1.0 percent of the estimated population of Kitsap County in 1996. This increase would represent 22.8 percent of the average annual gain in population that occurred in the county between 1990 and 1996. Even when potential increases in civilian employment are taken into consideration with the possible in-migration of workers and their families, impacts to population in the county would be less than significant.

HOUSING

With a potential increase in the number of both accompanied and unaccompanied personnel, the demand for both government- and civilian-owned housing units would increase. The arrival of unaccompanied personnel would result in higher occupancy rates in BOQ and BEQ facilities and especially apartment buildings in surrounding communities.

Accompanied military personnel would desire to occupy both military family housing and housing in surrounding communities. The demand for family housing would increase by 359 units. This would add to the existing demand for military family housing and lengthen waiting lists for these assets. Given the short supply of military family housing compared to the current demand, the major effect of the increased demand would be experienced in the housing market in surrounding civilian communities.

Assuming that the entire increase in demand for housing would be concentrated in the civilian housing market, the need for 359 units would decrease the 1996 vacancy rate in the region from 10.0 percent to 9.8 percent. The net future demand represents under 13 percent of the annual addition made to the housing stock of Kitsap County from 1990 through 1995. Due to the relatively small net increase, this change would be a less than a significant impact.

SCHOOLS

Under this action, in association with projected baseline conditions (decommissioning of two CGNs), enrollments would potentially increase by 188 students, which includes a gain of 87 students in the Central Kitsap School District, 41 students in the North Kitsap School District, 24 students in the South Kitsap School District, 34 students in the Bremerton School District, and two students in the Bainbridge School District. These net future potential enrollment increases would slightly increase the baseline rate of growth in these districts. All of the districts except Bainbridge Island School District report receiving at least some federal impact aid. All of the districts except the Bremerton School District currently receive or plan to implement developer impact fees on new residences. Impacts on schools would be adverse but less than significant, based on the level of the projected changes, the existence of capacity constraints in all of the districts, and the receipt of federal impact aid and developer impact fees.

4.8.2.4 *One Additional CVN: Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

Because no dredging activity is proposed under this action, no adverse effects on employment, population, housing, and schools would occur.

Facility Improvements

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

Because no facility improvements are required for this action, no adverse effects on employment, population, housing, and schools would occur.

Operations

EMPLOYMENT

The addition of one CVN (with 3,217 military personnel) resulting from this action in conjunction with decommissioning of two CGNs (with 1,200 military personnel), would result in a net future increase of 2,017 military personnel.

Permanent military personnel in the Naval Complex Bremerton numbered 13,921 in 1996 and are projected to reach 15,496 by the year 2001. A net future increase of 2,017 personnel would represent only 14.5 percent of the 1996 personnel level and 13.0 percent of the 2001 personnel level. Such a net future increase of 2,017 personnel represents only 2.9 percent of the full- and part-time employment in 1995 in Kitsap County. From 1990 through 1995, employment in the county increased by 1,475 jobs per year. A potential increase of 2,017 military jobs represents about 1-1/2 year's worth of employment growth. An increase in military personnel could also be accompanied by a rise in the federal workforce at PSNS, which could create further increases in secondary civilian employment. The potential magnitude of such increases in the civilian workforce would result in less than significant impacts to the local labor market.

POPULATION

The net future increase of 2,017 assigned military personnel would also result in an increase in accompanying dependents. This net increase would be an estimated 1,918 persons, resulting in a direct population gain of 3,935 persons.

A net future increase of 3,935 military personnel and their dependents would represent 1.8 percent of the estimated population of Kitsap County in 1996. This increase would represent 69.0 percent of the average annual gain in population that occurred in the county in 1995. Even when potential increases in civilian employment are taken into consideration with the possible in-migration of workers and their families, impacts to population in the county would be less than significant.

HOUSING

With a potential increase in the number of both accompanied and unaccompanied personnel, the demand for both government- and civilian-owned housing units would increase. The arrival of unaccompanied personnel would result in higher occupancy rates in BOQ and BEQ facilities and especially apartment buildings in surrounding communities.

Accompanied military personnel would desire to occupy both military family housing and housing in surrounding communities. The demand for family housing would increase by 886 units. This would add to the existing demand for military family housing and lengthen waiting lists for these assets. Given the short supply of military family housing compared to the current demand, the major effect of the increased demand would be experienced in the housing market in surrounding civilian communities.

Assuming that the entire increase in demand for housing would be concentrated in the civilian housing market, the need for 886 units would decrease the 1996 vacancy rate in the region from 10.0 percent to 9.5 percent. The net future demand represents 32 percent of the annual addition made to the housing stock of Kitsap County from 1990 through 1995. Due to the relatively small net increase, this change would be a less than a significant impact.

SCHOOLS

Under this action, in association with projected baseline conditions (decommissioning of two CGNs), enrollments would potentially increase by 464 students, which includes a gain of 215 students in the Central Kitsap School District, 101 students in the North Kitsap School District, 59 students in the South Kitsap School District, 84 students in the Bremerton School District, and five students in the Bainbridge School District. These net future potential enrollment increases would slightly increase the baseline rate of growth in these districts. All of the districts except Bainbridge Island School District report receiving at least some federal impact aid. All of the districts except the Bremerton School District currently receive or plan to implement developer impact fees on new residences. Impacts on schools would be adverse but less than significant, based on the level of the projected changes, the existence of capacity constraints in all of the districts, and the receipt of federal impact aid and developer impact fees.

4.8.2.5 Mitigation Measures

Employment

Because no significant impacts on employment would result, no mitigation measures are provided.

Population

Because no significant impacts on population would result, no mitigation measures are provided.

Housing

Because no significant impacts on housing would result, no mitigation measures are provided.

Schools

Because no significant impacts on schools would result, no mitigation measures are provided.

4.9 TRANSPORTATION

4.9.1 Ground Transportation

The following subsections describe the ground transportation system that provides access to PSNS. Because any substantial change in population or activity at PSNS would result in an increase in the number of commuters and the number of deliveries, there would be a corresponding increase in the volume of traffic (automobiles and trucks) traveling to and from PSNS. The primary objective of the ground transportation analysis is to quantify the change in traffic levels that would occur as a result of the proposed homeporting activities and evaluate the ability of the street and roadway network to accommodate the projected traffic volumes.

4.9.1.1 Affected Environment

The ground transportation system includes the local street and regional highway network in and around Bremerton that provides access to PSNS. The existing conditions relative to this roadway network are described below, and the key streets and highways are illustrated on Figure 4.9-1.

Roadways

Regional access to Bremerton and PSNS is provided by State Routes (SR) 3, 16, and 304. SR 3 is a north-south freeway that runs from Bremerton to Poulsbo along the west side of Dyes Inlet. It is located approximately 1 mile west of PSNS. SR 16 is a north-south freeway that intersects SR 3 south of Bremerton and extends south through Kitsap and Pierce counties to Tacoma. SR 304 intersects with SR 3 and serves as an access route to PSNS along the north side of Sinclair Inlet.

Local access is provided by the street network within the City of Bremerton, which is generally arranged in a grid pattern. The key east-west streets that serve as access routes to and from PSNS are Burwell Street, Sixth Street, and Eleventh Street, which are located north of PSNS, and Farragut Street, Kitsap Way, Arsenal Way, and Loxi Eagans Boulevard, which are located west of PSNS. In addition, the Manette Bridge crosses the Port Washington Narrows in an east-west direction near the northeast corner of PSNS.

The key north-south streets in Bremerton are Cambrian Avenue, Wykoff Avenue, Callow Avenue, and Montgomery Avenue, which are located west of PSNS, and Naval Avenue, Warren Avenue, and Washington Avenue, which are located north of PSNS. The Warren Avenue Bridge crosses the Port Washington Narrows and ties in with Wheaton Way.

SR 304 runs along Cambrian Avenue, Farragut Street, Callow Avenue, Burwell Street, and Washington Avenue (south of Burwell Street to the Bremerton Ferry Terminal). SR 303 runs along Warren Avenue and Wheaton Way. SR 310 runs along Kitsap Way between SR 3 and Bremerton.

Parking is allowed along the curb on most of the city streets, although there are some parking restrictions on the heavily traveled routes to enhance traffic flow.

The functional classification, existing number of travel lanes, and existing daily traffic volumes for each street in the study area are shown in Table 4.9-1 (DON 1995b).

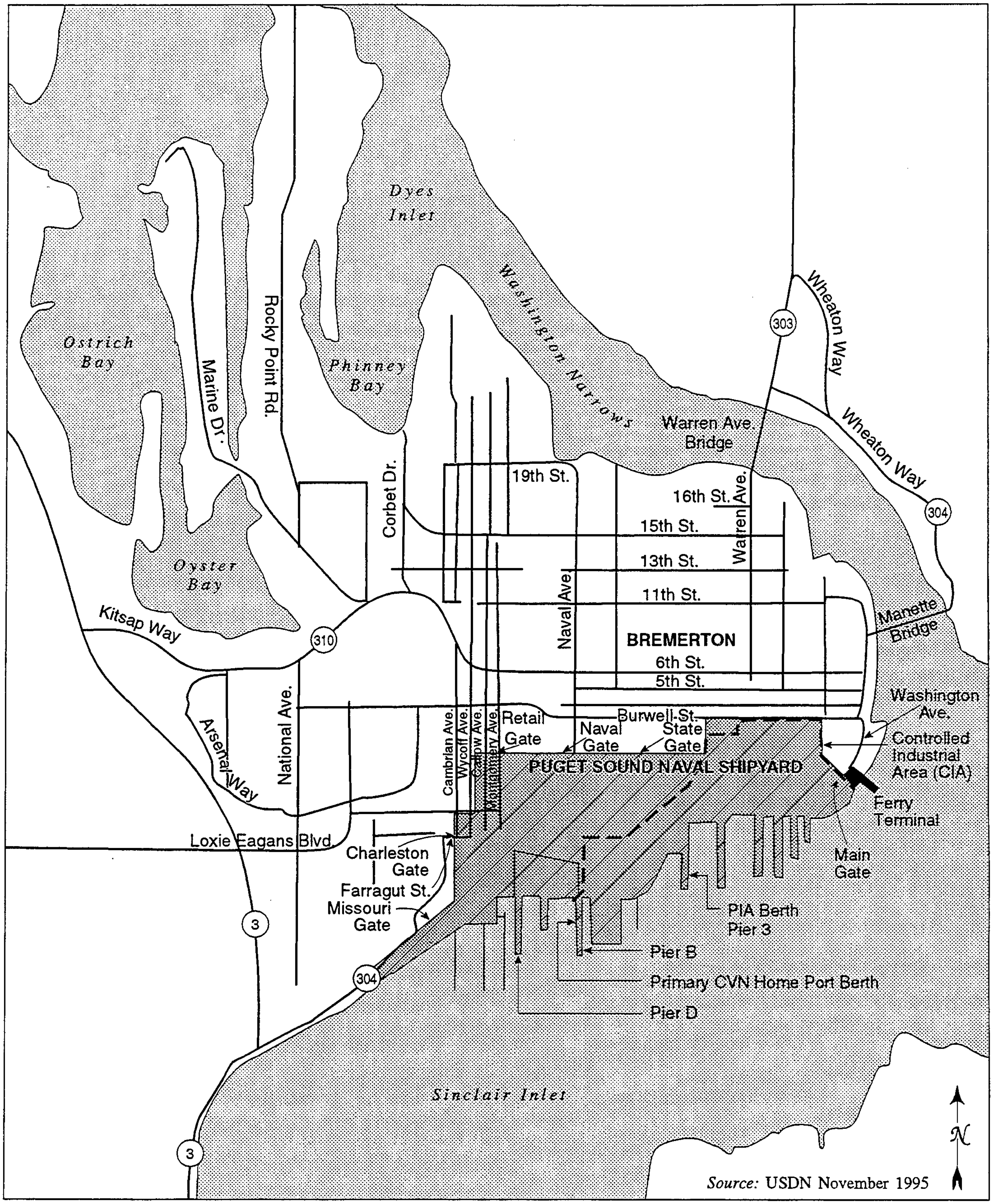

Figure 4.9-1. PSNS Bremerton Ground Transportation Network

Table 4.9-1. Existing Roadway Conditions

Roadway/Location	*Classification*	*Number of Lanes*	*Daily Traffic Volume*
State Route 3			
At Kitsap Way	Freeway	4	31,900
At State Route 304	Freeway	4	21,400
Burwell Street	Principal Arterial	2	15,800
Sixth Street	Minor Arterial	4	19,000
Eleventh Street	Principal Arterial	4/5	24,300
Farragut Street	Principal Arterial	5	27,200
Kitsap Way	Principal Arterial	5	36,700
Arsenal Way	Collector	2	N/A
Loxi Eagans Boulevard	Collector	4	N/A
Cambrian Avenue	Principal Arterial	4/5	30,500
Wykoff Avenue	Local	2	N/A
Callow Avenue	Principal Arterial	2/4	21,800
Montgomery Avenue	Local	2	5,800
Naval Avenue	Minor Arterial	4/5	12,300
Warren Avenue	Principal Arterial	4	33,300
Washington Avenue	Principal Arterial	4	11,500
Wheaton Way	Principal Arterial	5	35,200
Warren Avenue Bridge	Principal Arterial	4	45,700
Manette Bridge	Principal Arterial	2	18,000

Source: DON 1995b.

Traffic Conditions

Twenty-three study-area intersections were analyzed to determine their operating conditions during the afternoon peak periods on a typical weekday, as summarized in Table 4.9-2. Based on peak hour traffic volumes, turning movement counts, and the existing number of lanes at each intersection, the average vehicular delay, volume to capacity (V/C) ratios, and levels of service (LOS) were determined for each intersection using the methodology outlined in the *Highway Capacity Manual* (Transportation Research Board 1994) for signalized intersections. Only the afternoon peak hour is addressed as traffic counts indicate that the morning peak hour has substantially lower traffic volumes.

LOS is a qualitative indicator of an intersection's operating conditions as represented by congestion, delay, and V/C ratio. It is measured from LOS A (excellent conditions, little or no delay) to LOS F (extreme congestion and delay) with LOS D typically considered to be the threshold of acceptability. Table 4.9-2 indicates that all of the 23 intersections are operating at acceptable levels (LOS A through D) during the P.M. peak hour except Kitsap Way/SR 3 ramps.

PSNS currently has five access gates. Naval Gate is at Naval Way and First Street, Charleston Gate is at Farragut Street and Montgomery Avenue, State Gate is at State Avenue and Burwell Street, Main Gate is at Washington Avenue near the ferry terminal, and Missouri Gate is at the southwest corner of the base on SR 304. Based on 1992 traffic counts, the base generates approximately 23,000 vehicle trips per day (inbound and outbound). This is divided among the five gates as follows: Naval Gate – 10,600; Charleston Gate – 8,000; State Gate – 1,800; Main Gate – 500; and Missouri Gate – 2,100.

Table 4.9-2. Existing Intersection Levels of Service

Intersection	P.M. PEAK HOUR	
	Delay (sec) & V/C Ratio	*LOS*
Wheaton/Sylvan	33.3-0.80	D
Wheaton/Sheridan	32.7-0.85	D
Washington/Manette Bridge	9.8-0.75	B
6th/Washington	9.5-0.70	B
Burwell/Washington	11.1-0.50	B
Burwell/Warren	30.3-0.95	D
6th/Warren	15.7-0.75	C
11th/Warren	26.0-0.79	D
16th/Warren	9.0-0.72	B
11th/Naval	12.9-0.61	B
6th/Naval	15.0-0.73	C
Burwell/Naval	17.6-0.83	C
Burwell/Montgomery	8.6-0.62	B
6th/Montgomery	9.1-0.49	B
11th/Callow	13.0-0.60	B
6th/Callow	14.2-0.59	B
Callow/Burwell	15.8-0.74	C
Farragut/Callow	11.9-0.82	B
Cambrian (SR 304)/West Gate	20.7-0.84	C
Loxi Eagans/National	14.3-0.71	B
11th/Kitsap	19.6-0.74	C
Shorewood/Kitsap	8.0-0.61	B
Kitsap/SR 3 Ramps	63.1-1.02	F

4.9.1.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The project's impacts to the ground transportation system would be considered significant if one or more of the following impacts occur:

- Additional traffic generated by the homeporting activities would result in average daily traffic volumes that are above the planned capacity of a roadway segment.
- Additional traffic generated by the homeporting activities would result in an increase of 0.02 or greater in the volume/capacity ratio of an intersection that is projected to operate at LOS E or F.
- Homeporting activities would result in a substantial traffic or parking intrusion.
- Homeporting activities would generate a demand for public transit services that could not be accommodated by the existing or planned transit system.

Impact Methodology

A traffic impact analysis has been conducted to quantify the impacts of the facilities and infrastructure needed to support CVN homeporting on traffic conditions in the vicinity of PSNS. Because there are various development scenarios regarding the distribution of the homeported

CVNs among the four home port locations addressed in this EIS, the traffic analysis considers the various scenarios that would occur at PSNS relative to the number and type of homeported ships, the associated number of personnel, and the resulting level of traffic that would be generated.

The approach for the traffic impact analysis was to quantify the change (increase or decrease) in site-generated traffic volumes that would occur as a result of each development scenario, then analyze the corresponding impacts on traffic conditions on the roadway network that provides access to the base. The controlling factor used to estimate the increase or decrease in site-generated traffic is the number of personnel associated with each scenario. Traffic counts at the PSNS gates indicate that the base, as a whole, generates an average of 1.45 trips per person. This daily trip generation rate has been used for the PSNS traffic analysis. A peak hour rate of 0.265 trips per person was assumed, with 91 percent of the traffic entering and 9 percent exiting during the morning peak hour and with 9 percent entering and 91 percent exiting during the afternoon peak hour. These peak hour rates were developed for the *Puget Sound Aircraft Carrier Homeporting Environmental Assessment* (DON 1995b). The trip generation rates represent all vehicle trips entering and leaving the base, including commute trips, truck deliveries, and visitors.

The personnel loading for each scenario is presented in Table 4.9-3, which indicates that two out of the four scenarios would result in a decrease in the number of personnel. The scenario with one additional CVN and the relocation of two AOEs would result in an increase of 817 people, and the no action alternative (one additional CVN) would result in an increase of 2,017 people.

Table 4.9-3. Personnel Loading — PSNS Bremerton

Development Scenario	*CVN*	*AOE*	*CGN*	*Total*	*Change from Existing*
Existing					
Ships	1	4	2	7	0
Personnel	3,217	2,400	1,200	6,817	0
No Additional CVN					
Ships	1	4	0	5	- 2
Personnel	3,217	2,400	0	5,617	- 1,200
1 Additional CVN, -4 AOEs					
Ships	2	0	0	2	- 5
Personnel	6,434	0	0	6,434	- 383
1 Additional CVN, -2 AOEs					
Ships	2	2	0	4	- 3
Personnel	6,434	1,200	0	7,634	+ 817
No Action Alternative					
1 Additional CVN					
Ships	2	4	0	6	- 1
Personnel	6,434	2,400	0	8,834	+ 2,017

4.9.1.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

DREDGING

The dredging operations proposed at PSNS would result in little or no increase in vehicular traffic because the dredging material would most likely be transported by barge to the disposal sites. Some of the dredged material could be transported by truck to upland disposal sites. Approximately 7,800 truck trips, or approximately 30 a day, would occur over a 1-year period. This amount of short-term traffic would be negligible compared to the existing traffic volumes on area roadways and would not substantially degrade the transportation system level of service. Therefore, impacts would be less than significant

FACILITY IMPROVEMENTS

During construction of the various facilities that would be developed to support the proposed homeporting action, there would be a short-term increase in traffic associated with workers driving to/from the base and trucks delivering materials to the base. It is estimated that the construction activities would generate approximately 200 additional trips per day for light-duty vehicles and up to 100 truck trips per day (50 round trips). As compared to the existing volume of 23,000 total trips per day and an estimated 600 truck trips per day generated by PSNS, the additional construction traffic would not be significant, particularly since it is temporary.

OPERATIONS

The change in site-generated traffic is shown on Table 4.9-4. The scenario with No Additional CVN would result in a decrease in traffic of 1,740 trips per day and 320 trips during the peak hour. Because there would be a decrease in site-generated traffic, there would be no adverse traffic impacts.

Because CVNs that are not homeported at PSNS are periodically sent to PSNS for DPIAs, there would be a temporary increase in the number of personnel at PSNS when a CVN is in port. Each CVN is scheduled for a DPIA once every six years for a duration of 10 to 11 months. As most of the 3,217 crew members would be housed at the base, and/or on-ship during the DPIA as compared to in the community, there would be a minimal contribution to the commuter travel peaks. A PIA for a CVN that is homeported at NAVSTA Everett would involve commuting between Everett and PSNS by automobile, bus, ferry, or some combination of these modes. This impact is discussed in section 5.9.1.2.

Table 4.9-4. Traffic Generation Estimates — PSNS Bremerton

Development Scenario	*Personnel Change*	*Peak Hour Traffic*	*Average Daily Traffic*
Trip Rate (per person)	N.A.	0.265	1.45
No Additional CVN	- 1,200	- 320	-1,740
1 Additional CVN, -4 AOEs	- 383	- 100	- 555
1 Additional CVN, -2 AOEs	+ 817	+ 215	+ 1,185
No Action Alternative 1 Additional CVN	+ 2,017	+ 535	+ 2,920

4.9.1.2.2 *Facilities for One Additional CVN and Relocation of four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

DREDGING

The dredging operations proposed at PSNS would result in little or no increase in vehicular traffic because the dredging material would most likely be transported by barge to the disposal sites. Some of the dredged material could be transported by truck to upland disposal sites. Approximately 7,800 truck trips, or approximately 30 a day, would occur over a 1-year period. This amount of short-term traffic would be negligible compared to the existing traffic volumes on area roadways and would not substantially degrade the transportation system level of service. Therefore, impacts would be less than significant

FACILITY IMPROVEMENTS

During construction of the various facilities that would be developed to support the proposed homeporting action, there would be a short-term increase in traffic associated with workers driving to and from the base and trucks delivering materials to the base. It is estimated that the construction activities would generate approximately 200 additional trips per day for light-duty vehicles and up to 100 truck trips per day (50 round trips). As compared to the existing volume of 23,000 total trips per day and an estimated 600 truck trips per day generated by PSNS, the additional construction traffic would not be significant, particularly since it is temporary.

OPERATIONS

The change in site-generated traffic is shown on Table 4.9-4. The development scenario with one additional CVN and the relocation of four AOEs would result in a decrease in traffic of 560 trips per day and 100 trips during the peak hour. Because there would be a decrease in site-generated traffic, there would be no adverse traffic impacts.

As CVNs that are not homeported at PSNS are periodically sent to PSNS for DPIAs, there would be a temporary increase in the number of personnel at PSNS when a CVN is in port. Each CVN is scheduled for a DPIA once every six years for a duration of 10 to 11 months. As most of the 3,217 crew members would be housed at the base and/or on-ship during the DPIA as compared to in the community, there would be a minimal contribution to the commuter travel peaks. A PIA for a CVN that is homeported at NAVSTA Everett would involve commuting between Everett and PSNS by automobile, bus, ferry, or some combination of these modes. This impact is discussed in section 5.9.1.2.

4.9.1.2.3 *Facilities for One Additional CVN and Relocation of two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five consists of dredging turning basins plus Pier D replacement.

DREDGING

The dredging operations proposed at PSNS would result in little or no increase in vehicular traffic because the dredging material would most likely be transported by barge to the disposal sites.

Some of the dredged material could be transported by truck to upland disposal sites. Approximately 7,800 truck trips, or approximately 30 a day, would occur over a 1-year period. This amount of short-term traffic would be negligible compared to the existing traffic volumes on area roadways and would not substantially degrade the transportation system level of service. Therefore, impacts would be less than significant.

FACILITY IMPROVEMENTS

During construction of the various facilities that would be developed to support the proposed homeporting action, there would be a short-term increase in traffic associated with workers driving to and from the base and trucks delivering materials to the base. It is estimated that the construction activities would generate approximately 200 additional trips per day for light-duty vehicles and up to 100 truck trips per day (50 round trips). As compared to the existing volume of 23,000 total trips per day and an estimated 600 truck trips per day generated by PSNS, the additional construction traffic would not be significant, particularly since it is temporary.

OPERATIONS

As shown on Table 4.9-4, the development scenario with one additional CVN and the relocation of two AOEs would result in an increase of 1,180 trips per day and 215 trips during the peak hours. The increase in traffic would occur because the new CVN would have a higher personnel count than the two AOEs and two CGNs that would be removed.

An analysis was conducted to determine the impacts of the additional traffic that would be generated by the one additional CVN. Table 4.9-5 in Volume 4, section 4.9 shows the estimated increase in daily traffic volumes on each study area roadway segment and the before-and-after volume/capacity ratios. The future traffic volumes without the project were developed by using forecasts from the traffic analysis that was prepared for the *Puget Sound Aircraft Carrier Homeporting Environmental Assessment* (DON 1995b). The impacts of the additional traffic on peak-hour levels of service at the study area intersections are shown on Table 4.9-6 in section 4.9 of Volume 4. None of the study area roadways or intersections would be significantly impacted because the changes in traffic volumes and levels of service are below the significance criteria thresholds.

This development scenario would result in an increase in the number of transit riders on Kitsap Transit. The projected increase would not overburden the capacity of the bus operation according to information provided by Kitsap Transit. There would also be an increase in parking demand, which would be accommodated at PSNS.

As CVNs that are not homeported at PSNS are periodically sent to PSNS for DPIAs, there would be a temporary increase in the number of personnel at PSNS when a CVN is in port. Each CVN is scheduled for a DPIA once every six years for a duration of 10 to 11 months. As most of the 3,217 crew members would be housed at the base and/or on-ship as compared to in the community during the DPIA, there would be minimal contribution to the commuter travel peaks. A PIA for a CVN that is homeported at NAVSTA Everett would involve commuting between Everett and PSNS by automobile, bus, ferry, or some combination of these modes. This impact is discussed in section 5.9.1.2.

4.9.1.2.4 One Additional CVN: Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new improvements.

DREDGING

Because no dredging would take place under this alternative, there would be no impacts to traffic.

FACILITY IMPROVEMENTS

Because no construction would take place under this alternative, there would be no impacts to traffic.

OPERATIONS

As shown on Table 4.9-4, the no action alternative, with one additional CVN, would result in an increase of 2,920 trips per day and 535 trips during the peak hours. The increase in traffic would occur because the new CVN would have a higher personnel count than the two CGNs that would be removed.

An analysis was conducted to determine the impacts of the additional traffic that would be generated by the one additional CVN. Table 4.9-7 in Volume 4, section 4.9, shows the estimated increase in daily traffic volumes on each study area roadway segment and the before-and-after volume/capacity ratios. The future traffic volumes without the project were developed by using forecasts from the traffic analysis that was prepared for the *Puget Sound Aircraft Carrier Homeporting Environmental Assessment* (DON 1995b). The impacts of the additional traffic on peak-hour levels of service at the study area intersections are shown on Table 4.9-8 in section 4.9 of Volume 4. None of the study area roadways or intersections would be significantly impacted because the changes in traffic volumes and levels of service are below the significance criteria thresholds.

This action would result in an increase in the number of transit riders on Kitsap Transit. The projected increase would not overburden the capacity of the bus operation. There would also be an increase in parking demand, which would be accommodated at PSNS.

As CVNs that are not homeported at PSNS are periodically sent to PSNS for DPIAs, there would be a temporary increase in the number of personnel at PSNS when a CVN is in port. Each CVN is scheduled for a DPIA once every six years for a duration of 10 to 11 months. Because most of the 3,217 crew members would be housed at the base and/or on-ship as compared to in the community during the DPIA, there would be minimal contribution to the commuter travel peaks. A PIA for a CVN that is homeported at NAVSTA Everett would involve commuting between Everett and PSNS by automobile, bus, ferry, or some combination of these modes. This impact is discussed in section 5.9.1.2.

4.9.1.2.5 Mitigation Measures

Because all of the actions would result in a less than significant traffic impact, no traffic-related mitigation measures are proposed.

4.9.2 Vessel Transportation

4.9.2.1 Affected Environment

Access to and from various Puget Sound berthing sites is accomplished by traveling the well-defined and charted major ship navigation channel. Marine vessel circulation in the Puget Sound is regulated by the U.S. Coast Guard. All types of vessels are found in the Sound, including commercial and recreational. Compliance with the International Rules of the Road for lighting and day markers is required. Strict control of all shipping is maintained through a common radio channel.

Access to and from the berthing piers at PSNS requires sailing Sinclair Inlet and Rich Passage. The channel is well marked by buoys and flashing lights. These transits for aircraft carriers and other large Navy ships employ pilots and are assisted by tugs. These same waterways are used by AOEs and cruisers currently homeported at PSNS, ships entering or leaving a maintenance period at the yard, and the Washington State ferries. While there is generally adequate clearance for simultaneous passage, the Navy schedules its ship movements to avoid the regularly scheduled arrivals and departures of the ferries.

The Navy plans to execute the first PIA of the NAVSTA Everett-based CVN at PSNS while the vessel remains homeported at Everett. This would involve transporting 600-1,000 crew members from NAVSTA Everett to PSNS. Detailed discussion of cross-sound commute is presented in section 5.9.2.2.1.

As part of the homeporting of the current CVN at PSNS, projects have been identified for dredging certain berths and turning basins. When dredged, the turning basins would provide better clearance for CVNs as they arrive and depart from their berthing piers.

4.9.2.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The project's impacts to the vessel transportation system would be considered significant if one or more of the following impacts occur:

- Substantial reduction in current safety levels during either proposed action construction or operation related to:
  - vessel maneuvering room;
  - vessel congestion;
  - vessel anchorages;
  - recreational boating access; and
  - commercial fishing activity.

4.9.2.2.1 Facilities for No Additional CVN: No Change – Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

DREDGING

The impact is insignificant. The dredging or mitigation required would not impact ship movements.

FACILITY IMPROVEMENTS

The impact is insignificant. The construction required would not impact ship movements.

OPERATIONS

The current number of vessel movements in the area would continue with no additional impacts.

4.9.2.2.2 Facilities for One Additional CVN and Relocation of four AOEs: Capacity for Total of Two CVNs (Alternative One)

Alternative One consists of dredging turning basins plus Pier D replacement.

DREDGING

The impact is insignificant. The dredging or mitigation required would not impact ship movements.

FACILITY IMPROVEMENTS

The impact is insignificant. The construction required would not impact ship movements.

OPERATIONS

The impact is insignificant. The net effect would be the reduction of three homeported deep draft ships and the movement activities associated with them.

4.9.2.2.3 Facilities for One Additional CVN and Relocation of two AOEs: Capacity for Total of Two CVNs (Alternative Five)

Alternative Five consists of dredging turning basins plus Pier D replacement.

DREDGING

The impact is insignificant. The dredging or mitigation required would not impact ship movements.

FACILITY IMPROVEMENTS

The impact is insignificant. The construction required would not impact ship movements.

OPERATIONS

The impact is insignificant. The net effect is the reduction of one homeported deep draft ship and the movement activities associated with it.

4.9.2.2.4 One Additional CVN: Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new improvements.

DREDGING

The impact is insignificant. No dredging or mitigation would be required.

FACILITY IMPROVEMENTS

The impact is insignificant. No construction would be required.

OPERATIONS

The impact is insignificant. The waterways are more than capable of accommodating this minor increase in traffic.

4.9.2.2.5 Mitigation Measures

None of the facilities and infrastructure required to support an addition CVN at PSNS would result in significant impacts; therefore no mitigation measures are proposed.

4.10 AIR QUALITY

Air quality in the PSNS home port area and surrounding region would be affected by emissions from construction and operation of the proposed project. The following section describes the existing air quality resource, predicted impacts of the proposed actions, and mitigations that would lessen significant project impacts.

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing it to national and/or state ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards are established by the EPA and termed the National Ambient Air Quality Standards (NAAQS). The NAAQS are defined as the maximum acceptable ground-level concentrations that may not be exceeded more than once per year except for annual standards, which may never be exceeded. The WDOE has also established state standards that are at least as restrictive as the NAAQS. The national and Washington ambient air quality standards are shown in Volume 4, section 4.10, Table 4.10-1.

The main pollutants of concern considered in this air quality analysis include volatile organic compounds (VOCs), ozone (O_3), carbon monoxide CO, nitrogen oxides (NO_x), sulfur dioxide (SO_2), and particulate matter less than 10 microns in diameter (PM_{10}). Although there are no ambient standards for VOCs or NO_x, they are important as precursors to O_3 formation.

4.10.1 Affected Environment

Region of Influence

The area affected by the project emission sources would mainly include the PSNS and Southern Puget Sound region. Specifically identifying the region of influence (ROI) for air quality requires knowledge of (1) the types of pollutants being emitted, (2) emission rates of the pollutant source, (3) the proximity of an emission source to other emission sources, and (4) meteorological conditions. The ROI for inert pollutant emissions (pollutants other than O_3 and its precursors) is generally limited to a few miles downwind from the source. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants called precursors. The ROI for O_3 generally extends much farther downwind than for inert pollutants. In the presence of solar radiation, the maximum effect of precursor emissions on O_3 levels usually occurs several hours after their emission and many miles from the source, depending on the wind conditions. Consequently, the area affected by O_3 precursor emissions from the project could include much of the southern Puget Sound region.

Baseline Air Quality and Emissions

Baseline Air Quality

The EPA designates all areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. The criteria for nonattainment designation varies by pollutant: (1) an area is in nonattainment for O_3 if its NAAQS has been exceeded more than three discontinuous times in 3 years, and (2) an area is in nonattainment for any other pollutant if its

NAAQS has been exceeded more than once per year. Kitsap County is presently in attainment of all NAAQS and has always attained these standards, due to its rural nature and lack of substantial emission sources.

Ozone concentrations are generally the highest during the summer months and coincide with the period of maximum insolation. Maximum O_3 concentrations tend to be regionally distributed, since precursor emissions become homogeneously dispersed in the atmosphere. Inert pollutants, such as CO, tend to have the highest concentrations during the colder months of the year, when light winds and nighttime/early morning surface-based temperature inversions inhibit atmospheric dispersion. Maximum inert pollutant concentrations are usually found near an emission source.

PSNS Baseline Emissions

Volume 4, section 4.10, Table 4.10-2 presents stationary and area source emissions that occurred at PSNS in 1996 (DON 1997b). These data show that (1) the main sources of combustive emissions (CO and NO_x) were the coal-fired boilers (these sources have been converted to also burn natural gas), (2) VOC emissions occurred mainly from surface coating and solvent applications, and (3) metal cutting, grinding, and welding produced most of the PM_{10} emissions. The facility also emitted 96 tons of toxic air contaminants (TACs) in 1996 and the main sources of these emissions occurred from the use of surface coatings and solvents. Emissions associated with the homeporting of two nuclear cruisers and their associated 1,200 staff will be eliminated from PSNS with the decommissioning of these vessels in 1998 and 1999. Consequently, future baseline emissions at PSNS will decrease somewhat as a result of this action from the levels presented in Table 4.10-1 of Volume 4, section 4.10.

Radiological Air Emissions

Naval nuclear reactors and their support facilities are designed to ensure there are no significant discharges of radioactivity in airborne exhausts. Radiological controls are exercised in support facilities to preclude exposure of working personnel to airborne radioactivity exceeding one-tenth of the limits specified in 10 CFR 20. These controls include containment for radioactive materials and provide a barrier to prevent significant radioactivity from becoming airborne. Further, all air exhausted from these facilities is passed through High Efficiency Particulate Air (HEPA) filters and monitored during discharge. Comparison of sensitive airborne radioactivity measurements in shipyards demonstrates that air exhausted from facilities actually contained a smaller amount of particulate radioactivity than this same air contained when it was drawn from the environment into the facilities. There were no discharges of airborne radioactivity above concentrations normally present in the atmosphere from these facilities (NNPP 1997).

Regional Climate

Climate is important to air quality, because weather conditions determine the potential for the atmosphere to disperse emissions of air pollutants. The climate of the project region is maritime, characterized by mild summers and winters, small diurnal ranges in temperature, considerable cloudiness, and abundant rainfall during much of the year. Due to its location in the mid-latitude, the region experiences a high frequency of polar storm systems. These storms are the strongest and most common during the winter months. During the summer, the storm track weakens and shifts to the north, but storm systems can still bring cloudiness and light rain to the region. Since the majority of storms move into the region from the northern Pacific Ocean, a large percentage of precipitation falls first in the Olympic Mountains, to the west of Bremerton. This creates a rain shadow to the east and lessens the amount of precipitation that would otherwise fall within the project region. The presence of the Pacific Ocean and Puget Sound waters help to moderate temperatures in the region. The Cascade Mountains to the east often shield the region from the effects of cold continental air masses during winter months.

Precipitation

The annual average precipitation at Bremerton is 50.6 inches (National Weather Service 1997a). The highest monthly precipitation occurs in December, with an average rate of 8.6 inches. In July, the lowest amount of monthly precipitation occurs, with an average of 0.8 inches. Thunderstorms occur on an average of a few days per year in the region and are most common during the summer months. Snow occurs in Bremerton with an annual average rate of 9.0 inches.

Temperature

The annual average temperature in Bremerton is 51°F (National Weather Service 1997a). Daily mean high and low temperatures for January are 45°F and 34°F, respectively. Daily mean high and low temperatures for August are 75°F and 54°F, respectively.

Prevailing Winds

During the summer months, winds in Bremerton are generally light but persistent, due to the presence of regional sea breezes. Winds during this time of year prevail from the northwest, but the complexity of the shoreline geography in the region can affect wind direction. During the wintertime, winds are stronger but more variable, due to the frequent passage of storm systems. Calm and stagnant wind conditions also occur most often during the winter when atmospheric high pressure dominates the region. These conditions can produce periods of adverse atmospheric dispersion.

Applicable Regulations and Standards

The following is a summary of the state and local air quality regulations that would apply to each project location in the Bremerton region (see also Volume 2, Appendix A).

Federal regulations that would apply to the proposed project are presented in Volume 2, Appendix A of this EIS. Since the PSNS region is in attainment of all NAAQS, a conformity determination outlined in Section 176(c) of the 1990 CAA will not be required for a federal action at this location.

The impact on visibility from air pollutant emission sources is an issue with regard to federally-mandated Class I areas, such as national parks and wilderness areas, where any deterioration in air quality is considered significant. Visibility impairment is defined as (1) a reduction in regional visual range and (2) atmospheric discoloration or plume blight. Criteria to determine significant impacts on visibility within Class I areas usually pertain to stationary emission sources, as mobile sources are generally exempt from permit review by regulatory agencies. However, Section 169A of the CAA, as amended in 1977, states that it is a national goal to prevent any further impairment of visibility within Class I areas from manmade sources of air pollution. The nearest Class I area in proximity to PSNS is the Olympic National Park, about 25 miles to the west. The potential for visibility impacts to occur from the proposed actions are addressed in section 4.10.2.

State Regulations

The WDOE has the ultimate responsibility of enforcing air pollution regulations in the State of Washington. However, the WDOE has delegated the responsibility of regulating most air pollution sources to local agencies. The Washington Clean Air Act and the General Regulations for Air Pollution Sources, Chapter 173-400 of the WAC, outline the state air regulations. The WDOE oversees preparation of the Washington State Implementation Plan (SIP) and is responsible for its timely submittal to the EPA. The administration of Prevention of Significant Deterioration (PSD) regulations are also performed at the state level by the WDOE.

Local Regulations

The Puget Sound Air Pollution Control Agency (PSAPCA) is responsible for regulating stationary sources of air pollution in Kitsap, Pierce, King, and Snohomish counties. The PSAPCA has developed rules to accomplish this goal. Sources associated with each project action at PSNS would comply with all applicable PSAPCA rules and regulations. A summary of the more pertinent rules that would apply to the project actions is provided in Volume 4, section 4.10.

4.10.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Criteria to determine the significance of air quality impacts are based on federal, state, and local air pollution standards and regulations. Impacts would be considered significant if project emission sources (1) increase ambient pollutant levels from below to above a national or state ambient air quality standard, (2) require an operating permit under PSAPCA Regulation I, Article 7 by exceeding 100 tons per year of a regulated pollutant, 10 tons per year of a hazardous air pollutant (HAP), or 25 tons per year of combined HAPs, or (3) impair visibility in the Olympic National Park Class I area.

4.10.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging

Air quality impacts from dredging in the vicinity of Pier D and associated disposal activities would mainly occur from combustive emissions due to the operation of diesel-powered tug boats and dredges. It was assumed that the 425,000 yd^3 of material would be removed with a clamshell dredge and disposal technique, similar to the methodology used in section 3.10.2.2. The annual emissions associated with these activities would be (1) 2.6 tons of VOC, (2) 14.5 tons of CO, and (3) 74.3 tons of NO_x. These data also consider a worst-case scenario of the need to truck 117,000 yd^3 of contaminated sediments to an upland site 10 miles away from PSNS. Air quality impacts from dredging activities would be insignificant, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Air quality impacts would be temporary and would cease at the end of dredging activities.

Facility Improvements

Air quality impacts from the demolition and replacement of Pier D would mainly occur from combustive emissions due to the operation of equipment such as diesel-powered tug boats, cranes, and haul trucks. Minor amounts of fugitive dust emissions (PM_{10}) could occur during ground-disturbing activities associated with electric utility upgrades. Air quality impacts from these activities would be insignificant, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Air quality impacts would be temporary and would cease at the end of construction activities.

Operations

No new operations would occur from the action. However, since the action would remove two CGNs, emissions and associated air quality impacts from these vessels would be eliminated within the PSNS project region. The action would therefore produce insignificant air quality impacts.

4.10.2.2 Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs (Alternative One)

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging

Dredging and disposal activities and their associated air quality impacts would be identical to those identified in section 4.10.2.1. Air quality impacts from dredging activities would be insignificant, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Air quality impacts would be temporary and would cease at the end of dredging activities.

Facility Improvements

Air quality impacts due to facility improvements would be identical to those described in section 4.10.2.1. Air quality impacts from this activity would be insignificant, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Air quality impacts would be temporary and would cease at the end of construction activities.

Operations

Operational impacts from the action were determined by comparing the net change in emissions that would occur from the removal of two CGNs, the addition of one CVN, and relocation of four AOEs from PSNS. Emissions for stationary sources associated with the homeporting of each vessel group were estimated from the 1997 NAVSTA Everett emissions inventory (see Table 5.10-1 of Volume 5) (DON 1997a) and in consultation with DON staff. The 1997 NAVSTA Everett emissions inventory includes activities from the homeporting of one CVN. Emissions from stationary sources that would occur from the homeporting of four AOEs, such as commuter vehicle fueling, were obtained by factoring CVN emissions data with the population ratio between the two vessel groups. Emissions from routine maintenance of the AOE vessel group were assumed to be double the emissions that would occur from one CVN. Emission calculations were also based on the operational characteristics of each vessel group (for example, emissions from CVN ground support equipment would not occur in association with AOEs). Factors used to estimate emissions for AOE boilers were obtained from special studies on vessel emissions (EPA 1995 and Booz, Allen, and Hamilton 1991). Emissions from commuter vehicles were based on vehicle trips estimated for PSNS in the transportation section 4.9 and an average trip length of about 13 miles (DON 1995b). The EPA MOBILE 5a model was used to generate vehicle emissions from these data. Volume 4, section 4.10 presents a summary of emission calculations for all project actions at PSNS.

Sources associated with the action at PSNS would be similar to those identified for NASNI with the following exceptions: (1) steam demand for each vessel group would be provided by on-site natural-gas fired boilers and (2) two AOEs would be powered by fuel oil-fired boilers and two would be powered by gas turbine units. Emissions at PSNS from PIA maintenance would generally not change from baseline conditions, since this activity for the new CVN would be a replacement activity for the CV that would be decommissioned at a future date.

Table 4.10-1 shows that the action would reduce annual emissions within the PSNS home port region by (1) 23.5 tons of CO, (2) 48.4 tons of NO_x, (3) 57.6 tons of SO_2, and (4) 6.7 tons of PM_{10} and increase emissions by (1) 9.6 tons of VOC. The emission reductions would be mainly due to the elimination of the AOE power plants and vehicles from the CGNs and AOEs. Consequently, operation of the action would produce insignificant air quality impacts within the project region.

Project emission sources would not be expected to impair visibility within the Olympic National Park Class I area, as any emissions from PSNS would be adequately dispersed during the 25-mile transport distance to this area. Additionally, no stationary source associated with the action would exceed 100 tons per year of a regulated pollutant, 10 tons per year of a HAP, or 25 tons per year of combined HAPs. These air quality impacts from the action would therefore be insignificant.

RADIOLOGICAL AIR EMISSIONS INFORMATION. The applicable National Emission Standards for Radionuclide Emissions from project vessels and facilities are contained in 40 CFR 61, Subpart I. Similar facilities and ships at other Navy bases are exempt from the reporting requirements of 40 CFR 61.104(a), consistent with the criteria outlined in 40 CFR 61.104(b), since their emissions result in exposures to the public that are less than 10 percent of the standards established by the EPA in 40 CFR 61.102 (NNPP 1997). Thus, since radionuclide air emissions are not expected to increase beyond the levels established at other Navy bases, there would be no significant impacts on air quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

Table 4.10-1. Worst-case Annual Operational Emissions from the Project Alternatives at PSNS Bremerton

Sources	AIR POLLUTANT EMISSIONS (TONS/YEAR)				
	VOC	*CO*	*NOx*	*SOx*	*PM10*
Addition of 1 CVN					
Vessels and Auxiliary Equipment	0.40	1.80	8.28	0.55	0.59
Onshore Infrastructure	6.87	1.53	6.17	0.03	0.61
Routine Maintenance	2.64	0.00	0.00	0.00	0.00
PIA Maintenance	15.00	0.00	0.00	0.00	3.00
On-road Vehicles	60.96	536.25	72.42	0.00	0.50
Total for 1 CVN	**85.88**	**539.58**	**86.87**	**0.57**	**4.70**
Relocation of 4 AOEs					
Vessels and Auxiliary Equipment	(2.57)	(5.03)	(52.38)	(58.13)	(10.04)
Onshore Infrastructure	(5.94)	(2.05)	(8.23)	(0.04)	(0.81)
Routine Maintenance	(5.28)	(0.00)	(0.00)	(0.00)	(0.00)
On-road Vehicles	(62.82)	(556.08)	(74.71)	(0.00)	(0.52)
Total for 4 AOEs	**(76.26)**	**(563.11)**	**(135.12)**	**(58.17)**	**(11.38)**
Net Change of +1 CVN - 4 AOEs	**9.63**	**(23.52)**	**(48.44)**	**(57.59)**	**(6.68)**
Addition of 1 CVN					
Vessels and Auxiliary Equipment	0.40	1.80	8.28	0.55	0.59
Onshore Infrastructure	6.87	1.53	6.17	0.03	0.61
Routine Maintenance	2.64	0.00	0.00	0.00	0.00
PIA Maintenance	15.00	0.00	0.00	0.00	3.00
On-road Vehicles	60.96	536.25	72.42	0.00	0.50
Total for 1 CVN	**85.88**	**539.58**	**86.87**	**0.57**	**4.70**
Relocation of 2 AOEs					
Vessels and Auxiliary Equipment	(1.27)	(1.71)	(10.69)	(30.01)	(6.47)
Onshore Infrastructure	(2.98)	(1.02)	(4.11)	(0.02)	(0.41)
Routine Maintenance	(2.64)	(0.00)	(0.00)	(0.00)	(0.00)
On-road Vehicles	(43.63)	(386.18)	(51.88)	(0.00)	(0.36)
Total for 2 AOEs	**(50.52)**	**(389.02)**	**(66.70)**	**(30.03)**	**(7.24)**
Net Change of +1 CVN - 2 AOEs	**35.36**	**150.56**	**20.17**	**(29.46)**	**(2.54)**
Addition of 1 CVN					
Vessels and Auxiliary Equipment	0.40	1.80	8.28	0.55	0.59
Onshore Infrastructure	6.87	1.53	6.17	0.03	0.61
Routine Maintenance	2.64	0.00	0.00	0.00	0.00
PIA Maintenance	15.00	0.00	0.00	0.00	3.00
On-road Vehicles	40.82	357.97	48.47	0.00	0.38
Total and Net Change for 1 CVN	**65.73**	**361.97**	**62.92**	**0.58**	**4.58**

Note: () Represents a net decrease in emissions.

4.10.2.3 *Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

Air quality impacts from dredging activities would be identical to those described in section 4.10.2.1. Air quality impacts from dredging activities would be insignificant, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Air quality impacts would be temporary and would cease at the end of dredging activities.

Facility Improvements

Air quality impacts due to facility improvements would be identical to those described in section 4.10.2.1. Air quality impacts from this activity would be insignificant, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Air quality impacts would be temporary and would cease at the end of construction activities.

Operations

Operational impacts from the action were determined by comparing the net change in emissions that would occur from the removal of two CGNs, the addition of one CVN, and relocation of two boiler-powered AOEs from PSNS. Table 4.10-1 shows that the action would reduce annual emissions within the PSNS home port region by (1) 29.5 tons of SO_2 and (2) 2.5 tons of PM_{10} and increase emissions by (1) 35.4 tons of VOC, (2) 150.6 tons of CO, and (3) 20.2 tons of NO_x. Reductions of SO_2 and PM_{10} emissions would be mainly due to the elimination of the AOE steam plants. The increase in emissions would mainly be due to the increase in commuter traffic that would occur from the action. Since project traffic would not significantly increase traffic congestion in the region (see section 4.9), these emission increases would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Consequently, operation of the action would produce insignificant air quality impacts within the project region.

Project emission sources would not be expected to impair visibility within the Olympic National Park Class I area, as any emissions from PSNS would be adequately dispersed during the 25-mile transport distance to this area. Additionally, no stationary source associated with the action would exceed 100 tons per year of a regulated pollutant, 10 tons per year of a HAP, or 25 tons per year of combined HAPs. These air quality impacts from the action would therefore be insignificant.

RADIOLOGICAL AIR EMISSIONS INFORMATION. The impact of radiological air emissions from the action would be identical to those identified in section 4.10.2.2. With the addition of one CVN at PSNS, total radionuclide air emissions from the facility would remain well below applicable EPA standards. Consequently, there would be no significant impacts on air quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.10.2.4 *One Additional CVN: Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging

Since no dredging would occur from the action, no air quality impacts would be associated with this activity. Therefore, air quality impacts from dredging would be insignificant.

Facility Improvements

Since no facility improvements would occur from the alternative , no air quality impacts would be associated with this activity. Therefore, air quality impacts from construction would be insignificant.

Operations

Operational impacts from the action were determined by comparing the net change in emissions that would occur from the removal of two CGNs and the addition of one CVN from PSNS. Table 4.10-1 shows that the addition of one CVN would increase annual emissions within the PSNS home port region by (1) 65.7 tons of VOC, (2) 362.0 tons of CO, (3) 62.9 tons of NO_x, (4) 0.6 tons of SO_2, and (5) 4.6 tons of PM_{10}. The main contributor to these emissions would be project-generated commuter traffic. The traffic analysis in section 4.9 determined that project traffic would not significantly increase congestion within roadways or intersections within the ROI. As a result, emissions from project-generated traffic plus baseline traffic would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Consequently, operation of the alternative would produce insignificant air quality impacts within the project region.

Project emission sources would not be expected to impair visibility within the Olympic National Park Class I area, as any emissions from PSNS would be adequately dispersed during the 25-mile transport distance to this area. Additionally, no stationary source associated with the action would exceed 100 tons per year of a regulated pollutant, 10 tons per year of a HAP, or 25 tons per year of combined HAPs. These air quality impacts from the action would therefore be insignificant.

RADIOLOGICAL AIR EMISSIONS INFORMATION. The impact of radiological air emissions from the alternative would be identical to those identified in section 4.10.2.2. With the addition of one CVN at PSNS, total radionuclide air emissions from the facility would remain well below applicable EPA standards. Consequently, there would be no significant impacts on air quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.10.2.5 *Mitigation Measures*

Since air quality impacts from construction and operation of the actions would be insignificant, no mitigation measures are proposed to reduce project emissions at PSNS.

4.11 NOISE

This section describes existing noise conditions and potential effects associated with the proposed actions. Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although exposure to very high noise levels can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual. Volume 2, Appendix C provides additional background information about noise measurement and the noise terminology used in this section.

4.11.1 Affected Environment

PSNS is an existing military-industrial environment characterized by noise from truck and automobile traffic; ship-loading cranes; diesel-powered equipment; railroad traffic; continuously operating transmission lines for steam, water, and fuel; and compressors. In addition, new construction of buildings and reconstruction and rehabilitation activities for streets, buildings, and ships all contribute to an industrial-type noise environment. The primary concentration of these types of noise sources is along the shore where Naval support facilities are located.

Pier D, which is located along the waterfront in the western portion of PSNS, currently provides two AOE home port berths for the four AOEs at PSNS. Typically, two of the AOEs are in port and two are at sea. Whenever more than two are in port, the additional AOEs berth at Pier 4.

Noise-sensitive receptors are existing land uses associated with indoor or outdoor activities that may be subject to significant interference from noise. Such receptors would include residential (single- and multi-family dwellings, dormitories, barracks, and other residential uses), hospitals, convalescent homes, and educational facilities.

The on-base sensitive receptors closest to Pier D are the single-family residence officer quarters located approximately 1,700 feet northeast between Doyen and Dewey streets and north of Decatur Avenue. The nearest medical facility is the Naval Dental Clinic located 1,200 feet northeast of Pier D at the intersection of Farragut and Decatur avenues. The Occupational Health/Preventive Medicine Unit, a branch of the Bremerton Naval Hospital, is located 2,400 feet northeast of Pier D on Dewey Street.

The closest off-base sensitive receptors are single-family residences located west of PSNS along Callow Avenue and north of Coontz Street approximately 2,200 feet northwest of Pier D. This residential area is well buffered by distance from most of the noisier activities at PSNS and is exposed to noise levels typical of an urban residential neighborhood.

4.11.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Military Regulations

The DOD has established acceptable sound level criteria for various land uses. Where these criteria are exceeded, the impact would be significant. The criteria are outlined in the NAVFAC P-

Table 4.11-1. Acceptable Land Use and Minimum Building Sound Level Requirements at Military Facilities

Land Use	OUTDOOR NOISE ENVIRONMENT (LDN IN DBA) 85-89	80-84	75-79	70-74	65-69
Family Housing	No	No	No	NLR 30[4]	NLR 25[4]
Bachelor Housing	No	No	NLR 35[4]	NLR 30[4]	NLR 25[4]
Transient Lodging, Hotels, Motels, etc.	No	No	NLR 35[4]	NLR 35[4]	NLR 25[4]
Classrooms, Libraries, Churches	No	No	No	NLR 30	NLR 25
Office and Administration Buildings (Military)	NLR 40	NLR 35	NLR 30	NLR 25	Yes
Offices — Business and Professional	No	No	NLR 35	NLR 25	Yes
Hospitals and any Medical Facilities with 24-hr occupancy	No	No	No	NLR 30	NLR 25
Dental Clinics, Medical Dispensaries	No	No	NLR 30	NLR 25	Yes
Outdoor Music Shells	No	No	No	No	No
Commercial/Retail Stores, Restaurants/Cafeterias, Banks and Credit Unions, Exchanges, Theaters, EM/Officer Clubs	No	No	NLR 30	NLR 25	Yes
Flight Line Operations, Maintenance, and Training	NLR 35[5]	NLR 30[5]	Yes	Yes	Yes
Industrial, Manufacturing, and Laboratories	No	NLR 35[5]	NLR 30[5]	NLR 25[5]	Yes
Outdoor Sports Arenas, Outdoor Spectator Sports	No	No	No	Yes[1]	Yes[1]
Playgrounds, Active Sport Recreational Areas	No	No	No	Yes	Yes
Neighborhood Parks	No	No	No	Yes	Yes
Gymnasiums, Indoor Pools	No	NLR 30	NLR 25	Yes	Yes
Outdoor — Frequent Speech Communication	No[2,3]	No[2,3]	No[2]	No[2]	No[2]
Outdoor — Infrequent Speech Communication	No[2,3]	No[2,3]	Yes	Yes	Yes
Livestock Farming, Animal Breeding	No	No	No	Yes	Yes
Agricultural (except Livestock)	Yes[3]	Yes[3]	Yes	Yes	Yes

Notes: Yes - Land use compatible with noise environment. No special noise control restriction. Normal construction okay.
NLR- Appropriate noise level reduction where indoor activities predominate.
No — Land use not compatible with noise environment, even if special building noise insulation provided.
1. Land use is acceptable provided special sound reinforcement systems are installed.
2. Land use may be acceptable provided special speech communication systems are used.
3. Land use may be acceptable provided hearing protection devices are worn by personnel. Check applicable hearing damage regulations.
4. Although local conditions may require residential uses in these areas, this use is strongly discouraged in Ldn 70-74 and Ldn 75-79 and discouraged in Ldn 65-69. The absence of viable options should be determined. NLR criteria will not eliminate outdoor environment noise problems and, as a result, site planning and design should include measures to minimize this impact, particularly where the noise is from ground-level sources.
5. The NLR must only be incorporated into the design and construction of portions of these buildings where the public is received, office areas, and noise-sensitive work areas or where the normal noise level is low.

Source: *Planning in the Noise Environment* NAVFAC P-970 (DOD 1978).

970 document, *Planning in the Noise Environment* (DOD 1978), and are presented in Table 4.11-1. In the table, the outdoor noise environment is considered in five noise "zones." For each zone, acceptability is noted by one of the following four entries: (1) a "yes"; (2) noise level reduction (NLR); (3) a "no"; or (4) one of the above with additional stipulations described in the footnotes.

Where "yes" is indicated, no special noise control restrictions are necessary, and normal construction appropriate to the activity may be used. For many land uses, higher levels of exterior noise exposure are acceptable if the proper degree of interior noise attenuation is provided. Such tradeoffs are possible for land uses where indoor activities predominate. When such tradeoffs are appropriate, the amount of noise insulation required is enumerated in the table in units of NLR, which is measured in dBA and is the difference between noise measured outside the building and noise measured inside the building. If land use compatibility is contingent on meeting the NLR requirements, then a site-specific interior acoustical analysis must be performed to ensure that the proposed building design will provide the required level of noise reduction. A "no" indication means that the noise environment is not suitable for the designated activity or facility, even if special building noise insulation is provided. The table footnotes indicate exceptions where special conditions apply.

Civilian Regulations

Within the City of Bremerton, noise is regulated by a noise ordinance (City of Bremerton 1996). In residential areas, noise levels up to 60 dBA emanating from operational noise sources in an industrial area (such as PSNS) are acceptable between the hours of 7:00 A.M. and 10:00 P.M. Between the hours of 10:00 P.M. and 7:00 A.M., the acceptable limit for operational noise from an industrial area is 50 dBA. Operational noise levels that exceed these limits at residential locations would be significant. Temporary construction noise from an industrial area is permitted in a residential area at the 60 dBA limit 24 hours a day. Brief exceedances of this limit are provided for in the ordinance.

4.11.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four would include dredging of turning basins plus Pier D replacement.

Dredging

Dredging of approximately 425,000 cy would result in temporary noise impacts during 10-months of dredging activities. Noise levels from a diesel clamshell dredge typically range from 75 dBA to 85 dBA at a distance of 50 feet (DON 1995b).

The nearest on-base noise sensitive receptor is the Naval Dental Clinic located about 1,200 feet north of the foot of Piers D and B. The dredging area would extend from the foot of the piers to a distance of 2,700 feet out into Puget Sound. Thus, the approximate distance from the clinic to the dredge noise would range from 1,200 feet to 3,900 feet. At these distances, dredging noise levels would be attenuated to a range of approximately 37 to 57 dBA, well below the 65 to 69 dBA limit for outdoor levels at a military facility dental clinic (DOD 1978). Therefore, the dredging phase would have a less than significant adverse noise impact at on-base sensitive receptor locations.

The nearest off-base sensitive receptors are single-family residences located west of PSNS approximately 2,200 feet northwest of Pier D. At this distance, dredging noise levels would be attenuated to a range of approximately 42 to 52 dBA, well below the 60 dBA limit for construction noise established by the City of Bremerton (City of Bremerton 1996). Therefore, the dredging phase would have a less than significant adverse noise impact at off-base sensitive receptor locations.

Facility Improvements

Replacement of Pier D would generate a temporary noise impact during the 20-month construction period. A variety of noise-generating equipment would be used such as pile drivers, backhoes, jack hammers, concrete mixers, plus various motor vehicles. These types of construction equipment, when used at federal construction sites, are prohibited from exceeding noise levels that range from 75 dBA (backhoe, jack hammer, concrete mixer) to 95 dBA (pile driver) at 50 feet from the source (CERL 1975). When the pile driver is not operating, the combined maximum noise level of three of the other pieces of equipment operating at the same time and place would be approximately 80 dBA (at a distance of 50 feet). If the pile driver and three of the other pieces of equipment were operating at the same time and place, the combined maximum noise level (at a distance of 50 feet) would be approximately the same as the loudest equipment (the pile driver at 95 dBA). Therefore, construction noise levels would range from 80 dBA to 95 dBA (at a distance of 50 feet).

The nearest on-base noise sensitive receptor is the Naval Dental Clinic located about 1,200 feet north of the foot of Pier D. The Pier D construction area would extend the full length of the pier, a distance of approximately 1,300 feet into the sound. Thus, the distance from the clinic to the dredge noise would be a range of approximately 1,200 feet to 2,500 feet. At these distances, dredging noise levels would be attenuated to a range of approximately 46 dBA to 61 dBA, within or well below the 65 dBA to 69 dBA acceptable range for outdoor levels at a military facility dental clinic (DOD 1978). Therefore, the construction phase would have a less than significant adverse noise impact on on-base sensitive receptors.

The nearest off-base sensitive receptors are single-family residences located west of PSNS and approximately 2,200 feet northwest of Pier D. At this distance, noise levels would be attenuated to a range of approximately 47 dBA (when the pile driver is not operating) to 62 dBA (when the pile driver is operating). The City of Bremerton's noise ordinance sets a maximum noise level of 60 dBA in a residential area from construction activity in industrial area. This would be an imperceptible exceedance of 2 dBA. Section 6.32.040(c)(1) of the ordinance, however, provides for exceedances of "5 dBA for a total of 15 minutes in any 1-hour period" at any receiving property. Pile driving produces an intermittent sound with a very brief duration. One hour of pile driving would produce a total of less than 1 minute of noise at the maximum level. Thus, the noise impact at the nearest off-base sensitive receptors would not exceed the permissible levels established in the City of Bremerton's noise ordinance. Therefore, the construction phase would have a less than significant adverse noise impact on off-base sensitive receptors.

Operations

No change in operations would result. Therefore, no operational noise impacts would occur.

4.11.2.2 *Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One would include dredging of turning basins plus Pier D replacement.

Dredging

Homeporting an additional CVN at PSNS would require approximately 425,000 cy of dredging mostly in the vicinities of Piers D and B, with a lesser amount at Pier 3. This would result in temporary noise impacts during 10-months of dredging activities. Noise levels from a diesel clamshell dredge typically range from 75 dBA to 85 dBA at a distance of 50 feet (DON 1995b).

The nearest on-base noise sensitive receptor is the Naval Dental Clinic located about 1,200 feet north of the foot of Piers D and B. The dredging area would extend from the foot of the piers to a distance of 2,700 feet out into the sound. Thus, the distance from the clinic to the dredge noise would range approximately from 1,200 feet to 3,900 feet. At these distances, dredging noise levels would be attenuated to a range of approximately 37 to 57 dBA, well below the 65 to 69 dBA limit for outdoor levels at a military facility dental clinic (DOD 1978). Therefore, the dredging phase would have a less than significant adverse noise impact at on-base sensitive receptor locations.

The nearest off-base sensitive receptors are single-family residences located west of PSNS approximately 2,200 feet northwest of Pier D. At this distance, dredging noise levels would be attenuated to a range of approximately 42 to 52 dBA, well below the 60 dBA limit for construction noise established by the City of Bremerton (City of Bremerton 1996). Therefore, the dredging phase would have a less than significant adverse noise impact at off-base sensitive receptor locations.

Facility Improvements

Development of one additional CVN home port at PSNS would require replacement of Pier D. This would result in a temporary construction noise impact during the 20-month construction period. A variety of noise-generating equipment would be used such as pile drivers, backhoes, jack hammers, concrete mixers, plus various motor vehicles. These types of construction equipment, when used at federal construction sites, are prohibited from exceeding noise levels that range from 75 dBA (backhoe, jack hammer, concrete mixer) to 95 dBA (pile driver) at 50 feet from the source (CERL 1975). When the pile driver is not operating, the combined maximum noise level of three of the other pieces of equipment operating at the same time and place would be approximately 80 dBA (at a distance of 50 feet). If the pile driver and three of the other pieces of equipment were operating at the same time and place, the combined maximum noise level (at a distance of 50 feet) would be approximately the same as the loudest equipment (the pile driver at 95 dBA). Therefore, construction noise levels would range from 80 dBA to 95 dBA (at a distance of 50 feet).

The nearest on-base noise sensitive receptor is the Naval Dental Clinic located about 1,200 feet north of the foot of Pier D. The Pier D construction area would extend the full length of the pier, a distance of approximately 1,300 feet into the sound. Thus, the distance from the clinic to the dredge noise would be a range of approximately 1,200 feet to 2,500 feet. At these distances, dredging noise levels would be attenuated to a range of approximately 46 dBA to 61 dBA, within or well below the 65 dBA to 69 dBA acceptable range for outdoor levels at a military facility dental clinic (DOD 1978). Therefore, the construction phase would have a less than significant adverse noise impact on on-base sensitive receptors.

The nearest off-base sensitive receptors are single-family residences located west of PSNS and approximately 2,200 feet northwest of Pier D. At this distance, noise levels would be attenuated to a range of approximately 47 dBA (when the pile driver is not operating) to 62 dBA (when the pile driver is operating). The City of Bremerton's noise ordinance sets a maximum noise level of 60 dBA in a residential area from construction activity in industrial area. This would be an imperceptible exceedance of 2 dBA. Section 6.32.040(c)(1) of the ordinance, however, provides for exceedances of "5 dBA for a total of 15 minutes in any 1-hour period" at any receiving property. Pile driving produces an intermittent sound with a very brief duration. One hour of pile driving would produce a total of less than 1 minute of noise at the maximum level. Thus, the noise impact at the nearest off-base sensitive receptors would not exceed the permissible levels established in the City of Bremerton noise ordinance. Therefore, the construction phase would have a less than significant adverse noise impact on off-base sensitive receptors.

Operations

Pier D currently provides home port berths for two AOEs. Replacement of the two AOE berths at Pier D with a CVN home port would result in little change in operational noise in the vicinity of Pier D. Removal of the AOE mooring function at Pier 4 would result in a minor reduction of operational noise in the vicinity of Pier 4. Addition of one CVN and relocation of four AOEs would have a net personnel reduction, therefore a net reduction in average daily traffic of approximately 730 trips (see Table 4.9-4). This would correspondingly reduce traffic noise on the approach roads to PSNS. Therefore, implementation would result in a short-term increase in construction noise and long-term decreases in operational noise and traffic noise. This would be considered a net beneficial noise impact.

4.11.2.3 *Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five would include dredging of turning basins plus Pier D replacement.

Dredging

Relocation of only two AOEs would not change the dredging requirement compared to One Additional CVN and Relocation of Four AOEs. Therefore, the dredging noise impact would be the same (i.e., a less than significant adverse noise impact).

Facility Improvements

Relocation of only two AOEs would not change the construction requirement compared to One Additional CVN and Relocation of Four AOEs. Therefore, the construction noise impact would be the same (i.e., a less than significant adverse noise impact).

Operations

Pier D currently provides home port berths for two AOEs. Replacement of the two AOE berths at Pier D with a CVN home port would result in little change in operational noise in the vicinity of Pier D. Addition of one CVN and relocation of two AOEs would have a net personnel increase, therefore a net increase in average daily traffic of approximately 1,600 trips (see Table 4.9-4). This would correspondingly increase traffic noise on the approach roads to PSNS. Therefore, long-term increases in operational noise and traffic noise would result. Because the traffic noise increase would be minor, the overall noise impact would be considered adverse, but not significant.

4.11.2.4 *One Additional CVN: Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging

No dredging would be required. Therefore, no dredging noise impacts would occur.

Facility Improvements

No construction would be required. Therefore, no construction noise impacts would occur.

Operations

Addition of one CVN would increase the number of personnel commuting to PSNS. This would increase traffic on approach roads by approximately 3,800 trips per day with 535 trips during peak hour (see Table 4.9-4). This would be a relatively small traffic increase compared to the existing 23,000 trips per day generated by the base (see section 4.9.1.1). Base traffic is divided among numerous approach roads to the five gates around the base. The increased traffic would result in correspondingly small increases in traffic noise along the various approach roads. The changes, however, would not be distinguishable as increased noise levels, because when noise is generated by many sources of equal noise level, additional similar noise sources have very little effect on overall noise level. Thus, minor, but less than significant, traffic noise impacts would result.

4.11.2.5 Mitigation Measures

Because noise impacts would be less than significant, no mitigation is provided.

4.12 AESTHETICS

This section addresses the aesthetics, or visual resources, of the proposed PSNS home port site. Visual resources consist of topographic features such as landforms and bodies of water, and man-made features such as buildings, bridges, and recreational areas. The aesthetic quality of an area is evaluated by the extent that important visual resources are seen from view corridors (vantage points), or experienced from roadways, parks, or buildings (public and private).

4.12.1 Affected Environment

The proposed home port site at Pier D is within PSNS, adjacent to other waterfront piers where active and decommissioned Naval vessels are moored (DON 1995b). Vessels are visible from south of PSNS on SR 304 and SR 166 on the south shore of Sinclair Inlet. Surrounding PSNS waterfront structures include industrial sheds, buildings, drydocks, cranes, and railyards. The overall visual character is maritime industrial in nature (DON 1995b).

The proposed home port site is shielded from recreational development north of PSNS by the Military Support Area (MSA), which includes retail stores, recreational resources, and health care facilities. The waterfront, at elevations of between sea level and 25 feet above sea level, is also visually separated from residential areas off-station by the prominent bluff up to 100 feet in height running northeast to southwest through PSNS (DON 1989). The topography ensures that residential areas north of PSNS do not have views of industrial waterfront activities (DON 1989).

4.12.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The proposed action would result in a significant aesthetic impact if it would result in either of the following:

- Substantially adverse degradation of the quality of an identified visual resource, including but not limited to unique topographic features, undisturbed native vegetation, surface waters and major drainages, and parks or recreational areas; or
- Substantially adverse obstruction of any scenic vista or view visible to the public.

4.12.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging

Dredges and dredging equipment required for dredging of 425,000 cy of sediment would be consistent with the maritime-industrial visual character of PSNS. In addition, PSNS has a low level of visibility from surrounding residential areas and impacts would be short term. Therefore, impacts on aesthetics would be less than significant.

Facility Improvements

Construction activities at Pier D would be consistent with the maritime industrial visual character of PSNS. In addition, PSNS has a low level of visibility from surrounding residential areas and impacts would be short term. Therefore, impacts on aesthetics would be less than significant.

Operations

There would be no change in the number of ships homeported at PSNS, although the decommissioning of two CGNs would lead to more unobstructed views at and from PSNS. However, PSNS does not have high visibility from surrounding residential areas. Therefore, no adverse impacts on aesthetics would result.

4.12.2.2 Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs (Alternative One)

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging

Dredges and dredging equipment required for dredging of 425,000 cy of sediment would be consistent with the maritime-industrial visual character of PSNS. In addition, PSNS has a low level of visibility from surrounding residential areas and impacts would be short term. Therefore, impacts on aesthetics would be less than significant.

Facility Improvements

Construction activities at Pier D would be consistent with the maritime-industrial visual character of PSNS. In addition, PSNS has a low level of visibility from surrounding residential areas and impacts would be short term. Therefore, impacts on aesthetics would be less than significant.

Operations

The addition of one CVN and relocation of four AOEs would be visually consistent with the marine-industrial activity of the area. The nature of the seascape consistently changes with vessels calling and leaving the area. The additional CVN and relocation of four AOEs, in association with the decommissioning of two CGNs, would result in no net future change to this quality. In addition, PSNS has a low level of visibility from surrounding residential areas. Therefore, operational impacts on aesthetics would be insignificant.

4.12.2.3 Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs (Alternative Five)

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

Dredges and dredging equipment required for dredging of 425,000 cy of sediment would be consistent with the maritime-industrial visual character of PSNS. In addition, PSNS has a low level of visibility from surrounding residential areas and impacts would be short term. Therefore, impacts on aesthetics would be less than significant.

Facility Improvements

Construction activities at Pier D would be consistent with the maritime-industrial visual character of PSNS. In addition, PSNS has a low level of visibility from surrounding residential areas and impacts would be short term. Therefore, impacts on aesthetics would be less than significant.

Operations

The addition of one CVN and relocation of two AOEs would be visually consistent with the marine-industrial activity of the area. The nature of the seascape consistently changes with vessels calling and leaving the area. The additional CVN and relocation of two AOEs, in association with the decommissioning of two CGNs, would result in no net future change to this quality. In addition, PSNS has a low level of visibility from surrounding residential areas. Therefore, operational impacts on aesthetics would be insignificant.

4.12.2.4 One Additional CVN: Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

Because there would be no dredging, there would be no impacts on aesthetics.

Facility Improvements

Because there would be no construction, there would be no impacts on aesthetics.

Operations

The addition of one CVN would be visually consistent with the maritime-industrial activity of the area. The nature of the seascape consistently changes with vessels calling and leaving the area. The additional CVN, in association with the decommissioning of two CGNs, would result in no net future change to this quality. In addition, PSNS has a low level of visibility from surrounding residential areas. Therefore, operational impacts on aesthetics would be insignificant.

4.12.2.5 Mitigation Measures

Because impacts on aesthetics under all actions would be less than significant, no mitigation measures are proposed.

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4.13 CULTURAL RESOURCES

The cultural resources of PSNS have been studied as a result of previously approved projects. No cultural resources have been documented in the areas to be dredged, so these areas will not be considered in the following discussion. While most of the dredge material removed from the turning basins and alongside Piers D and B would be suitable for deep water disposal, some of the dredged material would require upland disposal.

4.13.1 Affected Environment

Overview

Human occupation of the State of Washington goes back at least 11,000 years, as established by recent finds east of the Cascades Range and on the Olympic Peninsula. While early groups focused on hunting terrestrial game, evidence of increased use of marine resources first appears in sites dating to about 5,000 years ago. Many of the traits associated with classic Northwest Coast adaptations, including cedar-plank longhouses, appear in sites dating to about 3,000 years ago. By this time, Native Americans living in the region had developed a life that focused on marine resources. They reached a level of social complexity normally only seen amongst groups that relied on agriculture. When the first European explorers arrived in the late 1700s, they found the Kitsap Peninsula to be inhabited by various groups, including the Suquamish. The Suquamish ceded ownership of lands around Sinclair Inlet in the Point Eliot Treaty of 1855 (Washington State OAHP 1987; Suttles 1990).

Euroamerican settlement of Puget Sound began in the 1830s and immigration increased dramatically in the 1850s. Logging became established as the primary industry in Puget Sound (Dodds 1986), and it continues to be important economically. Federal use of Sinclair Inlet began in 1891 with the purchase of 190 acres for a Naval base, and by 1896, a drydock and officer's quarters had been constructed. During the period around World War I, the facility continued to expand in response to the need for a larger Pacific Fleet. Near the beginning of World War II, the shipyard was the premier location for repairing large ships in the Pacific Fleet, and it played a key role in repairing ships damaged at Pearl Harbor on December 7, 1941. Following World War II, some vessels were deactivated at PSNS, but many were reactivated for use in the Korean War. Since that time, the base has continued to specialize in the repair and modernization of large vessels (DON 1989).

Cultural Resources in the Project Area

All of the areas that could be affected by the proposed project rest on fill that extended the original shoreline about 1,000 feet farther into Sinclair Inlet, indicating that any prehistoric cultural resources in the alternative project site area are not intact. Areas regarded as having a high potential for archaeological sites along the original shoreline that may still be intact are about 1,200 feet north of Pier D and about 950 feet north of Pier B, placing them well outside of the area that would be affected as a result of the proposed project at PSNS (see Figure 4.13-1 in Volume 4, section 4.13).

Four National Historic Districts and one National Historic Landmark have been established at PSNS, at a distance of 1,600 feet from the proposed action (see Figure 4.13-2 in Volume 4, section 4.13). The oldest of the four districts is Officer's Row, which contains military homes dating back to 1896. Structures of nearly equal age are present in the Old Puget Sound Radio Station District, which is immediately north of Officer's Row and consists of six buildings built between 1918 and 1941 to house radio facilities. The Old Marine Reservation District, containing four buildings built in the 1910s, reflects the history of using Marine units to defend the base. The youngest of the historic districts, the Old Naval Hospital, contains structures built from the early 1910s to World War II (DON 1989).

The largest historical resource is the World War II era drydock and pier facilities near the southeastern corner of the base, a registered National Historic Landmark. These structures are considered significant because of their association with important events in history, and they have retained much of their original function, maintaining their historical integrity. However, the base of Pier B is over 1,600 feet to the west of the landmark.

The historical significance of Piers B and D has already been assessed as a part of a historic survey of PSNS (Grulich Architecture and Planning Services 1986), in which each of the facilities was categorized according to its historical significance. The categories ranged from "1" to "4," but only Category 1 and 2 structures were considered to be eligible for inclusion on the NRHP. Both Piers B and D were placed in Category 3, meaning that they are not eligible for inclusion on the NRHP.

4.13.2 Environmental Consequences and Mitigation Measures

Significance Criteria

As outlined in the Federal regulations that implement the NHPA, the significance of project impacts are assessed only for those cultural resources that are considered "historic properties," which have been defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register" (36 C.F.R. 800.2 [e]). Therefore, the evaluation of historical significance is an important part of assessing impact significance. Evaluation of the significance of cultural resources is guided by specific criteria for listing on the NRHP, as defined in 36 C.F.R. 60.4, as augmented by appropriate state guidelines, and in consultation with the State Historic Preservation Officer. The quality of significance is present in districts, sites, buildings, structures, and objects that maintain the following attributes:

- Association with events that have made a significant contribution to the broad patterns of history;
- Association with the lives of persons significant in the past;
- Design or construction techniques that embody the distinctive characteristics of a type, period, or method of construction or represent the work of a master or possess high artistic value or represent a significant and distinguishable entity whose components may lack individual distinction; and
- Cultural materials, including artifacts, features, and other remains, that have yielded, or may be likely to yield, information important in prehistory or history.

The regulations at 36 C.F.R. 800 provide criteria for evaluating effects and determining whether or not the effects should be considered "adverse." For cultural resources, any "adverse effect" on a historic property, as defined by 36 C.F.R. 800.9, would be considered a "significant effect," as defined under NEPA, if it "diminished the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Significant effects (impacts) may include any of the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Alteration of the character of the property's surrounding environment (i.e., setting) that contributes to the property's qualification for the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or
- Neglect of a property resulting in its deterioration or destruction.

Other federal laws, including the American Indian Religious Freedom Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act, deal with cultural resources, but they do not establish criteria for determining significance of impacts. They only pertain after the pertinent cultural resources have been identified, or if their discovery seems likely.

4.13.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)*

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging

No cultural resources are located within the areas to be dredged, so removal of the dredged material would not impact cultural resources. All dredged material would be disposed of at approved and permitted locations. Therefore, no potential impacts to areas involving physical destruction, damage, or alteration of archaeological sites or other cultural resources would occur. No adverse impacts on cultural resources would occur. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Facilities Improvements

Pier D demolition and reconstruction of a new pier and utility extension would not directly impact any significant cultural resources within PSNS. No adverse impacts on cultural resources would occur. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Operations

Change in the operations of PSNS to provide the facilities and infrastructure for the existing CVN after the facilities improvements have been made would not alter any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. Therefore, this change in operations would have no adverse impacts on cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

4.13.2.2 Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs (Alternative One)

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging

No cultural resources are located within the areas to be dredged, so removal of the dredged material would not impact cultural resources. All dredged material would be disposed of at approved and permitted locations. Therefore, no potential impacts to areas involving physical destruction, damage, or alteration of archaeological sites or other cultural resources would occur. No adverse impacts on cultural resources would occur. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Facilities Improvements

Pier D demolition and reconstruction of a new pier and utility extension would not directly impact any significant cultural resources within PSNS. No adverse impacts on cultural resources would occur. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Operations

Change in the operations of PSNS to provide the capacity to homeport one additional CVN and the relocation of four AOEs would not alter any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. Therefore, this change in operations would have no adverse impacts on cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

4.13.2.3 Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs (Alternative Five)

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

Dredging associated with this alternative would not impact any recorded marine archaeological resources (shipwrecks). All dredged material would be disposed of at approved and permitted locations. Therefore, no potential impacts to areas involving physical destruction, damage, or alteration of archaeological sites or other cultural resources would occur. No adverse impacts on cultural resources would occur. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Facilities Improvements

Pier D reconstruction and utility extension would not directly impact any significant cultural resources within PSNS. No adverse impacts on cultural resources would occur. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Operations

Change in the operations of PSNS to provide the capacity to homeport one additional CVN and the relocation of two AOEs would not alter any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. Therefore, this change in operations would have no adverse impacts on cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

4.13.2.4 One Additional CVN: Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

As the no action alternative, no dredging would occur as a result of accommodating an additional CVN. Therefore, no impacts on cultural resources would result.

Facility Improvements

No facility improvements would be made under the no action alternative. Therefore, this alternative would not directly impact any significant cultural resources within PSNS, as no ground disturbances would occur.

Operations

Change in the operations of PSNS to accommodate one additional CVN would not alter any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. Therefore, this change in operations would have no adverse impacts on cultural resources.

4.13.2.5 Mitigation Measures

No impacts on cultural resources would occur under any of the actions discussed above. Therefore, no mitigation measures are required.

4.14 GENERAL SERVICES/ACCESS

This section discusses general services affecting Naval personnel quality of life, including recreational facilities, community support facilities, medical care, fire protection, and police protection. Schools and housing are addressed in section 4.8 (Socioeconomics). Access in and out of PSNS is also addressed, although specifics of vehicle movements of roadways are discussed in section 4.9 (Ground Transportation).

4.14.1 Affected Environment

Recreational Facilities

PSNS recreational facilities include four playing fields, tennis courts, bowling alley, gymnasium, and an auto hobby shop, and a new physical fitness center. SUBASE Bangor, 30 minutes away by public transit, provides additional limited recreational opportunities to PSNS personnel, although current demand for these facilities is very high (DON 1995b).

Regionally available Kitsap County recreational facilities include privately or semi-privately owned facilities and publicly owned facilities operated by state, county, or city governments, including six state parks and 23 county parks. Swimming, tennis, golf, and indoor sport facilities are available in the neighboring cities of Bremerton, Port Orchard, Silverdale, and other peninsula communities.

Community Support Facilities

Existing housing facilities at PSNS include five high-rise barracks with a capacity for 1,775 personnel; there is no family housing. PSNS has a commissary, chapel, family service center, military clubs, crafts shop, and child care center. Additional community support are available to the military community at SUBASE Bangor. Community support facilities at PSNS are adequate for the number of sailors currently stationed on PSNS-homeported ships (DON 1995b).

Medical Facilities

Medical facilities at PSNS include the Naval Hospital Bremerton (DON 1995b). The 148-bed facility includes an occupational health/prevention medicine unit and industrial dispensary (DON 1995b). It provides emergency care, in-patient care, out-patient care, family practice, and specialty clinics. Ambulance service is provided by the PSNS Fire Department. Other on-base facilities include the branch Medical Clinic and Naval Dental Clinic. The off-base Harrison Hospital also is available. Other non-military health services in the vicinity are doctor and dental offices and clinics. PSNS has agreements with the non-military hospitals and health care facilities to provide service.

Fire Protection

PSNS has two fire stations serving the facility, including sensors, alarms, and fire suppression systems. PSNS maintains reciprocal mutual aid agreements with the cities of Bremerton, Port Orchard, and Silverdale, and with Fire Protection District No. 7 (DON 1995b).

Law Enforcement

The PSNS Department of Defense police provides law enforcement protection (DON 1995b). A shore patrol in Bremerton provides security along waterfront areas. Boundary fencing, controlled gates, and patrols provide security. A Legal Services Office detachment is also provided.

Access

PSNS has six gates along the western and northern perimeter (Missouri Gate, Charleston Gate, State Gate, Main Gate, Retail Gate, and Naval Gate; see Figure 4.9-1) that provide access to the City of Bremerton (DON 1995b). Besides single-occupant vehicle use, PSNS is accessed by a variety of alternative transportation modes. Approximately 60 percent of commuters use these alternatives. These are discussed as follows (DON 1995b):

- *Auto and passenger ferry service* is provided between Bremerton and Seattle by the Washington State Department of Transportation. Passenger-only ferry service is available across the Sinclair Inlet between Bremerton and both Port Orchard and Annapolis.

- *Sidewalks* are located on many of the streets providing access to PSNS. In particular, the PSNS Main Gate is accessible within a reasonable walking distance from the Bremerton Ferry Terminal that provides service to Seattle, Port Orchard, and Annapolis.

- *Bus service* is provided by the Kitsap Transit District. The Navy contracts with the Transit District to provide special transit service, including 40 bus routes for PSNS employees. Visiting Navy vessels contract with the Transit District for bus service passes that are provided to Naval personnel and their dependents.

- *Car and van pools* are facilitated by the Kitsap Transit District.

4.14.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The proposed action would result in a significant impact on general services/access if it would result in any one of the following:

- A substantially adverse increase on the remaining service/access capacity;

- Reach or exceed the current capacity of the service/access such that accepted levels of service would not be maintained;

- Cause response times for fire protection or law enforcement to increase beyond their respective department standards; or

- Require development of new services/access beyond those existing or currently planned.

4.14.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Dredging and disposal of 425,000 cy of sediment would be temporary and the workforce would be local. Therefore, impacts on general services would be less than significant.

ACCESS

Because dredging would take place in the water and not on land, no impacts to land access would result. Dredging operations would be localized in existing Naval navigational channels and would not extend into commercial navigational channels. Therefore, no impacts on access would result.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Construction of homeporting facilities and infrastructure needed for the existing CVN would be temporary and the labor force would be local. Therefore, no impacts on general services would result.

ACCESS

Existing access routes would be sufficient to provide for construction required for homeporting facilities and infrastructure needed for the existing CVN. Construction would take place only on land, resulting in no impacts to water access. Impacts would be short term and less than significant.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

This action, in association with the decommissioning of two CGNs, would result in a net future decrease in military personnel and dependents by 1,200 persons. General services and access needs would continue to be met, and the net future decreased demand would cause beneficial impacts on general services/access.

4.14.2.2 *Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Dredging and disposal of 425,000 cy of sediment would be temporary and the workforce would be local. Therefore, no impacts on general services would result.

ACCESS

Because dredging would take place in the water and not on land, no impacts to land access would result. Dredging operations would be localized in existing Naval navigational channels and would not extend into commercial navigational channels. Therefore, no impacts on access would result.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Construction required for the addition of one CVN and relocation of four AOEs would be temporary and the labor force would be local. Therefore, no impacts on general services would result.

ACCESS

Existing access routes would be sufficient to provide for construction required for the addition of one CVN and relocation of four AOEs. Impacts would be short term and less than significant.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

The addition of one CVN and relocation of four AOEs , in association with the decommissioning of two CGNs, would result in a net future decrease in military personnel and dependents of 383 persons. General services and access needs would continue to be met, and the net future decreased demand would cause beneficial impacts on general services/access.

4.14.2.3 Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs (Alternative Five)

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Dredging and disposal of 425,000 cy of sediment would be temporary and the labor force would be local. Therefore, no impacts on general services would result.

ACCESS

Because dredging would take place in the water and not on land, no impacts to land access would result. Dredging operations would be localized in existing Naval navigational channels and would not extend into commercial navigational channels. Therefore, no impacts on access would result.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Construction needed for the addition of one CVN and relocation of two AOEs would be temporary and the labor force would be local. Therefore, no impacts on general services would result.

ACCESS

Existing access routes would be sufficient to provide for construction required for the addition of one CVN and relocation of two AOEs. Impacts would be short term and less than significant.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

The addition of one CVN and relocation of two AOEs , in association with the decommissioning of two CGNs, would result in a net future increase in military personnel and dependents of 817 persons. Existing facilities would reach maximum capacities. General services and access levels of service would not be reduced below historically accepted levels of service associated with periodic fluctuations the Bremerton population. Impacts would be adverse but not significant.

4.14.2.4 One Additional CVN: Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new facilities or dredging.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because no dredging would occur under this action, there would be no impacts on general services/access.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Because no construction would occur under this alternative, there would be no impacts on general services.

PSNS piers and turning basins, as currently configured, do not meet the requirements for water depth for homeporting CVNs. Water depth requirements are designed to limit fouling of ship's condensers and associated costly repairs. The piers designated as home port piers (B and D) presently impose severe limitations on the daily functions of a CVN, both operational and maintenance (lack of sufficient strength, laydown area, and width). Third, homeporting of a second CVN at PSNS and retention of the AOEs would cause PSNS to not be able to provide adequate support for CVN crew. PSNS would be over capacity in the areas of parking, housing, pier space, utilities, general services, and general land use.

ACCESS

Pier D would not be reconstructed to accommodate the CVN, creating access constraints to the ship. Impacts would be significant and unavoidable.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

The addition of one CVN, in association with the decommissioning of two CGNs, would result in a net future increase in military personnel and dependents by 2,017 persons. General services and access levels of service would not be reduced below historically accepted levels of service associated with periodic fluctuations in the Bremerton population, and there would be no feasible mitigation measures.

4.14.2.5 Mitigation Measures

Impacts under the no action alternative would not be mitigable. All other impacts on general services/access would be less than significant. No mitigation measures are proposed.

4.15 HEALTH AND SAFETY

4.15.1 Affected Environment

This section addresses health and safety issues related to the project alternatives at PSNS. All operations at PSNS are governed by the Navy Occupational Health and Safety (NAVOSH) program (DON 1994). Volume 3, section 3.15 provides a detailed summary of the content of this program, which is applied by the Navy.

NAVOSH Program

All PSNS operations supporting the ship come under the purview of PSNS NAVOSH program (DON 1995).

The Seattle OSHA office conducted a review of the NAVOSH program at PSNS in March 1994. In their overall assessment of the "Program Planning" section, OSHA concluded that PSNS integration of the Occupational Safety and Health Program Improvement Plan (OSHPIP) with the PSNS Corporate Operations Strategy Plan (COSP) was "an excellent system which places employee safety and health planning under the same management control system as production, quality, and cost containment issues."

In October 1995, the NAVOSH Oversight Inspection Unit conducted an oversight re-inspection of the NAVOSH program at NAVSHIPYD Puget Sound. The purpose of the re-inspection was to evaluate compliance with the NAVOSH program, gain an overview of program coordination throughout the command, and report the findings to a higher authority The 17-26 October 1995 Navy Inspector General (IG) findings were as follows:

> The Program Findings score was 94 percent, the highest score the Shipyard has ever attained; the Workplace Findings score was 84 percent. The overall NAVOSH rating was 89 percent (DON 1996c).

Additionally, PSNS was won numerous Navy awards for their Health and Safety programs, such as the 1995 and 1996 NAVSEA Award for Achievement in Safety Ashore (Large Industrial Activity) and the 1993-1996 NAVSEA, CNO, and Secretary of the Navy (SECNAV) awards for Environmental Excellence/Security (various).

Hazardous Materials Program

PSNS actively seeks and implements methods to reduce the risks inherent in the use of hazardous material and generation of hazardous waste through the following:

- Source reduction.
- Recycling hazardous waste for use in on-site and off-site processes.
- Treating hazardous waste to reduce it to a non-hazardous state, and/or to reduce the waste volume.

PSNS consolidated the hazardous material and hazardous waste programs into a single organization focused on integrated hazardous material management program, Code 910HZ. This program is described in Volume 4, section 4.15. The Navy continuously monitors its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes. For example, nonhazardous materials are substituted for hazardous materials wherever practicable, processes are changed to ones that do not employ hazardous materials, and care is taken to avoid contaminating nonhazardous materials with hazardous materials.

NNPP Radiological Impact

Chapter 7 provides detail on the radiological health and safety aspects of NNPP activities. Also, the Navy's safety and health record is well documented. As is discussed in the Navy's annual report (NNPP 1997a), procedures used by the Navy to control releases of radioactivity from Naval nuclear-powered ships and their support facilities have been effective in protecting the environment and the health and safety of the general public.

Other Federal Health and Safety Requirements

All proposed facilities at PSNS are designed, constructed, and operated to meet the requirements of Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, to ensure whenever feasible that pollution would be prevented or reduced at the source, that pollution that cannot be prevented would be recycled in an environmentally safe manner; that pollution that cannot be prevented or recycled would be treated in an environmentally safe manner; and that disposal or other releases to the environment would be employed as a last resort. These requirements are contained in all contractual documents for the design, construction, and operation of the proposed facilities. Operations such as the proposed action are required to comply with regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

4.15.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Impacts associated with hazardous waste generation are considered significant if the construction, and/or operation of the proposed action create either of the following:

- Substantially increases the risk of a hazardous substance release during construction; or
- Generates or otherwise manages hazardous materials in a manner that substantially increases the risk of hazardous waste upset (e.g., release or spill).

Facilities associated with the proposed action would be designed, constructed, and operated to meet the requirements of Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, to ensure whenever feasible that pollution would be prevented or reduced at the source, that pollution that cannot be prevented would be recycled in an environmentally safe manner; that pollution that cannot be prevented or recycled would be treated in an environmentally safe manner; and that disposal or other releases to the environment would be employed as a last resort. These requirements would be contained in all contractual documents for the design, construction, and operation of the proposed facilities. Operations would comply with regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

4.15.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)*

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging

Dredging activity would not be expected to involve handling of hazardous wastes. No potential for hazardous waste releases or upset impacts would occur.

Facility Improvements

Facility improvement construction activity would be short term. Any unexpected releases of hazardous substances during construction would be subjected to existing NAVOSH program procedures. These procedures would reduce potential impacts to health and safety to less than significant.

Operations

The decommissioning of two CGNs would result in a net future decrease in hazardous waste generation. This would result in a beneficial impact to health and safety.

Radiological effects would be the same as those identified under 4.15.2.2.

4.15.2.2 *Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging

Dredging activity would not be expected to involve handling of hazardous wastes. No potential for hazardous waste releases or upset impacts would occur.

Facility Improvements

Facility improvement construction activity would be short term. Any unexpected releases of hazardous substances during construction would be subjected to existing NAVOSH program procedures. These procedures would reduce potential impacts to health and safety to less than significant.

Operations

Hazardous waste generation associated with an additional CVN would be offset by the relocation of four AOEs in association with the projected future decommissioning of two CGNs. Operations would comply with the Navy's Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program, as well as regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act. The net future hazardous waste generation would be reduced so that the impact on health and safety would be beneficial.

A quantitative analysis of a hypothetical accident involving the release of hazardous substances at PSNS has been included in Volume 2 Appendix J. Using conservative assumptions, the analysis concludes that if an accident involving hazardous substances were to occur at PSNS without the currently established mitigation measures (such as emergency planning) in place, there could be a potential impact to safety and environmental health. However, as described in Volume 2 Appendix J, the Navy already has mitigation measures in place at PSNS which minimize the possibility of such an accident occurring, and minimize the impact if such an accident occurs. These mitigation measures include administrative controls for safe handling of hazardous substances, personnel protective equipment, and emergency response programs involving established resources such as fire departments and emergency command centers. In addition, since the number of carriers being maintained at PSNS would not change over present workload conditions, no additional impact would be incurred from CVN maintenance at PSNS.

Nuclear-powered ships homeported at PSNS and the propulsion plant maintenance facilities would comply with the NAVOSH program for the radiological aspects of the work. This program meets or exceeds all applicable OSHA regulations and has proven to be effective in ensuring safe and healthful conditions in the workplace. No significant occupational safety and health impacts are expected to occur.

PERSONNEL RADIATION EXPOSURE

Trained personnel would encounter radioactivity when performing work shipboard on the reactor plant, and in areas of the propulsion plant maintenance facilities that would handle radioactive materials (i.e., the controlled industrial facility, the mixed-waste storage facility, and the container storage facility). Personnel radiation exposure would be controlled using the same controls used in shipyards performing Naval nuclear work. Individual radiation worker exposure is strictly controlled, resulting in exposures well below the federally established limit of 5 rem per year. In fact, no shipyard worker has exceeded 2 rem per year since 1980 (NNPP 1997b). These controls are discussed further in Chapter 7.

The effectiveness of these controls is demonstrated by the fact that the average occupational exposure of shipyard personnel is less than three-tenths of a rem per year, which is equivalent to the amount of radiation exposure a typical person in the United States receives each year from natural background radiation. For workers performing the mixed-waste activities, their average occupational exposure is about 0.04 rem per year. With additional NIMITZ-class aircraft carriers at PSNS, radiation levels outside of the facilities that handle radioactive material would continue to be well below federal standards for permissible levels of radiation in uncontrolled areas. There would continue to be no distinguishable effect on the normal background radiation levels at the site perimeter (NNPP 1997a).

The risk to radiation workers from occupational radiation exposure related to nuclear propulsion plant maintenance is small compared to the risks accepted in normal industrial activities and compared to the risks regularly accepted in daily life outside work (NNPP 1997b). In 1991, researchers form the Johns Hopkins University in Maryland completed a comprehensive epidemiological study of the health of workers at the six Navy shipyards and two private shipyards that serviced Navy nuclear-powered ships. This independent study evaluated a population of over 70,000 civilian workers over a period from 1957 through 1981 to determine whether there was an excess risk of leukemia or other cancers associated with exposure to low levels of gamma radiation. This study did not show any cancer risks linked to radiation exposure.

Furthermore, the overall death rate among radiation-exposed shipyard workers was less than the death rate for the general U.S. population. In conclusion, the Johns Hopkins study found no evidence to conclude that the health of people involved in work on U.S. nuclear-powered ships has been adversely affected by exposure to low levels of radiation incidental to their work (NNPP 1997b). Thus, homeporting additional NIMITZ-class aircraft carriers and performing Naval nuclear propulsion plant maintenance, either aboard the ship or in shoreside maintenance facilities, would pose no significant radiological risk to other Navy personnel or to the general public.

RADIOACTIVE MATERIAL CONTROL

The principal source of radioactive materials encountered during Naval nuclear propulsion plant maintenance is from trace amounts of corrosion and wear products from reactor plant metal surfaces in contact with reactor coolant water, which is either deposited internally or contained in the coolant water. Radioactive materials would be strictly controlled to protect the environment and human health, utilizing the same proven methods used in shipyards performing Naval nuclear work. Examples of techniques used to control the spread of radioactive contamination include use of multiple boundaries, HEPA filters, and impermeable easily cleaned surfaces. In addition, frequent monitoring is performed to detect contamination. Only specially trained personnel are permitted to handle radioactive material.

Environmental monitoring at facilities supporting Naval nuclear-powered ships shows these controls have been effective in protecting the environment, and that radioactivity associated with Naval nuclear-powered ships has had no significant or discernible effect on the quality of the environment. The results of this monitoring are reported annually in publicly available reports (NNPP 1997a). Thus, since stringent control of radioactive materials would continue, there would be no significant impact on the environment from homeporting additional NIMITZ-class aircraft carriers at PSNS.

SOLID RADIOACTIVE WASTE

The Navy uses stringent controls to minimize the generation of radioactive waste from nuclear propulsion plant operation and maintenance. Radioactive waste is waste that contains man-made radionuclides as described in the Atomic Energy Act of 1954 and its implementing regulations. This waste includes radioactively contaminated rags, plastic bags, paper, filters, ion exchange resin, and scrap materials resulting from operations and minor, routine work aboard ship. Liquids that cannot be processed for reuse are solidified. Radioactive waste is strictly controlled to prevent loss, and is packaged in rigid containers, shielded as necessary, accumulated in a controlled storage area, and shipped to licensed burial sites. Radioactive waste from the propulsion plant maintenance facilities would be shipped to a commercial or Department of Energy burial site. Radioactive waste generated at PSNS is currently sent to the Hanford reservation in central Washington State for disposal. However, a controlled area would be available in the facility to manage waste for a limited period of time, should a commercial facility become unavailable. It is expected that for each CVN maintained at PSNS, approximately 325 cubic feet of low-level radioactive waste per year would be generated.

Mixed waste generated from NNPP activities is a mixture of low-level radioactive waste and chemically hazardous waste. The Navy has implemented strict controls to prevent, to the maximum extent practicable, mixing radioactive and chemically hazardous waste. However, small amounts of mixed waste (less than 3 cubic meters per year from each CVN) would be generated by the Navy and temporarily stored at PSNS. The mixed waste would be primarily solid in form. The radioactivity would be controlled as noted above. The chemically hazardous constituents of the waste would be regulated in accordance with Washington Administrative Code (WAC) 173-303, which implements the federal RCRA. Detailed characterization of NNPP mixed waste has been accomplished using sampling and extensive process knowledge, and has confirmed that the waste is suitable for safe storage until it is shipped off site for treatment and disposal. Mixed waste would be packaged in sealed containers, accumulated in a controlled area, and shipped to permitted treatment, storage, and disposal facilities. Mixed waste would be stored in a dedicated, controlled, mixed-waste storage facility that meets Navy, EPA, and State of Washington requirements for storing mixed waste. The mixed-waste storage facility complies with Washington state regulations (WAC 173-303). It is anticipated that this small amount of mixed waste would be stored pending availability of permitted treatment and disposal facilities.

The same effective methods used to control other radioactive materials and to minimize personnel radiation exposure would be used to control low-level radioactive and mixed wastes. Thus, there would be no significant radiological environmental impacts as a result of storing this waste generated by additional NIMITZ-class aircraft carriers at PSNS.

RADIOACTIVE MATERIAL TRANSPORTATION

All shipments of radioactive materials in the NNPP are required to be made in accordance with the applicable regulations of the U.S. Department of Transportation, the U.S. Department of Energy, and the U.S. Nuclear Regulatory Commission. In addition, the Navy has issued instructions to further control these shipments. These regulations and instructions ensure that shipments of radioactive materials are adequately controlled to protect the environment and the health and safety of the general public, regardless of the transportation route taken, and have proven to be effective.

There have never been any significant accidents involving release of radioactive material during shipment since the NNPP began. Shipments of radioactive materials associated with Naval nuclear propulsion plants have not resulted in any measurable release of radioactivity to the environment. The maximum exposure to any individual member of the public is far less than that received from natural background radioactivity. Carriers of radioactive materials are required to have accident plans that identify the actions to be taken in case of an accident, including notification of the civil authorities and communication with the shipment originator for guidance and assistance. The Navy would communicate with and cooperate fully with state radiological officials in the event of occurrences involving shipments of radioactive materials (NNPP 1997a). Thus, there would be no significant impacts related to shipment of radioactive materials with homeporting additional NIMITZ-class aircraft carriers at PSNS.

4.15.2.3 Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs (Alternative Five)

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

Dredging activity would not be expected to involve handling of hazardous wastes. No potential for hazardous waste releases or upset impacts would occur.

Facility Improvements

Facility improvement construction activity would be short term. Any unexpected releases of hazardous substances during construction would be subjected to existing NAVOSH program procedures. These procedures would reduce potential impacts to health and safety to less than significant.

Operations

The impacts of an additional CVN at PSNS would be small related to hazardous substance use. The PSNS mission of repairing carriers will not change as a result of CVN homeporting, and maintenance of ships is where the majority of hazardous substances are used. The existing NAVOSH program would apply and existing facilities are capable of accommodating any minor increase in hazardous material disposal. The impact is therefore less than significant.

Operations would comply with the Navy's Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program, as well as regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

A quantitative analysis of a hypothetical accident involving the release of hazardous substances at PSNS has been included in Volume 2 Appendix J. Using conservative assumptions, the analysis concludes that if an accident involving hazardous substances were to occur at PSNS without the currently established mitigation measures (such as emergency planning) in place, there could be a potential impact to safety and environmental health. However, as described in Volume 2 Appendix J,. the Navy already has mitigation measures in place at PSNS which minimize the possibility of such an accident occurring, and minimize the impact if such an accident occurs. These mitigation measures include administrative controls for safe handling of hazardous substances, personnel protective equipment, and emergency response programs involving established resources such as fire departments and emergency command centers. In addition, since the number of carriers being maintained at PSNS would not change over present workload conditions, no additional impact would be incurred from CVN maintenance at PSNS.

Radiological effects would be the same as those identified under section 4.15.2.2.

4.15.2.4 *One Additional CVN: Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging

No dredging would occur; therefore, no impacts on health and safety would occur.

Facility Improvements

No facility improvement development would occur; therefore, no impacts on health and safety would occur.

Operations

The impacts of an additional CVN at PSNS would be small related to hazardous substance use. PSNS mission of repairing carriers will not change as a result of CVN homeporting and maintenance of ships is where the majority of hazardous substances are used. The existing NAVOSH program would apply and existing facilities are capable of accommodating any minor increase in hazardous material disposal. The impact is less than significant.

Operations would comply with the Navy's Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program as well as regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

A quantitative analysis of a hypothetical accident involving the release of hazardous substances at PSNS has been included in Volume 2 Appendix J. Using conservative assumptions, the analysis concludes that if an accident involving hazardous substances were to occur at PSNS without the currently established mitigation measures (such as emergency planning) in place, there could be a potential impact to safety and environmental health. However, as described in Volume 2 Appendix J, the Navy already has mitigation measures in place at PSNS which minimize the possibility of such an accident occurring, and minimize the impact if such an accident occurs. These mitigation measures include administrative controls for safe handling of hazardous substances, personnel protective equipment, and emergency response programs involving established resources such as fire departments and emergency command centers. In addition, since the number of carriers being maintained at PSNS would not change over present workload conditions, no additional impact would be incurred from CVN maintenance at PSNS.

Radiological effects would be the same as those identified under section 4.15.2.2.

4.15.2.5 Mitigation Measures

None of the facilities and infrastructure required to support an additional CVN at PSNS would result in significant impacts to health and safety; therefore, no mitigation measures are proposed.

4.16 UTILITIES

This section addresses utilities including energy (natural gas and electricity), fuel supply, drinking water, wastewater (sanitary, industrial, and oily industrial) disposal, stormwater disposal, solid waste (hazardous and non-hazardous waste) disposal, steam, and compressed air, which is required to serve the proposed PSNS home port site.

4.16.1 Affected Environment

The PSNS Facilities and Maintenance Department is responsible for all major utilities servicing PSNS. Several upgrades were made to support the homeporting of the CVN (DON 1995b).

Pier D is presently home port for two AOE-class ships. PSNS has three AOEs, with a fourth scheduled to arrive in 1998. Utilities at Pier D are considered minimally adequate to support a CVN. Utilities serving the demands of the west end of PSNS, particularly electrical service, are not sufficient to meet the demand when several ships are moored at the piers and at Drydock #6. As a result, operational restrictions are placed on ships to avoid exceeding the utility system capacity (DON 1997).

4.16.1.1 Energy

Natural Gas

Natural gas at PSNS is provided by Cascade Natural Gas. Gas is transmitted to the PSNS power plant by a 6-inch line (DON 1995b). The system has a capacity of 360,000 cubic feet/hour (cfh) with a steady-state load (average operating flow) of 90,000 cfh.

Electricity

Electricity is provided to PSNS by the Bonneville Power Administration. Minor and backup service is provided by Puget Power (DON 1995b). PSNS has an extensive electrical distribution system. Pier B electrical service was upgraded to support homeporting of the CVN. Similar facilities exist at the proposed homeporting berth at Pier D. Emergency electrical power is supplied by the PSNS power plant, capable of providing 11.6 MVA. Total capacity of the electrical system in the home port area (west end of PSNS) is 34 MVA.

4.16.1.2 Fuel Supply

The PSNS fuel supply is trucked from the Naval Supply Center, Puget Sound (Manchester Fuel Depot) to PSNS (DON 1992, 1989). The Manchester Fuel Depot includes 33 underground fuel tanks, the largest underground defense storage facility in the continental United States (DON 1989). Ten diesel fuel tanks have a 4.77-million-barrel capacity, and 28 jet fuel tanks have a 1.369-million-barrel capacity (DON 1989).

4.16.1.3 Water Supply

The City of Bremerton, Public Works Department provides potable water to PSNS through a 24-inch transmission pipeline and a series of 8-, 12-, and 24-inch distribution lines along Montgomery Street, Rodgers Street, Farragut Street, and Callow Avenue (DON 1995b). The PSNS system has an estimated peak flow rate of 7.5 mgd. Potable water is distributed to the pier and wharf area with a maximum flow of 3,000 gpm. Total available water capacity is 7.5 mgd, with a steady-state load of 2.5 mgd.

4.16.1.4 Wastewater Disposal

Sanitary Wastewater

PSNS sanitary wastewater is subject to secondary treatment at the City of Bremerton Wastewater Utility, Charleston Wastewater Treatment Plant. Wastewater is transported from vessels by on-board pumps into pier sewage lines (DON 1992). The capacity of the sanitary sewer piping at Pier B, the existing CVN berth, is 1.4 mgd (DON 1995b). Wastewater is conveyed from PSNS to the city plant through a series of lines that route the wastewater into two pumping stations that are connected to the city's piping. The capacity of the PSNS system is 2.16 mgd and an average flow rate of 1.125 mgd.

Industrial Wastewater Disposal

Industrial wastewater results from cleaning equipment activity from onshore maintenance building showers, sinks, laundry, and floor drains; and vessel deck drains, galley drains, bilgewater (water collecting inside the lowest point of the ship's inner hull from seepage or leakage), and equipment cooling water; brine solutions; and refrigerant emissions (DON 1995b). All industrial wastewater from these ships is processed through the industrial wastewater pretreatment plant. Onshore showers, sinks, laundry, and floor drains go to the city sewer. The PSNS industrial waste treatment plant has a capacity of approximately 3,000 gpd, approximately 1,000 gpd for chrome, and approximately 1,000 gpd for cyanide. Effluent from the plant discharges to the PSNS sewer system (DON 1989). An Industrial Discharge permit is required for disposal of the waste stream discharge.

Oily Wastewater

Oily wastewater (including water brake fluid, catapult piston oil, and grease) from ships and barges is processed at the PSNS sanitary sewer. The current oily wastewater system, which has been in use for the last 4 years, has doubled the capacity of the previous system, which was a 66,000-barrel storage capacity (DON 1989). The oily wastewater is separated, the clean water is discharged into the city POTW, the oil is collected by a contractor for recycling, and sludge residue is collected by a contractor who transports the waste to an approved hazardous waste storage and disposal facility (DON 1989).

4.16.1.5 Stormwater Disposal

PSNS stormwater disposal is provided by a conventional drainage system that carries runoff to the Puget Sound through approximately 100 outfalls (DON 1989). Stormwater is not collected on shipyard piers and is not affected by CVN berthing activities (DON 1995b). Oil/water separators are located at various locations within PSNS and collect storm runoff and isolate any oil before it enters the Puget Sound (DON 1989). The stormwater system is capable of accommodating the current annual runoff capacity. Discharge of stormwater in the Puget Sound is discussed in section 4.2.

4.16.1.6 Solid Waste Disposal

Non-Hazardous Waste

Solid waste and potentially recycled materials are separated by a private contractor at the station. Approximately 644 tons/month of non-recyclable refuse, and 163 tons/month of non-recyclable wood is transported to the Kitsap County landfill (DON 1989). Approximately 60 tons/month of recyclable material are taken to the station's recycling center.

Hazardous Waste

Hazardous waste generated at PSNS is stored in approved containers designed for this purpose up to 365 days (DON 1989) before being transported by a contracted waste hauler to a licensed hazardous waste treatment storage and disposal facility offsite (see section 4.15 for additional discussion of hazardous waste storage procedures).

4.16.1.7 Steam

Steam is required at PSNS for industrial activity, building (office, residence, and industrial) heating, and hot water. The steam system at Pier B has a capacity of 30,000 pounds per hour (pph) at 150 pounds per square inch.

4.16.1.8 Compressed Air

Compressed air used for industrial activities is generated at the PSNS steam plant (DON 1995b). The low pressure air (LPA) is distributed throughout the station through a supply main system, operated at approximately 80 pounds per square inch gauge (psig). The total compressed air capacity is 45,000 standard cubic feet per minute (scfm), with a maximum peak demand of 27,000 scfm.

4.16.2 Environmental Consequences and Mitigation Measures

The greater Kitsap County regional utility grid can accommodate any of the proposed actions at PSNS. The proposed PSNS operations at full capacity would not impact regional utilities during peak demand. The incremental increased demand is below maximum capacity, is a utilization of previously available capacity, and is not considered an increase. Therefore, utilities which are accommodated for by current systems would have a less than significant impact on the overall environment.

Significance Criteria

The proposed action would result in a significant impact on utility systems if it would result in any one of the following:

- Use a substantial proportion of remaining system capacity;
- Reach or exceed the current capacity of the system; or
- Require development of new facilities and sources beyond those existing or currently planned.

The facilities associated with the proposed project would be designed, constructed, and operated to meet the requirements of Section 306 of Executive Order 12902 to minimize the life cycle cost of the facilities by utilizing energy efficiency, water conservation, or solar or other renewable energy techniques when they are cost effective. These considerations are contained in all contractual documents for the design, construction, and operation of Naval facilities.

4.16.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)*

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Dredging and disposal of 425,000 cy of sediment would place minimal additional demands on these utilities. Dredging would occur over an approximate 10-month period, resulting in short term and less than significant impacts.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Construction required for homeporting facilities and infrastructure needed for one existing CVN would place minimal additional demands on these utilities. Construction would occur over an approximate 20-month period, resulting in short term and less than significant impacts..

Operations

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

PSNS has an existing shortage of electrical power to support CVNs on the west end of the shipyard, although this would be alleviated by the reconstruction of Pier D, which would increase electrical capacity to 60 MVA. This would result in a less than significant impact on electricity. All other utilities currently meet the demands at PSNS, and they would continue to do so with one existing CVN. In addition, these utility demands would decrease in association with the future decommissioning of two CGNs. Therefore, beneficial operational impacts on utilities would result.

4.16.2.2 *Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Dredging and disposal of 425,000 cy of sediment would place minimal additional demands on these utilities. Dredging would occur over an approximate 10-month period, resulting in short term and less than significant impacts.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Construction required for one additional CVN and the relocation of four AOEs would place minimal additional demands on these utilities. Construction would occur over an approximate 20-month period, resulting in short term and less than significant impacts.

Operations

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

PSNS has an existing shortage of electrical power to support CVNs on the west end of the shipyard, although this would be alleviated by the reconstruction of Pier D, which would increase electrical capacity to 60 MVA. This would result in less than significant impacts on electricity. All other utilities currently meet the demands at PSNS, and they would continue to do so with the addition of one CVN and relocation of four AOEs because additional demands caused by one additional CVN would be more than offset with the relocation of four AOEs and decommissioning of two CGNs. For example, the net future demand would be within the historical PSNS hazardous waste storage and treatment capacities associated with the shipyard's maintenance mission. Therefore, beneficial operational impacts on utilities would result.

4.16.2.3 *Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Dredging and disposal of 425,000 cy of sediment would place minimal additional demands on these utilities. Dredging would occur over an approximate 10-month period, resulting in short term and less than significant impacts.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Construction required for the addition of one CVN and relocation of two AOEs would place minimal additional demands on these utilities. Construction would occur over an approximate 20-month period, resulting in short term and less than significant impacts.

Operations

ENERGY

Natural Gas. CVN demands on natural gas would be minimal and accommodated for by the current system (DON 1988). Therefore, operational impacts on natural gas would be less than significant.

Electricity. One additional CVN would require maximum electrical capacity equivalent to 16,000 amps at 450 volts (DON 1994). The relocation of two AOEs, in association with the decommissioning of two CGNs would decrease demand by 19,200 amps at 450 volts (DON 1988). PSNS has an existing shortage of electrical power to support CVNs on the west end of the shipyard, although the reconstruction of Pier D would correct this deficiency and increase capacity to 60 MVA. This would provide ample electricity to meet the demands associated with the additional CVN and relocation of two AOEs. Therefore, the net decreased demand of 3,200 amps at 450 volts would result in beneficial impacts to electricity.

FUEL SUPPLY

CVN demands on the fuel supply would be minimal and accommodated for by the large supply of fuel tanks at Manchester (DON 1988). Therefore, operational impacts on the fuel supply would be less than significant.

WATER SUPPLY

One additional CVN would demand approximately 185,000 gpd of potable water during peak demand, and the relocation of two AOEs, in association with the future decommissioning of two CGNs would decrease demand by 32,200 gpd (DON 1988). Therefore, the net change would be an additional 152,800 gpd. The current distribution system would be adequate to meet increased demands. Therefore, impacts on the water supply would be less than significant.

WASTEWATER DISPOSAL

Sanitary Wastewater. While one CVN generates approximately 171,000 gpd of sewage during peak production, the relocation of two AOEs would decrease demand by approximately 60,000 gpd (DON 1994). The sanitary sewer system at Pier B has sufficient capacities to meet the increased demand of 111,000 gpd. Therefore, impacts on sanitary wastewater would be less than significant.

Industrial Wastewater Disposal. One additional CVN and the relocation of two AOEs would not generate appreciable amounts of industrial wastewater, except during CVN maintenance, when the maintenance facility would produce 16,500 gpy of industrial wastewater (DON 1995a). The current system would adequately handle this demand. Therefore, operational impacts on the industrial wastewater disposal would be less than significant.

Oily Wastewater. One additional CVN would generate a maximum of 440,000 gpy of oily wastewater (DON 1994), and the relocation of two AOEs, in association with the decommissioning of two CGNs would decrease the production by approximately 75 percent of this amount, 330,000 gpy (based on a size comparison of CVN and AOE personnel). Therefore, the net change in oily wastewater production would be an additional 110,000 gpy. The current system would be adequate to meet these demands. Therefore, impacts on oily wastewater disposal would be less than significant.

STORMWATER DISPOSAL

Operations of homeporting facilities and infrastructure needed for one additional CVN and the relocation of two AOEs would not effect stormwater disposal. Therefore, no impacts on stormwater disposal would result.

SOLID WASTE DISPOSAL

Non-Hazardous Waste. Using the average solid waste generation rate of 3.7 pounds per person per day (DON 1994), non-hazardous waste generated at PSNS by homeporting facilities and infrastructure needed for one additional CVN and the relocation of two AOEs would increase by 3,023 pounds per day (an increase of 817 personnel x 3.7 pounds per person), which would be transported to a landfill. However, because this increase is small compared to the total non-hazardous wastes generated at PSNS, impacts on non-hazardous wastes would be less than significant.

Hazardous Wastes. Increases in hazardous waste for one additional CVN would be partially offset by the relocation of two AOEs, in association with the decommissioning of two CGNs. The net future demand would be within the historical PSNS hazardous waste storage and treatment capacities associated with the shipyard's maintenance mission. Therefore, operational impacts on hazardous waste storage would be less than significant.

STEAM

The steam demand for one CVN would be 15,500 pph. During CVN maintenance, this demand would be 2,200 mega BTU per year. The relocation of two AOEs, in association with the decommissioning of two CGNs would decrease this demand by 16,300 pph (DON 1988). The net future increase of 33,700 pph would be met by the steam system at Pier B. Therefore, impacts on steam would be less than significant.

COMPRESSED AIR

One CVN would demand 2,400 scfm of compressed air plus, during CVN maintenance, an additional 2,800 scf per year, and the relocation of two AOEs, in association with the decommissioning of two CGNs would decrease this demand by 5,400 scfm (DON 1988). The net decreased demand of 3,000 scfm would result in beneficial impacts. During CVN maintenance, the net increased demand of 2,000 scfm would be met by the PSNS Steam Plant. Therefore, these impacts on compressed air would be less than significant.

4.16.2.4 One Additional CVN: Total of Two CVNs (Alternative Six: No Action)

The No Action Alternative would not require any new improvements.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no dredging would occur, no impacts on these utilities would result.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no construction would take place, no impacts on these utilities would result.

Operations

Natural Gas. Additional demands by one additional CVN on natural gas would be minimal and accommodated for by the current system (DON 1988). Therefore, operational impacts on natural gas would be less than significant.

Electricity. A CVN requires maximum electrical capacity equivalent to 16,000 amps at 450 volts (DON 1994). The decommissioning of two CGNs would decrease this demand by approximately 12,800 amps at 450 volts (DON 1988), resulting in a net increased demand of 3,200 amps. However, because Pier D would not be reconstructed, there would be a deficiency of electrical power. Although power restrictions would be implemented, this would result in an unavoidable adverse impact.

FUEL SUPPLY

CVN demands on the fuel supply would be minimal and accommodated for by the large supply of fuel tanks at Manchester (DON 1988). Therefore, operational impacts on the fuel supply would be less than significant.

WATER SUPPLY

A CVN requires approximately 185,000 gpd of potable water at peak demand. The decommissioning of two CGNs would decrease this demand by approximately 32,200 gpd (DON 1988). Therefore, the net increased demand of an additional 152,800 gpd. The current distribution system would meet the demands on the water supply. Therefore, impacts on the water supply would be less than significant.

WASTEWATER DISPOSAL

Sanitary Wastewater. A CVN generates approximately 171,000 gpd of sewage at peak production. The decommissioning of two CGNs would decrease this production by approximately 60,000 gpd

(DON 1994). The sewer piping at the existing CVN berth, Pier B, has sufficient capacities to meet the increased demand of 111,000 gpd. Therefore, impacts on sanitary wastewater would be less than significant.

Industrial Wastewater. A CVN does not generate appreciable amounts of industrial wastewater, except during CVN maintenance when the maintenance facility produces 16,500 gpy of industrial wastewater (DON 1995a). The PSNS industrial waste treatment plant would have sufficient capacities to meet this demand. Therefore, impacts on industrial wastewater disposal would be less than significant.

Oily Wastewater. A CVN generates a maximum of 440,000 gpy of oily wastewater (DON 1994). The decommissioning of two CGNs would decrease the production rate by approximately 40 percent of this amount, 176,000 gpy (based on a size comparison of CVN and CGN crew size). The net increased production would be an additional 264,000 gpy. The existing oily wastewater treatment facilities would be sufficient in handling this demand. Therefore, operational impacts on oily wastewater would be less than significant.

STORMWATER DISPOSAL

The addition of one CVN would not generate any additional stormwater at PSNS, and, as such, would not require additional stormwater improvements. Therefore, no impacts on stormwater disposal would result.

SOLID WASTE DISPOSAL

Non-Hazardous Waste. Using the average solid waste generation rate of 3.7 pounds per person per day (DON 1994), non-hazardous waste generated by one additional CVN, and in association with the baseline relocation of two CGNs, would increase by 7,463 pounds per day (2,017 personnel x 3.7 pounds per person). This would be an increase of approximately 112 tons/month, which would be a an adverse but less than significant impact.

Hazardous Waste. Increases in hazardous waste for one additional CVN would be offset by the decommissioning of two CGNs and would not exceed existing storage and treatment capacities at PSNS (DON 1995b). Therefore, operational impacts on hazardous waste storage would be less than significant.

STEAM

Maximum demands for steam would be 15,500 pph plus, during CVN maintenance, 2,200 mega Btu per year (DON 1988). The decommissioning of two CGNs would decrease demand by approximately 5,100 pph (DON 1988). Therefore, the net increase during normal operation would be a demand of an additional 44,900 pph. Existing steam production at Pier B would meet the demands of operations of one additional CVN. Therefore, impacts on steam would be less than significant.

COMPRESSED AIR

One CVN would demand 2,400 scfm of compressed air plus, during CVN maintenance, an additional 2,800 scf per year (DON 1988). The decommissioning of two CGNs would decrease demand by 2,400 scfm (DON 1988). Therefore, the net increase would be a demand of an additional 2,800 scfm during CVN maintenance. The PSNS steam plant would provide compressed air that would be adequate in meeting the increased demand. Therefore, operational impacts on compressed air would be less than significant.

4.16.2.5 *Mitigation Measures*

In the instance that electrical power would be deficient (see section 4.16.2.4), power restrictions would be implemented, thereby ensuring that electrical demands would not exceed capacity. However, a shortage of electrical power would still remain. Impacts on all other utilities would be less than significant. No further mitigation measures are proposed.

4.17 ENVIRONMENTAL JUSTICE

This section addresses the proposed action's potential to generate disproportionately high and adverse human or environmental effects on minority and low-income populations, as required under Executive Order 12898. As part of this directive, the federal agency must promote enforcement of all health and environmental strategies in areas where minority and low-income populations reside. Identifying differential patterns of natural resource consumption and ensuring greater public participation is required. In addition, federal agencies may provide project information to non-English speaking populations whenever practicable and appropriate (DON 1995b). The EPA Office of Solid Waste and Emergency Response (OSWER) *Environmental Justice Task Force Draft Final Report* (EPA 1994) recommends identifying minority or low-income communities in the vicinity of the proposed action to determine whether they may be disproportionately or adversely affected by the proposed action, identifying any proposed action health and safety risks, and proposing ways to distribute project information and potential effects to affected communities. Guidance provided by the Council on Environmental Quality (CEQ 1997) has been considered in developing the environmental justice analysis presented below.

Also addressed in this section is the proposed action's potential to generate disproportionately high environmental health and safety risks to children, as required under Executive Order 13045. This executive order was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. Under this order, the federal agency must ensure that its policies, programs, activities, and standards address disproportionate environmental health or safety risks to children that result from the project, described as those risks to health or safety that are attributable to product or substances that the child is likely to come into contact with or ingest. These impacts include increases in noise levels in public school areas, which could disrupt children while they are in a learning environment.

4.17.1 Affected Environment

Minority Populations

No minority or low-income populations live adjacent to PSNS. Land uses in the PSNS home port site vicinity include commercial and utility properties, and parking lots (DON 1995b).

Information on the presence of minority populations in the vicinity of the home port site is found in the 1990 Census. The census provides demographic information in terms of Kitsap County, Washington State, and the United States. Although the census data are over 7 years old, they are the only current statistical information available for population composition analysis. They are presented in Table 4.17-1.

Kitsap County figures are used to characterize populations in the vicinity of PSNS that could be affected by the proposed action. The county is primarily white, with small percentages of minorities. Kitsap County's composite of minority populations is generally similar to the state of Washington. These data indicate that residential areas adjacent to the PSNS project alternate site do not contain a disproportionate minority population.

The Suquamish Tribe, considered a minority under Section 1-101 of Executive Order 12898, has a reservation approximately 9 miles north of PSNS. The Sinclair Inlet between the reservation and

Table 4.17-1. Kitsap County Minority Populations

	Kitsap County		Washington State	
Ethnicity	*Number*	*Percent*	*Number*	*Percent*
White	171,063	90.2	4,308,937	88.5
Black	5,107	2.7	149,801	3.1
Native American	3,211	1.7	81,483	1.7
Asian/Pacific Islander	8,282	4.4	210,958	4.3
Other	2,068	1.1	115,513	2.4
Total	**189,731**	**100.0**	**4,866,692**	**100.0**

Source: DON 1995b.

PSNS is part of the Suquamish Tribe's "Usual and Accustomed fishing places" that were established by the federal act creating the Oregon Territory, and subsequently upheld by Court actions (Bureau of Indian Affairs [BIA] 1979). This area, as shown on Figure 4.17-1, includes the CVN homeporting berth and dredging areas. The Suquamish also have a salmon terminal fishery at Gorst Creek, at the terminus of the Sinclair Inlet, southwest of PSNS. The Suquamish fish for the salmonid species raised at the Gorst Creek fishery using drift net and gill net methods in the Sinclair Inlet. The Muckleshoot Tribe, also considered a minority under Section 1-101 of Executive Order 12898, also maintains "Usual and Accustomed fishing places" within the "saltwater of Puget Sound" established under the Treaty of Point Elliot (BIA 1978) that includes the PSDDA Elliott Disposal Site near Seattle. "Usual and Accustomed fishing places" were defined based on historical accounts of where Native American tribes customarily fished during and before the time treaties were established (BIA 1978). The treaty reserved the right of members to take fish from these fishing places, and was upheld in the case *United States v. Washington* No. 9213, January 1, 1977. Tribes have been guaranteed the opportunity to take up to 50 percent of the harvestable anadromous (species that spawn, such as salmon and steelhead trout) fish that are associated with these fishing places, as necessary to provide the population with a moderate standard of living (COE 1986). Native American tribe fishing activity is an integral component of their holistic world view, as well as providing subsistence.

The Puget Sound Dredge Disposal Analysis (PSDDA) program (see section 4.4 for additional discussion), developed jointly by the U.S. Army Corps of Engineers and Washington state natural resource agencies, resulted in a protocol for land use decision-making related to sediment disposal (COE 1988). Impacts to the social and natural environment resulting from projected sediment disposal were also considered, including those on Native American tribe fishing and terminal fishery activity.

Income

As discussed previously, residential populations do not live adjacent to the home port site. Based on an analysis in 1995, approximately 15 percent of non-military households in Kitsap County are considered "low income" (earning below 50 percent of the median income), while 4 percent of Navy households earn below that amount. Combined, 13 percent of Kitsap County households are characterized as low income (DON 1995b). These income data also indicate the relative lack of lower income populations in the regional vicinity of the PSNS home port site.

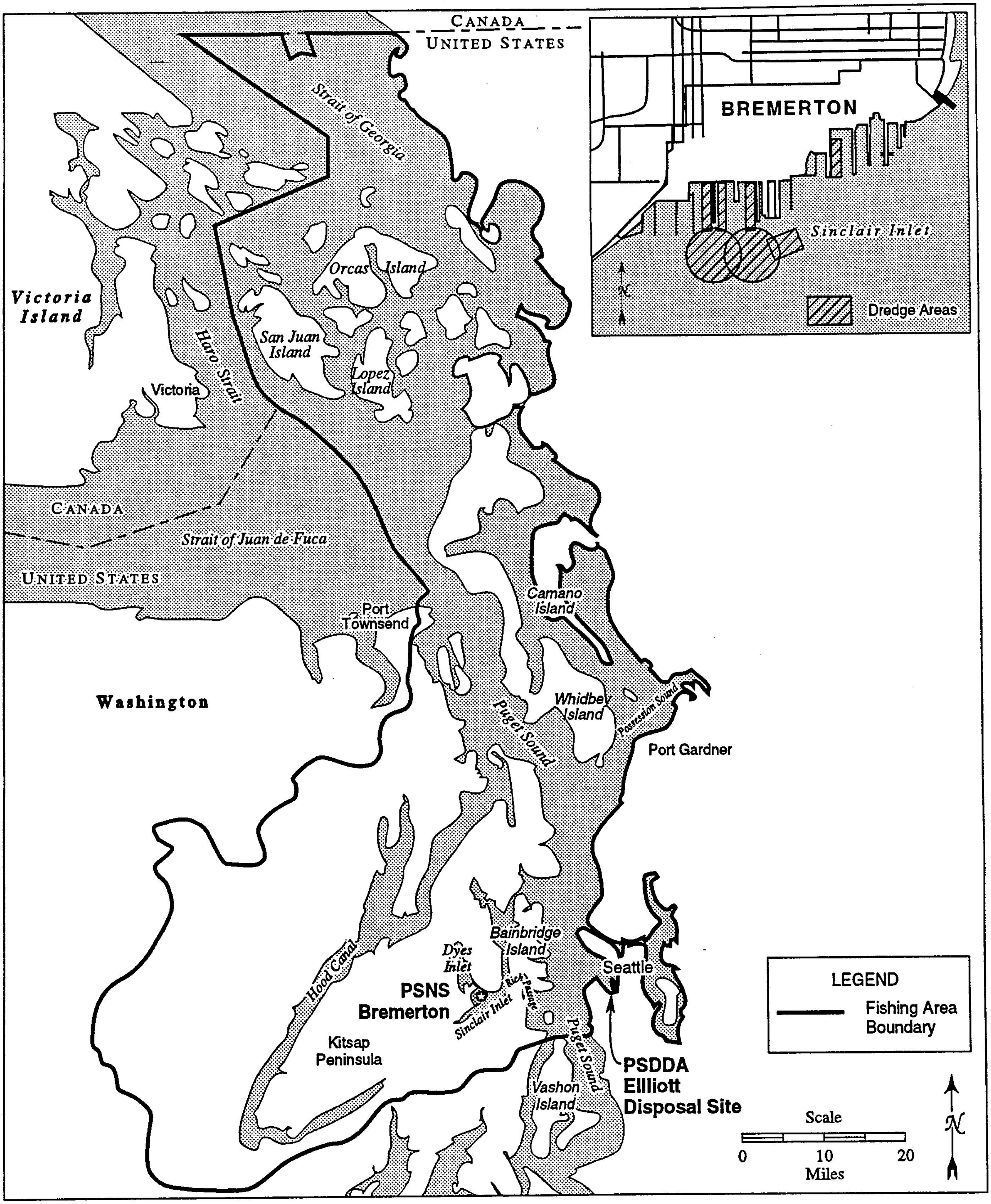

Figure 4.17-1. Suquamish Tribe Usual and Accustomed Fishing Areas

Public Participation and Informational Access

The proposed action has been subject to public participation as required under NEPA. The EIS Notice of Intent (NOI) was circulated to neighborhood and community groups who have demonstrated an interest in or are considered likely to show interest in the environmental review process. Navy personnel met with members of the Suquamish Tribe on 30 January 1997 to brief them on the proposed action, anticipated project schedule, and regional issues. The meeting was designed to help maximize the tribe's opportunities for future involvement. A scoping meeting was held at Bremerton High School on 3 February 1997 (see section 1.6) to solicit input on the EIS scope of investigation.

Local Public Schools and Day Care Facilities

The school districts that potentially could be impacted by increased noise levels are Central Kitsap, North Kitsap, and Bremerton school districts. These districts have a total of 20, 11, and 11 public schools, respectively, located at varying distances from the project site. In addition, day care facilities are located within 0.25 miles of PSNS Bremerton.

4.17.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The proposed action would result in a significant impact on environmental justice if it would result in any one of the following:

- Degrading the health and safety of low-income or minority communities disproportionately when compared to the regional population;
- Causing a disproportionately high and adverse impact on members of low-income or minority communities adjacent to the proposed action area;
- Failing to provide for or encourage effective participation of members of low-income or minority communities adjacent to the proposed action area in the associated environmental review and decision-making process;
- Relocating public schools within a 65-dBA CNEL contour that was not previously located in such an area; or
- Substantially increasing project air emissions of carbon monoxide (CO), toxic pollutants, or odors to sensitive receptors (such as day care centers and hospitals) in proximity to the project site.

Public participation in this environmental impact analysis is described in section 4.17.1.

4.17.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternatives Two, Three, Four)

Alternatives Two, Three, and Four consist of dredging turning basins plus Pier D replacement.

Dredging

The dredging and disposal of 425,000 cy of material would result in increased use of the waters near the Sinclair Inlet and the Suquamish Tribe's "Usual and Accustomed fishing places." This impact would be short term, and, would not significantly preclude tribal members from sharing in the short-term economic benefits of the proposed action associated with dredging. In addition, as shown in Figure 4.17-1, the proposed dredge footprint is a very small proportion of the tribe's total fishing area. Dredged sediment disposal impacts at the PSDDA Elliott Disposal Site within the Muckleshoot Tribe's "Usual and Accustomed fishing places" have been previously addressed during development of the PSDDA program.

Public schools and day care centers are all further from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care centers would be located within a 65-dBA CNEL contour (see section 4.11.2.1). In addition, dredging activity would be short term and not located near any schools or day care centers. Air emissions from dredging equipment would not result in any additional health risk at schools or day care facilities. Therefore, impacts on environmental justice would be less than significant.

Facility Improvements

Facility improvement construction required for the homeporting facilities and infrastructure needed for one existing CVN, including reconstruction of Pier D, would not affect the Sinclair Inlet. Therefore, no impacts on environmental justice would result.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 4.11.2.1). In addition, construction activity would be short term and not located near any schools or day care centers. Air emissions from construction activities would not result in any additional health risk at schools or day care facilities. Therefore, no impacts on environmental justice would result.

Operations

No additional CVN, together with the decommissioning of two CGNs, would lead to a net future decrease in activity near the Sinclair Inlet and the Suquamish Tribe's "Usual and Accustomed fishing places" and terminal fishery. Therefore, these operational impacts on environmental justice would be beneficial.

The decommissioning of two CGNs would result in decreased adverse environmental impacts. As such, air quality impacts would decrease, resulting in a reduced exposure of children, including those in neighboring day care centers, to air pollutants. Therefore, beneficial impacts on environmental justice would result.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65 dBA CNEL contour (see section 4.11.2.1). This would result in no impacts on environmental justice.

4.17.2.2 *Facilities for One Additional CVN and Relocation of four AOEs: Capacity for Total of Two CVNs (Alternative One)*

Alternative One consists of dredging turning basins plus Pier D replacement.

Dredging

Dredging would be the same as described above in section 4.17.2.1. Therefore, impacts on environmental justice would be less than significant.

Facility Improvements

Facility improvement construction, including reconstruction of Pier D, would not affect the Sinclair Inlet.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 4.11.2.2). In addition, construction activity would be short term and not located near any schools or day care facilities. Air emissions from construction activities would not result in any additional health risk at schools or day care facilities. Therefore, no impacts on environmental justice would result.

Operations

The relocation of four AOEs and addition of one CVN, in association with the decommissioning of two CGNs, would result in a net future decrease in the use of the waters around PSNS. This would lead to a decreased level of activity near the Sinclair Inlet and the Suquamish Tribe's "Usual and Accustomed fishing places" and terminal fishery. Therefore, these operational impacts on environmental justice would be beneficial.

The relocation of four AOEs and addition of one CVN would reduce emissions of NO_x, SO_2, and PM_{10}. Emissions of VOC and CO would increase due to an increase in commuter vehicle traffic. Since the PSNS traffic analysis determined that roadways in proximity to the facility would not be significantly impacted by project traffic, resulting air quality impacts from these sources would also be less than significant. Consequently, air quality impacts to children, including those in day care centers in proximity to PSNS, would be less than significant.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care centers would be located within a 65-dBA CNEL contour (see section 4.11.2.3). This would result in no impact on environmental justice.

4.17.2.3 *Facilities for One Additional CVN and Relocation of two AOEs: Capacity for Total of Two CVNs (Alternative Five)*

Alternative Five consists of dredging turning basins plus Pier D replacement.

Dredging

Dredging would be the same as described above in section 4.17.2.1. Therefore, impacts on environmental justice would be less than significant.

Facility Improvements

Construction would be the same as described in section 4.17.2.2. Therefore, impacts on environmental justice would be less than significant.

Operations

One additional CVN and relocation of two AOEs, in association with decommissioning of two CGNs, would result in a net future decrease in the use of the waters around PSNS. This would lead to a decreased level of activity near the Sinclair Inlet and the Suquamish Tribe's "Usual and Accustomed fishing places" and terminal fishery. Therefore, these operational impacts on environmental justice would be beneficial.

One additional CVN and the relocation of two AOEs would reduce emissions of NO_x, SO_2, and PM_{10}. Emissions of VOC and CO would increase due to an increase in commuter vehicle traffic. However, since the PSNS traffic analysis determined that roadways in proximity to the facility would not be significantly impacted by project traffic, resulting air quality impacts from these sources would also be less than significant. Consequently, air quality impacts to children, including those in day care centers in proximity to PSNS, would be less than significant.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 4.11.2.3). This would result in no impact on environmental justice.

4.17.2.4 *One Additional CVN: Total of Two CVNs (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging

Because no dredging would take place, there would be no impacts on environmental justice.

Facility Improvements

Because no construction would take place, there would be no impacts on environmental justice.

Operations

One additional CVN, in association with decommissioning of two CGNs, would result in a net future decrease in the use of the waters around PSNS. This would lead to a decreased level of activity near the Sinclair Inlet and the Suquamish Tribe's "Usual and Accustomed fishing places" and terminal fishery. Therefore, these operational impacts on environmental justice would be beneficial.

One additional CVN would increase emissions from pollutants due to commuter vehicles, which is the main source of emissions associated with the project. However, since the PSNS traffic analysis determined that roadways in proximity to the facility would not be significantly impacted by project traffic, resulting air quality impacts from these sources would also be less than significant. Consequently, air quality impacts to children, including those in day care facilities in proximity to PSNS, would be less than significant.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 4.11.2.4). This would result in no impact on environmental justice.

4.17.2.5 Mitigation Measures

All impacts on environmental justice would be less than significant. No mitigation measures are proposed.

4.18 CUMULATIVE IMPACTS

In this section, the proposed action is analyzed in relation to the other projects in the area. Cumulative impacts on environmental resources result from the incremental effects of the project when added to other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from minor but collectively significant actions undertaken over a period of time. In accordance with NEPA, a discussion of past projects, those under construction, proposed actions, or projects that are reasonably anticipated to be built in the near future are included. This section addresses the cumulative impacts associated with the action at PSNS that has the greatest potential for adverse environmental impacts, either the One Additional CVN and Relocation of two AOEs: Total of Two CVNs (Alternative Five), or One Additional CVN: Total of Two CVNs (Alternative Six: No Action), in combination with other military and civilian projects in the area. In order to ensure a comprehensive impact analysis, this section considers the region of influence for each environmental resource area for which cumulative impacts are evaluated, and the timeframe during which all reasonably foreseeable projects would occur. The combined impact of the proposed action and reasonably foreseeable projects is discussed. When the proposed action's incremental contribution to the cumulative impact is significant, mitigation is proposed to reduce this effect. Guidance provided by the Council on Environmental Quality (CEQ 1997) has been taken into account in developing the cumulative analysis presented below.

Reasonably Foreseeable Projects

A total of 13 approved, planned, and reasonably foreseeable projects have been included in this analysis. These projects are identified on Figure 4.18-1, and are summarized below.

1. PSNS Recreational Facility Construction

An additional recreational facility on PSNS property was completed in 1998. This facility provides increased availability of recreational opportunities.

2. Maintenance Improvements

These improvements at the shipyard would modernize buildings 426 and 450 for an Industrial Support Complex. Access bridges would be built between Drydock #6 and Pier B at the north and south ends. This project is scheduled for fiscal year 2002.

3. Drydock #1 Maintenance Dredging

Dredging at Drydock #1 for maintenance purposes is in the early design phase. Both the quantity of material and timeframe for operations have net yet been determined.

4. Callow Avenue Drainage Basin Project

A new storm sewer drainage system for the Callow Avenue Basin, which borders PSNS and extends north and west to Kitsap Way, and Corbett Drive, was completed in 1998. The new sewer provides more sewer pipe length and a more efficient drainage system.

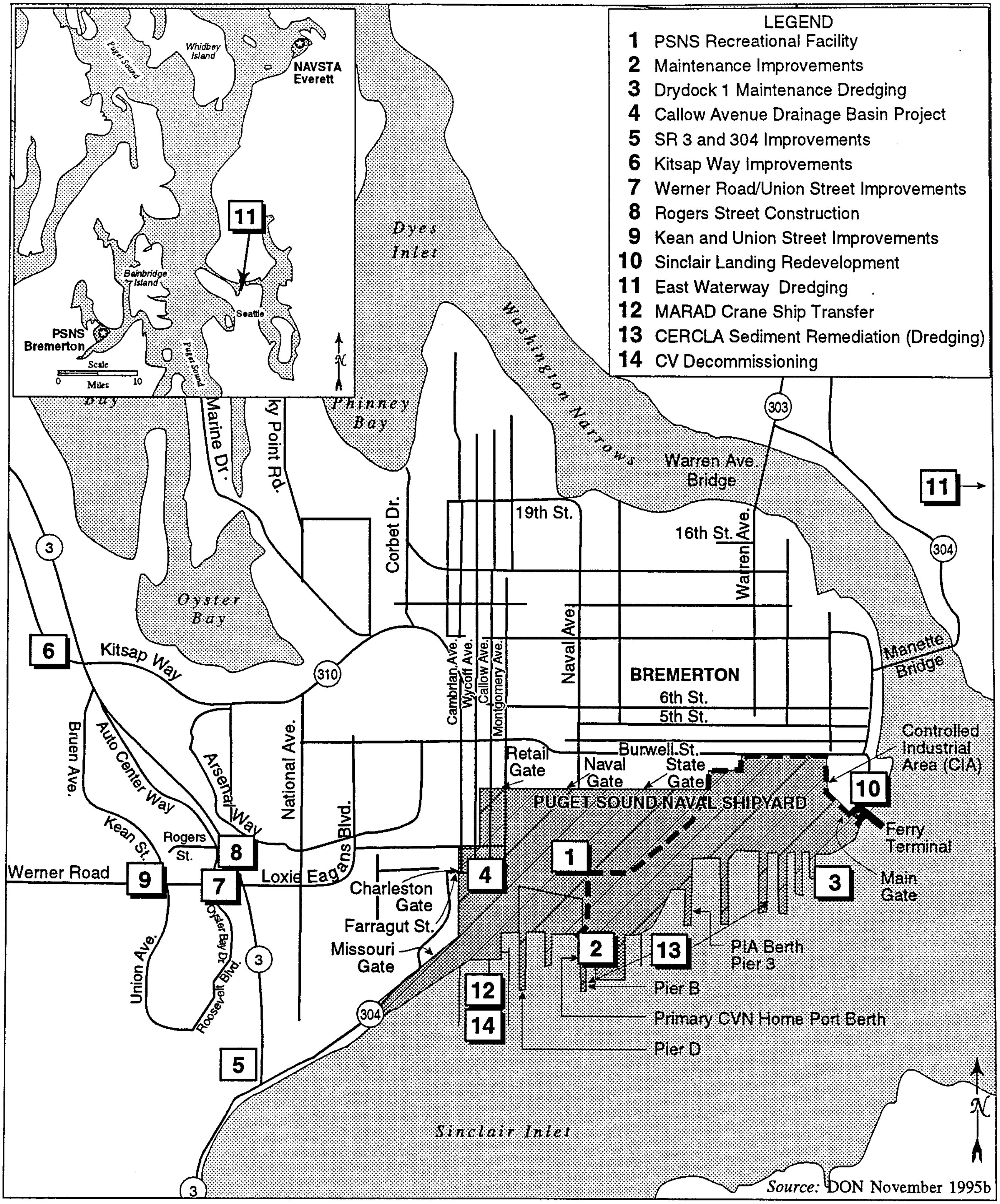

Figure 4.18-1. Projects Considered in Cumulative Impact Analysis

5. Improvements to State Routes 3 and 304

A CIP project on State Routes 3 and 304 from approximately Oyster Bay Avenue to Washington Avenue will improve road conditions on this segment of highway. A portion of this project borders PSNS, and may reduce future transportation congestion. This project has commenced and construction will continue through the year 2001.

6. Kitsap Way Improvements

Construction of improvements on Kitsap Way east of State Route 3 began in 1998.

7. Werner Road/Union Street Improvements

Minor surface road improvements to Werner Road and Union Street will take place in 1998 and 1999.

8. Rodgers Street Construction

As part of the City of Bremerton's CIP projects, Rodgers Street will be reconstructed in 1998 and 1999.

9. Kean and Union Streets Improvements

The intersection at Kean and Union streets will be upgraded in 1998, and completion is expected by 1999.

10. Sinclair Landing Redevelopment

This redevelopment project is approximately 10 city blocks in area and represents an effort to revitalize the downtown area adjacent to the ferry terminal. The project involves pier construction, dredging, demolition, and redevelopment. With the introduction of newer and faster ferries to Seattle, the area is expected to attract more visitors. The project would include mixed uses of residential, commercial, and entertainment space. The first construction phase of this project is currently underway. Other construction phases of this project are undetermined at this time.

11. East Waterway Dredging

The East Waterway of the Duwamish River in Seattle will be dredged to -51 feet MLLW to improve navigational access in the Waterway from Elliott Bay to Terminal 25 and South Terminal 18. Approximately 400,000 cy of material will be dredged. Much of the dredged material is expected to be unsuitable for unconfined aquatic disposal, and both confined aquatic disposal and upland sites are considered for dredged material disposal. This project is located over 17 miles from the proposed action at PSNS Bremerton and is outside the region of influence for all resource areas except environmental justice.

12. MARAD Crane Ship Transfer

Transfer of two Maritime Administration (MARAD) crane ships with Reduced Operating Status to the Naval Inactive Ship mooring area at PSNS Bremerton was completed in January 1998. These two ships displaced three Navy Ready Reserve Fleet (RRF) ships that were transferred to the RRF Suisun Bay, California. A skeleton crew of nine persons accompanies each of the two relocated vessels. Berths were modified to provide utilities for these ships. No other facility requirements were implemented.

13. CERCLA Sediment Remediation

Dredging of marine sediments at PSNS for remediation purposes is being considered under the PSNS CERCLA (Superfund) program. This dredging could occur over a wide area of PSNS. The volume of material to be dredged has not been determined, but would likely range between 100,000 and 400,000 cubic yards. All or part of this material could be disposed of in a CAD facility along with contaminated material from homeport dredging. The balance of material, if any, would be disposed in an existing, appropriately permitted upland landfill, transported by train or truck. CERCLA dredging could be conducted concurrently with homeport dredging (during the years 2000-2001), or it could occur later.

14. CV Decommissioning to the Naval Inactive Ship Maintenance Facility (NISMF)

The CVs that have been homeported at NASNI would be decommissioned upon their replacement by CVNs. The decommissioned ships would most likely be sent to the Naval Inactive Ship Maintenance Facility (NISMF) in Bremerton. The Navy plans to moor these ships at Moorings E, F, or G. This is consistent with past Navy practice to hold recently decommissioned ships in reserve for several years if needed for a national emergency. When the ships are no longer useful in this capacity, they are typically sold for scrap. There are no plans to moor these ships at any one of the three mooring buoys in Sinclair Inlet. NISMF in Bremerton is the only Pacific Fleet location available to moor these deep draft ships. The Navy is not proposing to increase the size of NISMF facilities at Bremerton.

In addition to the projects described above, a series of capital improvement projects (CIPs) for sewer and water piping are planned over the next 6 years. These projects will enhance utility service in the City of Bremerton (personal communication, T. Richard 1997).

CUMULATIVE IMPACTS FOR EACH ENVIRONMENTAL RESOURCE

4.18.1 Topography, Geology, and Soils

The region of influence for topography, geology, and soils includes the entire Kitsap Peninsula region, due to the interrelated nature of the geology and soils of this region. The timeframe for projects considered in this analysis includes past, present, and reasonably foreseeable projects. Past projects are included in the cumulative impact analysis since existing structures would be exposed to the same earthquake-related hazards as those affecting reasonably foreseeable project construction. Significance criteria described in section 4.1.2 are applicable to the cumulative analysis.

Analysis of the distribution of past, present, and reasonably foreseeable projects suggests that many of the projects are clustered on or immediately adjacent to Puget Sound Naval Shipyard (Nos. 1, 2, 3, 4, and 10) and the city streets of southwest Bremerton (Nos. 7, 8, and 9). A significant seismic event, however, would have the potential to affect all of the project sites concurrently. The addition of one CVN and relocation of two AOEs (Alternative Five) would result in a small incremental increase of people and property exposed to earthquake-related hazards. Reasonably foreseeable projects on the Kitsap Peninsula involving new structural development (e.g., PSNS Recreational Facility Construction, Maintenance Improvements, City of Bremerton CIPs, and Sinclair Landing Redevelopment) would be exposed to earthquake-related hazards such as ground acceleration, ground shaking, liquefaction, and settlement. Most of these reasonably foreseeable projects are also located adjacent to Puget Sound where hydraulic fill soils with a high potential for liquefaction are prevalent.

Potential seismic impacts associated with the proposed action, in combination with potential seismic impacts associated with past and reasonably foreseeable projects, could potentially result in increased cumulative impacts from the overall loss of use of naval facilities and infrastructure development in the entire Kitsap Peninsula region. Alternatives 1, 2, 3, or 5 would add incrementally to risks to property and human safety associated with geologic hazards and erosional hazards; however measures incorporated into the proposed action would reduce the incremental effects such that there would not be a cumulatively significant impact.

The addition of one CVN and relocation of two AOEs would also result in a small incremental increase of people and property exposed to flooding hazards in the event of 100-year storms. Those projects adjacent to the shoreline could also be subject to tsunamis and seiches, although these hazards are very rare and would likely not occur during the projects' operational lifespan. Reasonably foreseeable projects in the vicinity of the Puget Sound Naval Shipyard would be potentially affected by coastal flooding. Potential flooding impacts associated with the proposed project, in combination with potential flooding impacts associated with past and reasonably foreseeable projects, may result in increased cumulative impacts with respect to overall loss of use of facilities along the waterfront area. However, measures incorporated into the project, including incorporation of building code regulations and flood control features, reduce the incremental effects such that there would not be a cumulatively significant impact.

Reasonably foreseeable project construction would be completed primarily within previously developed areas where the topography is generally flat. However, construction could result in excessive soil erosion and resultant water quality impacts if not completed properly. Because many of these construction projects are somewhat clustered and are occurring simultaneously, potential erosional impacts associated with the proposed project, in combination with potential erosional impacts associated with past and reasonably foreseeable projects, may result in increased cumulative impacts with respect to water quality impacts (surface water and marine waters) in the Kitsap Peninsula area. However, measures incorporated into the project, including soil compaction and incorporation of standard erosion control features, reduce the incremental effects such that there would not be a cumulatively significant impact, and no mitigation measures are required.

Maintenance dredging at Drydock #1 would create an incremental increase in bathymetry at PSNS. Dredging would temporarily disrupt underwater depositional processes, but depositional equilibrium would be reestablished within a short period and no regional, long-term depositional disruptions would occur. Dredging would primarily occur within previously dredged areas and associated impacts would generally be confined to the immediate vicinity of the dredged area. Impacts would be less than significant. Dredging as part of the Sinclair Landing Redevelopment as well as the East Waterway are geographically separated from the proposed project and potential impacts are confined to the immediate vicinity of the dredged area. Dredging as part of CERCLA Sediment Remediation or Drydock #1 maintenance dredging could occur concurrently with homeport dredging. These cumulative projects would create an incremental increase in bathymetry changes in marine waters in the vicinity of PSNS. Dredging would temporarily disrupt submarine depositional processes, however, depositional equilibrium would be reestablished within a short period of time and no regional, long-term depositional disruptions would occur. Dredging would primarily occur within previously dredged areas. Impacts would generally be confined to the immediate vicinity of the dredged area and would be less than significant.

In conclusion, cumulative impacts on geological resources would be reduced to less than significance through appropriate mitigation measures, and the proposed action's contribution to cumulative impacts from the addition of one CVN and relocation of two AOEs under the proposed action would be less than significant, and no mitigation measures are required.

4.18.2 Terrestrial Hydrology and Water Quality

The region of influence for terrestrial hydrology and water quality includes the Kitsap Peninsula and Kitsap Lake, as surface and groundwater resources in these areas is used for public water supply. Projects in this area that locally impact water quality also have the potential to impact water quality of the region as a whole. Projects considered in this analysis are those occurring from 1998 to 2005, as well as past projects which have influenced the water quality of the region. Due to the high rate of recharge of groundwater and the history of relatively little pollution in the area, water quality in the region of influence is generally good.

Analysis of the distribution of past, present, and reasonably foreseeable projects suggests that many of the projects are clustered on or immediately adjacent to Puget Sound Naval Shipyard (Nos. 1, 2, 3, 4, and 10) and the city streets of southwest Bremerton (Nos. 7, 8, and 9). With the exception of the Navy Maintenance Improvements project (No. 2), which is expected to occur in 2002, and the proposed project, which is expected to occur from 2000 to 2002, naval projects have either been completed (No. 1) or have no timeframe for construction (No. 3). Construction for the street improvement projects are generally occurring simultaneously through 1999. Those projects occurring simultaneously and/or in close proximity would potentially result in an increase in cumulative impacts.

The addition of one CVN and relocation of two AOEs (Alternative Five) would not significantly impact surface or groundwater. Standard erosion control measures and pollution control measures would be incorporated to reduce construction impacts on water quality to below a level of significance. Construction and operations of the land-based reasonably foreseeable projects, all of which are located within the region of influence, could produce discharges that would flow into surface or groundwater sources. If not designed properly, these projects could result in stormwater degradation, contaminating discharges, release of toxic substances, and release of hydrocarbons or related contaminants.

Because some of these projects are geographically clustered and/or could potentially occur simultaneously, potential water quality impacts associated with the proposed project, in combination with potential water quality impacts associated with past and reasonably foreseeable projects, may result in increased cumulative water quality impacts in the Kitsap Peninsula area. However, measures incorporated into the project, including compliance with applicable federal, state, and local regulations such as a National Pollutant Discharge Elimination System (NPDES) permit, mandating management plans to regulate soil and groundwater contamination, and hazardous materials releases, reduce the incremental effects such that there would not be a cumulatively significant impact. All of these reasonably foreseeable projects would be required to comply with applicable federal, state, and local regulations such as a National Pollutant Discharge Elimination System (NPDES) permit, mandating management plans to regulate soil and groundwater contamination, and hazardous materials releases. Soil and groundwater remediation related to the homeporting of one CVN, in conjunction with any similar remediation occurring during other related project development in the vicinity, would be a beneficial cumulative impact.

4.18.3 Marine Water Quality

The region of influence for marine water quality includes marine waters potentially affected by the proposed action and other proposed development projects in the area are the waters impacted by proposed dredging, construction and disposal sites, and the adjacent waters of Sinclair Inlet. The quality of marine waters in the vicinity of PSNS is also affected by sediment quality in Sinclair Inlet and by inputs from terrestrial areas. The time period considered includes recent historical and present-day conditions, as well as future projects. Reasonably foreseeable development projects occurring in the area between 1998 and 2005 are those considered in the cumulative analysis. The significance criteria for cumulative impacts to water quality are the same as those described in section 4.3.

The principal impacts to water quality from the proposed action would be increased suspended solids concentrations, which leads to other water quality changes such as reduced light transmittance, increased oxygen demand leading to reduced DO, increased nutrients levels, and increased levels of toxic chemical associated with suspended particulates. Project actions would be implemented in conformance with permit conditions intended to protect water quality, and impacts to water quality would be less than significant.

Of the 13 reasonably foreseeable projects in the region, only the Sinclair Landing Redevelopment, Maintenance Improvements, Drydock #1 Maintenance Dredging, and CERCLA Sediment Remediation would have direct impacts on marine water quality. The Maintenance Improvements project is likely to overlap in time with the reconstruction of Pier D, but not with home port dredging. The first phase of the Sinclair Landing project that would affect water quality, improvements to the state ferry terminal, are underway and are expected to be complete by the end of 1999. The timing for later phases of this project has not been determined, but would probably be later than home port construction. Therefore, the Sinclair Landing project is not likely to overlap in time with proposed action home port construction and dredging. The CERCLA Sediment Remediation project could occur concurrently with the homeport dredging and pier reconstruction, or could occur later. The Drydock #1 Maintenance Dredging, if it occurs, could be concurrent with the home port dredging, or could occur later. The Maintenance Improvements project is located near Pier B (Figure 4.18-1). The Sinclair Landing project is located approximately three-quarters of a mile northeast of Pier 3 (the closest homeport construction site). CERCLA Sediment Remediation could be carried out at several marine areas along the PSNS shoreline. Drydock #1 is located approximately one-third mile northeast of Pier 3.

All of these reasonably foreseeable projects involve dredging and/or in-water construction to some degree. Their water quality impacts would be similar to those of the homeporting project: short-term increases in turbidity and related water quality effects. The water quality impacts of the Maintenance Improvements and the first phase of the Sinclair Landing project are likely to be minor, and the Sinclair Landing project is not expected to overlap in time with home port construction. If the CERCLA Sediment Remediation and Drydock#1 Maintenance Dredging (and disposal) are conducted concurrently (sequentially) with the home port dredging and disposal, there could be cumulative impacts to water quality. However, the same "environmental" dredging and other measures to minimize water quality impacts for the home port dredging (section 4.3.2) would also be used for these other two projects. Therefore, the temporary water quality effects of dredging would be extended but would be unlikely to have significant or long-term effects on biota. The combined improvement in sediment quality that would result from the CERCLA Sediment Remediation, Drydock #1 Maintenance Dredging, and the home port dredging would be likely to result in an improvement in water quality in the long-term.

The Maintenance Improvements and Sinclair Landing projects also involve land-based demolition or construction adjacent to Puget Sound, potentially resulting in increased transport of contaminants contained in stormwater runoff that, if not regulated, could significantly impact marine water quality. The proposed action's wastewater runoffs would be regulated under a NPDES permit, and non-point source runoff would be regulated under a general stormwater permit. The remainder of the reasonably foreseeable projects are all CIP improvements to existing roadways and drainage systems. They would not impact marine water quality. Measures incorporated into the proposed action, including compliance with permit conditions as well as proposed mitigation, reduce the incremental effects such that there would not be a cumulatively significant impact on marine water quality.

4.18.4 Sediment Quality

The region of influence of potential cumulative impacts to sediment quality include the marine sediments at PSNS and adjacent areas in Sinclair Inlet that would be affected by dredging, disposal, filling, construction, and operation of homeported ships. The time period considered includes historical and present-day conditions, as well as future projects. Reasonably foreseeable projects analyzed are those that would occur from the present through 2005. The significance criteria for cumulative impacts to sediment quality are the same as those described in section 4.4.

Potential impacts to sediment quality associated with the proposed action include minor changes in physical and conventional characteristics of surface sediments of the dredging sites, temporary reductions in dissolved oxygen in surface sediments, and degraded sediment quality should fuel or other hazardous substances discharged from ships at the shipyard. However, as described in section 4.4.2.1, these impacts are not expected to be significant. In addition, dredging and construction activities could result in slightly lower concentrations of toxic chemicals in the surface sediments. The effective removal of contaminated sediments at the site during dredging and containment in CDF or CAD sites would improve the environmental quality at the dredge sites.

The Sinclair Inlet Redevelopment, Drydock #1 Maintenance Dredging, and CERCLA Sediment Remediation and Maintenance Improvements projects would involve in-water work including pier construction and dredging. The overlap of these projects in time and space with the homeporting project is discussed in section 4.1.8.3. The short-term sediment impacts of all of these projects would be similar to those described for the proposed action (section 4.4.2): minor and minimized through the use of measures to protect water quality during construction (section 4.3.2). The proposed action in combination with the other projects would not result in significant cumulative impacts to sediments. In the long term, the CERCLA Sediment Remediation is intended to improve sediment quality, and the homeport dredging/disposal and Drydock #1 Maintenance Dredging should also result in some improvement in sediment quality. This would result in a beneficial cumulative impact to sediment quality.

The Sinclair Landing and Maintenance Improvement projects also involve land-based demolition or construction adjacent to Puget Sound and could result in increased transport of contaminants by stormwater runoff that, if not regulated, could significantly impact sediment. Direct discharges of reasonably foreseeable project wastewaters would be regulated under a NPDES permit, and non-point source runoff would be regulated under a general stormwater permit. Monitoring associated with these programs would be conducted to ensure that the reasonably foreseeable project discharge would meet applicable water quality objectives. In addition, the City of Bremerton CIP projects are all roadway or drainage improvements, and would have minimal adverse impacts on sediment quality. Measures incorporated into the proposed action, including compliance with permit conditions as well as proposed mitigation, reduce the incremental effects such that there would not be a cumulatively significant impact on sediment quality.

Although cumulative impacts to marine sediment quality from historical inputs combined with other past, present, and future projects may contribute to reduced sediment quality, the incremental contributions to impacts associated with the reasonably foreseeable projects are likely to be less than significant. Because sediments are the sink for many contaminants in aquatic systems, sediment quality impacts tend to be less temporary than water quality impacts. Therefore, it is not necessary for two or more projects to coincide in order to have cumulative impacts on sediment quality. Still, the proposed action, when combined with other reasonably foreseeable projects, would not have significant cumulative impacts on sediment quality. The sediment impacts of each of the projects considered would be small (the sediment impacts of the homeporting project would actually be slightly beneficial) such that, even when taken together, the total impacts would not result in substantial degradation of sediments or adverse effects on biota. The proposed action would have a less than significant impact on sediment quality, and therefore a less than significant contribution to cumulative impacts on sediment quality. No mitigation measures are required.

4.18.5 Marine Biology

The marine biological resources region of influence includes communities that could be affected by reasonably foreseeable development projects occurring at PSNS and its vicinity, and those occurring in the dredging, construction, and disposal sites and adjacent waters of Sinclair Inlet. These communities include plankton, algae, benthic and epibenthic invertebrates, fish, birds, and marine mammals. The proposed action is within the geographical range of migratory fish and foraging range of marine birds and mammals that move in and out of the area. Historical conditions are particularly relevant when considering the potential for cumulative impacts on marine biology, as they have defined the existing setting. The reasonably foreseeable development projects that would occur within the area between 1998 and 2005 were those considered for potential cumulative impacts. The significance criteria for cumulative impacts to the marine biological communities are the same as those provided in section 4.5.

As discussed in section 5.4.2, with the exception of impacts to salmon, the biological impacts of any of the proposed changes in ship homeporting would be localized and temporary. Impacts to salmon and other fish would be avoided by scheduling dredging and construction during non-peak outmigration months. Measures incorporated into the proposed action, including the construction scheduling defined above, would reduce the incremental effects such that there would not be a cumulatively significant impact on marine biology.

Four of the proposed development projects, Sinclair Landing Redevelopment, Maintenance Improvements, Drydock #1 Maintenance Dredging, and CERCLA Sediment Remediation ,could have potential cumulative impacts on the marine biological communities at PSNS as a result of in-water work. Access bridges under the Maintenance Improvements would not be built if CDF2 were constructed between Drydock #6 and Pier B. The overlap of these projects in time and space with the home port project is described in section 4.18.3, above. The types of biological impacts resulting from construction and dredging activities associated with these projects would be similar to those described in section 4.5.2. There would be temporary and localized disturbance of biota due to increased turbidity and other water quality effects, and due to noise and construction activity. All of the projects would employ permit conditions and other environmental protection measures to minimize impacts to water quality and biota, as described in sections 4.3.2 and 4.4.2. For the projects that would overlap in time with the home port project, there would be an extension of the temporary impacts to biota, but considering the various environmental protection measures that would be applied to all these projects, the cumulative biological impacts would still remain less than significant. The combined improvement in sediment quality that would result from the CERCLA Sediment Remediation, Drydock #1 Maintenance Dredging, and the proposed project would result in improved biological habitat. Expanding the size of the CAD to accommodate dredged material from both the homeport and CERCLA dredging would increase the area of contaminated, mostly deep-water habitat that would be replaced with clean shallow habitat. The resulting cumulative impacts to biological communities would not be significant, and could be beneficial.

There could be cumulative impacts on the salmon and other fish should dredging and construction occur during the salmon out-migration period. Impacts would be less than significant provided that reasonably foreseeable dredging projects do not occur during the out-migration period. If discussions with NMFS conclude that there are impacts to threatened or endangered species in the area, additional mitigation for these impacts would ensure cumulative impacts on marine biology do not occur.

4.18.6 Terrestrial Biology

Terrestrial biological resources potentially affected by the homeporting project are those occurring on PSNS proper, plus mobile species, primarily birds, that include PSNS in their range. Considered in this analysis are historical conditions, and projects occurring between 1998 and 2005. Due to the increasing urbanization of the area, PSNS has little terrestrial biological habitat and supports little wildlife. Significance criteria for the cumulative analysis is identical to that described in section 4.6.2. The proposed action would have little effect on the biological resources that do occur at PSNS. The project would cause negligible or no disturbance of feeding or nesting by the bald eagle and marbled murrelet (threatened species). Therefore, the proposed action's impacts on terrestrial biological impacts would not be significant.

The other reasonably foreseeable projects considered in this analysis would have similar negligible impacts on terrestrial biological resources. Because all of the projects would occur in already developed areas, none would result in loss or significant degradation of terrestrial habitat. The reasonably foreseeable projects involving in-water work (Sinclair Landing, CERCLA Sediment Remediation, and dry-dock maintenance dredging) would have a minor potential to disturb feeding by bald eagles or marbled murrelets; resulting impacts to these species would be insignificant. The cumulative effect of the proposed action, together with other reasonably foreseeable projects on terrestrial biological resources would also be less than significant, as collectively they would not result in substantial degradation of terrestrial habitat. No mitigation is needed to address the proposed action's incremental contribution to these cumulative impacts.

4.18.7 Land Use

The region of influence for cumulative land use impacts includes the surrounding land areas in the immediate vicinity of the proposed PSNS CVN homeporting site. Projects with increasing distance from the site would have a decreasing contribution to cumulative land use impacts. The timeframe for land use impacts is the post-construction period through the lifetime of the constructed facilities after the new land use has been established. The cumulative impact significance thresholds are the same as those presented in section 4.7.2. None of the proposed actions at PSNS would create any significant adverse land use impacts or incompatibilities with existing uses or inconsistencies with the PSNS Master Plan or local jurisdiction land use plans.

The nearest reasonably foreseeable projects to the proposed CVN homeporting site are the recently completed PSNS recreational facility, improvements to State Routes 3 and 304, and the stormdrain improvements. These projects would be compatible with existing uses and consistent with the PSNS Master Plan and with local jurisdiction land use plans. These cumulative projects and the proposed action would be compatible with one another and when considered collectively would not result in any adverse cumulative land use impact. The proposed action would be consistent with the PSNS Master Plan as well, and have an insignificant incremental contribution to cumulative land use impacts. Because cumulative land use impacts would be less than significant, no mitigation is provided.

4.18.8 Socioeconomics

The region of influence throughout which cumulative socioeconomic impacts could extend includes all of Kitsap County and significance criteria used to evaluate potential cumulative impacts are the same as those used to address project-specific impacts (section 4.8.2). Although the socioeconomics of this area is a function of growth throughout the 20th century, the historic timeframe for the cumulative analysis is reasonably defined in the last 5 years, as economic trends have substantially changed since then. The timeframe for evaluation of socioeconomic impacts extends into the future beyond the 2005 arrival of the homeported CVN.

Adverse impacts to regional employment would be most pronounced for Alternatives Two, Three, or Four, (No Additional CVN: No Change –Total of One CVN). The potential loss of 1,200 direct military personnel jobs could result from this action. The economy of Kitsap County is accustomed to fluctuations in employment directly associated with activity levels at the Navy installations in the area. Reasonably foreseeable civilian development projects mainly consist of minor infrastructure improvements that would utilize the existing workforce for their construction. The Sinclair Landing Redevelopment Project would contain, in part, mixed retail and entertainment uses over a 10-block area. The timing of this project is currently unclear, although its construction and operations could offset the loss of military jobs associated with Alternatives Two, Three, or Four. Anticipated growth in population and employment in the region would also further offset cumulative impacts. Therefore, the cumulative impacts resulting from the proposed action in conjunction with other reasonably foreseeable projects on employment would be adverse but not significant, and no mitigation measures are required.

Impacts to housing from Alternatives Two, Three, or Four would be less than significant. The Sinclair Landing Project would involve some new residential buildings and it would contribute to the existing housing supply in Bremerton. None of the other reasonably foreseeable projects would have a significant impact on housing. Therefore, cumulative impacts on housing would be less than significant, and no mitigation measures are required.

The proposed action involving no additional CVN, taken together with the decommissioning of two CGNs (Alternatives Two, Three, or Four) would not significantly affect schools in the vicinity of the PSNS home port site. There would be a decrease in baseline growth rates in enrollment at the five affected school districts. All of the reasonably foreseeable projects in the local area are part of baseline growth that would occur prior to the proposed action being implemented. The reduction in enrollments would be offset slightly by the projected baseline growth rates, and generate a comparatively small change in regional school enrollments such that the proposed action's incremental contribution to regional cumulative impacts would be less than significant, and no mitigation measures are required.

4.18.9 Transportation

Ground Transportation

The region of influence relative to traffic impacts for PSNS consists of the local street network within Bremerton and the regional highways that provide access to Bremerton (i.e., State Routes 3 and 304). These facilities are described in section 4.9.1.1. The cumulative traffic analysis of these facilities uses 2005 as the target year, and the significance criteria for the traffic analysis are defined in section 4.9.1.2. The proposed action would result in a change in site-generated traffic volumes ranging from a decrease of 2,300 vehicle trips per day to an increase of 3,800 trips per day. The traffic analysis indicates that the worst-case No Action (Alternative Six) (3,800 additional daily trips and 535 peak hour trips) would result in less than a significant traffic impact. Therefore, all other actions would result in less than significant impacts as well. Significance criteria presented in section 4.9.2 is applicable to the cumulative analysis.

The approach for the traffic analysis was to forecast the future baseline traffic volumes by using traffic model projections from the study prepared for the Puget Sound Aircraft Carrier Homeporting Environmental Assessment (DON 1995b), then adding the project traffic to the future baseline scenario. The traffic forecasts accounted for regional growth, the cumulative increase in traffic volumes that would occur as a result of other development projects planned in the Bremerton area, and other reasonably foreseeable projects at PSNS. The volume of site-generated traffic used in the analysis represents the cumulative total of all the activities at the base. There may be temporary fluctuations in traffic associated with specific construction projects or CVN maintenance activities such as PIAs and DPIAs; however, these activities are not permanent and are not included in the quantification of cumulative traffic conditions. Because the traffic analysis for the proposed action is based on traffic projections that accounted for the cumulative effects of other projects as well as the PSNS activities, an additional cumulative traffic analysis is unnecessary. The analysis indicates that the proposed action's contribution to the cumulative traffic impacts in the study area would be less than significant. No traffic-related mitigation measures would be required.

Vessel Transportation

The region of influence includes Puget Sound and the waterways leading to the PSNS piers. By definition, this resource area includes only water-based activities. Historical development around the bay, including naval activity, commercial shipbuilding, and recreational sportfishing have contributed to the existing setting. The time period involved is the present condition through 2005, and continues into the future. The significance criteria used to evaluate cumulative impacts are the same as those used to address project-specific impacts (section 4.9.2). The addition of one CVN and relocation of two AOEs (Alternative Five), in combination with the decommissioning of two CGNs, would result in a net future decrease in vessel traffic. The additional CVN would replace the two removed AOEs. Therefore, this action would not contribute to regional cumulative impacts on vessel transportation. Two reasonably foreseeable projects have the potential to impact vessel transportation: Drydock #1 Maintenance Dredging; and CERCLA Sediment Drydock #1 Maintenance Dredging. Any impacts to vessel transportation would be short-term and therefore less than significant. The CERCLA dredging could be conducted concurrently with homeport dredging (during the years 2000-2001), or could occur later. If the proposed action and CERCLA dredging occurred simultaneously, this activity would still be limited to areas within PSNS, such that only naval vessel navigation activity would be affected. The Navy would coordinate dredging activity with projected operations at PSNS, such that the combined cumulative effect would be less than significant. Since none of the proposed decommissioned CVs at NISMF would be moored at any one of the three mooring buoys in Sinclair Inlet, no contribution to cumulative impacts on vessel transportation would result. The remainder of the reasonably foreseeable projects are on-land improvements that would have no impact on vessel transportation. There are no known plans that would cause the addition of large vessels in the affected waterways. Consequently, the proposed action and reasonably foreseeable projects combined cumulative impact on vessel transportation would be less than significant, and no mitigation measures are required.

4.18.10 Air Quality

The region of influence for air quality impacts would mainly include PSNS and the Southern Puget Sound region, in proximity to project emission sources. The existing quality of the air basin is a function of previous development and pollution control measures. Significance thresholds are based on past and existing cumulative emission levels, as well as regional plans that take into account projected regional growth and land uses. These thresholds are the same as the project-specific thresholds (see section 4.10.2). Implementation of the proposed action would not adversely impact air quality in the Puget Sound area, because air emissions would be below thresholds of significance. The proposed actions of one additional CVN and the removal of either two or four AOEs would result in a reduction of emissions of at least two pollutants (NO_x and SO_2) at PSNS due to the elimination of the AOE boilers. During construction, reasonably foreseeable projects may increase some pollutant emissions within the project region. However, these emission increases would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Emissions from future reasonably foreseeable projects, when combined with emissions from the proposed action, would not likely cause an exceedance of any ambient air quality standard. Therefore, the cumulative impacts on air quality resulting from the proposed action at PSNS and other reasonably foreseeable projects would be less than significant.

4.18.11 Noise

The region of influence for noise impacts is a roughly circular area around the noise source. The radius of the circle is equal to the distance that the noise source can be heard. Any reasonably foreseeable project that has a region of influence that overlaps with the region of influence of any of the proposed actions may have a cumulative impact if a sensitive receptor is located within the overlap area. The timeframe of the impacts would include the construction period through the lifetime of the constructed facilities. The cumulative impact significance thresholds are the same as those presented in section 4.11.2. None of the proposed CVN homeporting actions at PSNS would create any significant adverse noise impacts.

The only reasonably foreseeable projects within the region of influence are the PSNS recreational facility and the storm drain improvements, although both of these construction projects were completed in 1998. As they occurred long before the scheduled construction for the proposed action, they would not result in any combined cumulative noise impact when considered with the proposed action. The CERCLA Sediment Remediation could overlap with the proposed action construction. This cumulative activity could affect sensitive receptors at PSNS, particularly the Naval Dental Clinic located 1,200 feet northeast of Pier D at the intersection of Farragut and Decatur avenues. It is likely, however, that the increased construction activity would not be a substantial contribution to the ambient industrial noise levels experienced at PSNS. The noise level experienced by the closest off-base sensitive receptors, single-family residences located west of PSNS along Callow Avenue and north of Coontz Street approximately 2,200 feet northwest of Pier D, would not be substantially increased due to the distance separating the activity and the residential land use. Therefore, cumulative impacts on noise would be less than significant and no mitigation is required.

4.18.12 Aesthetics

The region of influence for cumulative impacts on aesthetics encompasses PSNS Bremerton and the adjacent shoreline and marine area. These areas constitute the visual appearance of the region. Historical development has contributed to the cumulative impact on shoreline view corridors. The time period for assessment of cumulative impacts includes the CVN buildout of the year 2005. Significance criteria is the same as discussed in section 4.12.2. The addition of one CVN and the relocation of two AOEs (Alternative Five), in association with the decommissioning of two CGNs, would result in less than significant impacts on aesthetics. A net change of fewer ships homeported at PSNS would result. Construction activities would be visually consistent with the maritime industrial character of the area. The City of Bremerton CIPs would have minimal impacts on aesthetics, as they are roadway and utility improvements impacting previously developed areas. Facility construction at PSNS would also remain visually consistent with the surrounding military and waterfront area. The MARAD Crane Ship Transfer and Decommission of CVs at NISMF would result in additional ships at PSNS, although the Navy is not proposing to increase the size of NISMF decommissioning facilities at Bremerton to accommodate the CVs. CERCLA Sediment Remediation would result in temporary use of a dredge barge at PSNS. This reasonably foreseeable project could occur concurrently with dredging for the proposed action. The combination of additional ships from these reasonably foreseeable projects in conjunction with the proposed action would result in a temporary addition of vessels at PSNS and vicinity, although this impact would be less than significant, as the nature of the seascape constantly changes with ships calling and leaving the area. Finally, the Sinclair Landing project would result in visual changes to a large area adjacent to the shipyard. An older area of the city would undergo renovation, and although a design plan has not been finalized, it is expected to provide beneficial visual impacts to the area. Reasonably foreseeable and proposed action development would be visually consistent with the existing setting. Therefore, their combined cumulative impact on aesthetics along the Puget Sound waterfront would be less than significant. No mitigation measures are required.

4.18.13 Cultural Resources

This review of cumulative impacts on cultural resources (i.e., historic properties) focuses on the region of influence defined by PSNS and other properties in the general vicinity of Sinclair Inlet, and it covers those projects that may impact cultural resources in the period between the 1998 and 2005. Cumulative impact analysis also considers previous development within the region of influence. Both prehistoric and early historic-period sites in the Sinclair Inlet area tend to be located along shorelines and major freshwater drainages, although recent construction and urbanization has affected the integrity of many of the known resources. At the same time, substantial portions outside PSNS but within the region of influence remain unsurveyed. This means that new historic properties resources could be identified outside PSNS within the region of influence; historic properties that retain their integrity can be found in even the most developed areas. Other areas have been built out without the benefit of cultural resource surveys. It is likely that substantial numbers of cultural resources have been inadvertently destroyed in the process. Criteria for accessing the significance of impacts over this area identical to the significance criteria presented in section 4.13.2. None of the homeporting actions discussed in section 4.13 would affect historic properties in the project area. Therefore, proposed action would not contribute to any reasonably foreseeable project impacts.

The potential for the 13 other reasonably foreseeable projects to affect cultural resources depends on their location. Two of the reasonably foreseeable projects would occur within PSNS, and would fall under similar review processes as the one undertaken by the proposed action. Construction of the PSNS Recreational Facility in the general vicinity of the Marine Reservation Historic District and the Hospital Reservation Historic District was recently completed, but this project was determined to not have any effects on these nearby historic properties. Therefore, the PSNS Recreational Facility does not contribute to cumulative effects in the vicinity. Most of the Sinclair Landing Redevelopment project will take place on fill soils, so the potential for impacts to prehistoric archaeological sites is minimal. Nevertheless, some significant historic-period standing structures may be affected by this project. Given that some demolition is likely to occur as a result of this project, significant impacts to historic properties are possible. Improvements to State Routes 3 and 304 will occur along the original shoreline of Sinclair Inlet, and landforms of this type often have a high density of archaeological sites. CERCLA Sediment Remediation dredging most likely would occur within historic fill sediments, such that the potential to impact intact cultural resources is low.

All of the remaining reasonably foreseeable projects will occur within inland areas, and the density of significant prehistoric archaeological sites in these areas is typically low. Furthermore, significant historic-period cultural resources tend to be infrequent. Construction of these projects are likely to have a negligible impact on cultural resources individually, and the would not likely contribute to cumulative effects.

Therefore, although there is the potential for reasonably foreseeable projects to impact cultural resources within the greater Sinclair Inlet area, particularly from the redevelopment of Sinclair

Landing and the improvements to State Routes 3 and 304, the proposed action's incremental contribution to this cumulative impact would be less than significant. No mitigation measures are required.

4.18.14 General Services/Access

The region of influence for general services includes PSNS Bremerton and the surrounding city where various general services are located. Previous PSNS development has contributed to cumulative impacts on general services and access that are reflected in current conditions. The cumulative analysis considers reasonably foreseeable projects occurring between 1998 and 2005. Significance criteria presented in section 4.14.2 would also apply to cumulative impacts. The addition of one CVN under Alternative Six: No Action, is considered in this section because it would result in the most adverse impacts on general services and access. One additional CVN would significantly impact general services and access, as existing facilities would reach maximum capacity. However, projects including the recently completed recreational facility and reasonably foreseeable Maintenance Improvements would result in a beneficial cumulative impact on on-base general services. Civilian reasonably foreseeable CIP projects improving existing infrastructure would result in no population changes and no increased demand on general services. The Sinclair Landing Redevelopment project involves some residential development, and this project has the potential to increase demands on general services. Since the project involves mixed uses, some of these services may also be provided for by the project itself. General services and access would not be reduced below historically accepted levels of service associated with periodic fluctuations in the Bremerton population. The MARAD Crane Ship Transfer would result in a net increase of 18 military personnel that would further increase demands on general services. Impacts would be adverse but not significant. Due to the large increase in personnel associated with the addition of one CVN, Alternative Six: No Action would result in a significant contribution to these cumulative impacts. The cumulative increased demand on general services from the proposed action, the MARAD Crane Ship Transfer, and the Sinclair Landing Redevelopment project could result in significant cumulative increases on general services. As stated previously, cyclical population fluctuations in Bremerton would allow general services to remain within historically accepted levels of service.

The region of influence for access includes the perimeter of PSNS where access gates are located, as well as arterial streets leading to PSNS such as State Route 304 and Naval Avenue. The region of influence also includes the nearby waters of the Sinclair Inlet. The addition of one CVN under Alternative Six would result in access constraints to the CVN because Pier D would not be reconstructed to accommodate for the ship. Access impacts during other reasonably foreseeable project construction would be addressed by individual construction management plans. Several of the reasonably foreseeable projects, including improvements to SR 3 and 304, are roadway improvements. Depending on their timing, they could contribute to a significant cumulative effect on temporary access. The location of the proposed action, on the shipyard and away from other reasonably foreseeable projects, would not impact these short-term access issues. In addition, access-related constraints to the CVN would be highly localized and would not be compounded by any of the other reasonably foreseeable projects requiring in-water work (Drydock 1 Maintenance Dredging, MARAD Crane Ship Transfer, and CERCLA Sediment Remediation). Therefore, the Alternative Six: No Action would not result in cumulatively significant impacts to access.

4.18.15 Health and Safety

The region of influence is defined as the area around the carrier piers and PSNS. The time period involved commences with construction activities associated with the first additional CVN in late 1999 and continuing for operations into the future. The cumulative impact significance criteria are as stated in section 4.15.2. The addition of one CVN and relocation of two AOEs (Alternative Five) in combination with the decommissioning of two CGNs would result in a less than significant risk of a hazardous substance release during construction and operation. Other reasonably foreseeable Naval projects, including the CERCLA Sediment Remediation Dredging, would be subject to similar hazardous waste management programs and procedures, resulting in less than significant cumulative impacts. In addition, the City of Bremerton CIP projects also would occur outside of the region of influence. Nevertheless, they would not involve the use of hazardous substances. Impacts to health and safety would be limited to construction activities and would be subject to standard safety mitigations precluding non-construction personnel access to activity areas. Since any health and safety impact related to the proposed action would be minimized by established programs and procedures, and no reasonably foreseeable projects occur within the region of influence, the proposed action, in association with other reasonably foreseeable projects, would have result in less than significant cumulative impacts. In addition, Volume 2, Appendix F, Section 3.3, presents a discussion of cumulative radiological impact. No significant impacts are identified and no mitigation is required.

As described in the annual report referenced in the EIS, 26 previous versions of that report, and the 1998 update of the report, the total long-lived gamma radioactivity in liquids released annually to all ports and harbors from all Naval nuclear-powered ships and supporting tenders, Naval bases and shipyards is less than 0.002 curies. This annual total includes any accidental releases of radioactivity that occurred during the year. For perspective, the total annual amount is less than the amount of naturally occurring radioactivity present in the seawater displaced by a single submarine, and is environmentally inconsequential. Since the total amount released was inconsequential, any individual release was also inconsequential, and was not subject to reporting, immediate or otherwise, by any regulatory requirements. Thus, there would be no cumulative impacts from releases to any one water body from various NNPP activities in close proximity to that water body.

4.18.16 Utilities

The region of influence for utilities includes the greater Kitsap County area that is serviced by the Kitsap County Public Utilities Department. Previous regional development and particularly that at PSNS has contributed to cumulative impacts on general services and access that are reflected in current conditions. The addition of one CVN and relocation of two AOEs (Alternative Five) along with the decommissioning of two CGNs would be addressed by increased capacity at Pier D to 60 MVA. With these improvements, utilities would operate within proposed capacity. The additional demand would be accommodated by existing regional utility capacity.

Reasonably foreseeable projects with the potential for cumulative impacts on utilities are those that result in a new demand on the utility system. The recently completed PSNS Recreational Facility, BEQ, MARAD Crane Ship Transfer, and the Sinclair Landing project all have this potential. Individual project permit conditions of approval would require that each project provide fees to compensate for the increased demand on utilities, including needed infrastructure improvements. Reasonably foreseeable Naval projects would also be required to provide sufficient improvements to ensure they would not impact existing facility peak operational demands. The Sinclair Landing Redevelopment is the only civilian project that would result in a new demand on utilities. This project would require a very small portion of the total demand on utilities within the greater Kitsap County region, so that impacts would be less than significant. In addition, provisions requiring construction of appropriate utility infrastructure would mitigate cumulative impacts on utilities to less than significance. The proposed action and other reasonably foreseeable naval projects would operate within exiting utility capacity, resulting in less than significant cumulative impacts.

4.18.17 Environmental Justice

The region of influence for cumulative impacts on environmental justice includes Kitsap County. This is the area defined by census data which provides the identification of minority and low-income populations. Significance criteria presented in section 4.18.2 is applicable in this analysis. The proposed action resulting in the addition of one CVN and relocation of two AOEs (Alternative Five) would result in fewer ships be homeported at PSNS, and a net decrease of impacts on waters in the Sinclair Inlet and the Suquamish Tribe's "Usual and Accustomed fishing places." This would result in beneficial impacts on environmental justice. Dredging of the East Waterway in Seattle and CERCLA Sediment Remediation could potentially impact Suquamish Tribe fishing areas, although these impacts would be temporary and cease upon completion of dredging. Decommissioned CVs would not be moored at any one of the three mooring buoys in Sinclair Inlet and the Navy is not proposing to increase the size of NISMF facilities at Bremerton such that there would be no additional loss of fishing area. Therefore, the cumulative effect of these projects would be less than significant, and no mitigation is required. No other reasonably foreseeable project would have a potential effect on Native American fishing activity, as they are all on-land improvements. Other naval projects are not located adjacent to minority or low-income residential areas, and would not have impacts on environmental justice. The Sinclair Landing project involves redevelopment of a portion of the city. It is unknown at this time if this project would have a disproportionate affect on minority or low-income communities. Any impact on environmental justice from this project would not affect Native American fishing activity, and no mitigation is required.

Impacts from the proposed action on noise and air quality at child care centers and local public schools would be less than significant. Since none of the on-base projects have overlapping construction schedules, there would be a less than significant cumulative impact on the noise environment at local schools and child care centers. Air quality could be impacted by concurrent construction activities with the potential to impact nearby day care facilities. These cumulative impacts would be localized and would end upon completion of construction. Therefore, cumulative impacts on environmental justice associated with noise and air quality impacts would be less than significant, and no mitigation is required. The proposed action, by decreasing impacts on waters in the Sinclair Inlet and the Suquamish Tribe's "Usual and Accustomed fishing places," would have a beneficial incremental contribution to cumulative impacts on environmental justice.

5.0 NAVAL STATION EVERETT

5.1 TOPOGRAPHY, GEOLOGY, AND SOILS

5.1.1 Affected Environment

Topography

The Naval Station (NAVSTA) Everett location is located in the Puget Sound Lowlands province. This area lies within 500 feet of sea level and runs north and south between the Cascade Mountains to the east and the Olympic Mountains to the west. The proposed home port location is predominantly flat, with an average elevation of 18 feet above mean high water. East of the location, across Marina Drive, 60- to 100-foot bluffs show where the original Puget Sound shoreline existed prior to landfilling at the location for industrial development. The shoreline of the location is bordered by quay walls and docks (DON 1995b).

Geology and Soils

The project area is underlain by artificial fill overlying marine and beach sediments to a depth of 50 to 200 feet. This material overlies glacially consolidated soils extending to a depth estimated in excess of 1,600 feet. The fill material varies across the location. The early waterfront area along the base of the bluff contains 10 to 15 feet of wood waste fill from lumber mills that once occupied the location. The wood waste is underlain by a very dense sand layer. The remainder of the fill was placed historically and contains fine silty sand with debris. The density of the fill is a function of the history of placement. The older fill areas have fully settled and are stable. The younger fill area in the vicinity of the North Wharf continues to undergo settlement. Settlements up to 1 foot occurred in the late 1980s and early 1990s (DON 1994, 1995b).

Faulting and Seismicity

Earthquakes are caused by geologic processes that produce stresses in the earth. In the Pacific Northwest, oceanic crust is being pushed beneath the North American continent along a major boundary parallel to the coast of Washington and Oregon. This boundary, called the Cascadia Subduction Zone, lies about 50 miles offshore and extends from the middle of Vancouver Island in British Columbia past Washington and Oregon to northern California.

The location is located within Seismic Zone 3 risk category, as defined by the Uniform Building Code. The U.S. Geological Survey Professional Paper 1560, Assessing Earthquake Hazards and Reducing Risk in the Pacific Northwest, states that the "earthquake hazards in this region are substantial" (USGS 1996). Approximately 200 earthquakes have been documented in the area since 1840, most of which caused little or no damage. Sizable events occurred in 1882, 1909, and 1939. The two most recent major earthquakes in this area occurred near Olympia in 1949 (Richter magnitude 7.8, Modified Mercalli Intensity VIII) and near Seattle in 1965 (Richter magnitude 6.8, Modified Mercalli Intensity VIII). Epicenters and dates of the largest Pacific Northwest earthquakes that occurred between 1872 and 1987 are shown on Figure 4.1-1 (Washington Division of Geology and Earth Resources [WDGER] 1988). Based on the history of past earthquakes and present understanding of the geologic history of the Pacific Northwest, damaging earthquakes (magnitude 6 or greater) are expected in the future (see Volume 5, section 5.1).

A major earthquake could impact NAVSTA Everett during the life of the proposed facilities. A maximum credible earthquake (maximum earthquake likely to occur at the location) of Richter magnitude 7.5 has been predicted for the area, with a recurrence rate of 500 to 2,500 years. Peak ground accelerations of 0.15 g (an estimation of the ground motion associated with an earthquake) have about an 80 percent probability of nonexceedance during a 50-year period. (HartCrowser 1990; COE 1986). The symbol "g" represents acceleration due to gravity.

Surface faulting has not been well documented in conjunction with earthquakes in the region, most likely due to a thick layer of glacial drift that covers the bedrock where surface faulting occurs. Figure 4.1-2 shows faults with Quaternary (in the last 2 million years) displacement in the Puget Sound area (USGS 1996).

The nearest surface fault, the South Whidbey Island fault, is located about 4 miles south of the home port location (Figure 4.1-2). The fault was last active 100,000 to 200,000 years ago (USGS 1996).

Geologic Hazards

Soils underlying the NAVSTA Everett location, especially those containing recent fill material, may be subject to consolidation and liquefaction during seismic events (DON 1995b). Liquefaction is a seismically induced phenomenon in which loose to medium dense, saturated, predominantly granular material loses its cohesive properties resulting in ground failure (see Volume 5, section 5.1). A liquefaction assessment of the location soils indicated that soils in the upper 60 to 80 feet may liquefy at acceleration levels equal to or greater than 0.1 g (HartCrowser 1990; COE 1986).

Tsunamis (seismically induced sea waves) are very long, shallow, high-velocity ocean waves that are usually generated by earthquakes. The potential for tsunami damage to land areas adjacent to Puget Sound and Sinclair Inlet has not been quantified. However, distant or local earthquakes could generate a tsunami that could impact the project area. Offshore earthquakes (in the Pacific Ocean) could generate a tsunami that would likely be manifested as a gradual upwelling of water. It is probable that the height, energy, and damaging effects of a tsunami generated from an offshore earthquake would dissipate as the tsunami traveled the curved path into the interior of Puget Sound (see Figure 4.1-2). Local earthquakes could also generate tsunamis within the Puget Sound. Along with an upwelling of water, associated currents could damage structures in the water or along the shoreline. The last seismic event along the Seattle fault is thought to have generated a tsunami in the Puget Sound 1,100 years ago (Atwater 1987, Atwater and Moore 1992, Karlin and Abella 1992). In addition, sudden submergence of coastal areas that may accompany great earthquakes might increase the amount of land susceptible to tsunami damage (WDGER 1988).

A seiche is a standing wave in an enclosed or partly enclosed body of water, which is analogous to the sloshing of water that occurs when an adult suddenly sits down in a bathtub. A relatively large earthquake may induce a seiche. More commonly, seiches are caused by wind-driven currents or tides. So far, no significant damage has been reported from seismic seiches in Washington caused by local or distant earthquakes (WDGER 1988).

5.1.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Impacts of the proposed project on the geologic environment would be considered significant if the following occurred:

- Unique geologic features of unusual scientific value, for study or interpretation, would be adversely affected.
- Geologic processes such as major landsliding or erosion would be triggered or accelerated.
- Substantially adverse alteration of topography beyond that resulting from natural erosional and depositional processes.
- Substantially adverse disruption, displacement, compaction, or overcovering of the soil. Substantial irreversible disturbance of the soil materials at the location could cause their use for normal purposes in the area to be compromised.

Impacts of the following geohazards on the proposed project would be considered significant if the following occurred:

- Ground rupture due to an earthquake on an active fault, causing damage to structures and limiting their use due to safety considerations or physical conditions.
- Earthquake-induced ground shaking causing liquefaction, settlement, or surface cracks at the location and attendant damage to proposed structures, causing a substantial loss of use or exposing the public to substantial risk of injury.
- Historic soil failure (primarily fill) due to liquefaction.
- Slope failure on hillsides or dikes (ship berths area).
- Seiches or tsunamis caused by nearby or distant earthquakes that are likely to occur in the lifetime of the project and are capable of causing substantial damage to structures or exposing the public to substantial risk of injury.
- Flooding caused by 100-year storm events or when combined with an extreme high tide or seismic sea wave occur that are capable of causing substantial damage to structures or exposing the public to substantial risk of injury.

5.1.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)*

Alternative Two would require no new projects.

Geologic Environment

DREDGING

Dredging would not be required; therefore, no impacts are anticipated on the geologic environment at the home port location.

FACILITY IMPROVEMENTS

Construction would not be required; therefore, no impacts would occur to the geologic environment.

OPERATIONS

Operations would not result in additional disturbance or impacts to the geologic environment.

Geohazards

DREDGING

Because no dredging is proposed, impacts associated with geohazards would not occur.

FACILITY IMPROVEMENTS

Demolition or construction would not be required; therefore, impacts associated with geologic hazards at the project location would remain unchanged and no additional impacts would result.

OPERATIONS

Operations would remain unchanged; therefore, impacts associated with geologic hazards at the project location would remain unchanged and no additional impacts would result.

5.1.2.2 Removal of Existing CVN: Total of No CVNs (Alternative Three)

Alternative Three would not require any new projects.

Geologic Environment

DREDGING

Dredging would not be required; therefore, no impacts would occur on the geologic environment.

FACILITY IMPROVEMENTS

Construction would not be required; therefore, no impacts would occur on the geologic environment.

OPERATIONS

No impacts would occur on the geologic environment.

Geohazards

DREDGING

Because no dredging is proposed, impacts associated with geohazards would not occur.

FACILITY IMPROVEMENTS

Because no demolition or construction is proposed, impacts associated with geologic hazards at the project location would remain unchanged and, therefore, no additional impacts would occur.

OPERATIONS

No structures are proposed and the existing CVN would be removed. Therefore, impacts of geohazards on facilities and personnel would remain unchanged or decrease slightly, resulting in beneficial impacts. In addition, an effective earthquake preparedness plan is in place as part of the *Operations Plan, Annex A, 1-96* approved by COMNAVBASE Seattle.

5.1.2.3 Removal of Existing CVN and Addition of Four AOEs: No CVNs (Alternative One)

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Geologic Environment

DREDGING

An additional 50,000 cubic yards (cy) of dredging would be required at North Wharf to accommodate the FFGs displaced by the AOEs. The proposed dredging is considered minor relative to the total dredging previously conducted in the area. Dredging would temporarily disrupt underwater depositional processes; however, similar to prior dredging episodes in this area, depositional equilibrium would be reestablished within a short period of time. No regional, long-term depositional disruptions would occur as a result of dredging in this area. Therefore, the impact from dredging on geological resources is considered less than significant.

FACILITY IMPROVEMENTS

Construction proposed includes a mooring dolphin southwest of the end of the Carrier Pier, in approximately 80 feet of water, and electrical and utility upgrades. Construction of the mooring dolphin would have no impact on the topography or bathymetry, therefore, impacts to the geologic environment would not occur. Excavations completed for electrical and utility upgrades would cause a short-term increase in erosion potential. However, because of the relatively flat terrain, short-term erosion resulting from construction would be limited. Standard erosion control measures and pollutant control measures are specified in the SWPPP currently in place. The SWPPP would be amended to incorporate the proposed project, thus further minimizing impacts to less than significant levels.

OPERATIONS

No impacts are anticipated on the geologic environment at the home port location.

Geohazards

DREDGING

Geohazard impacts (i.e., seismicity, surface fault rupture) during dredging are considered unlikely and would not differ significantly from impacts absent dredging operations. They are therefore less than significant.

FACILITY IMPROVEMENTS

Geohazard impacts (seismicity and fault rupture) on the mooring dolphin and utility upgrades during construction are very unlikely and, therefore, less than significant.

OPERATIONS

No new structures would be impacted by earthquake-related hazards, such as ground acceleration, ground shaking, fault rupture, liquefaction, tsunamis, seiches, and settlement.

When in port, the bow of the AOEs would tie off to piles of the mooring dolphin; the stern would be attached to the Carrier Pier. If one or more piles were destabilized during a seismic event, the AOEs would be relocated until the mooring dolphin was repaired. With the exception of the mooring dolphin, no structures are proposed. Therefore, impacts of geohazards would generally remain unchanged and would be less than significant. In addition, an effective earthquake preparedness plan is in place as part of the *Operations Plan, Annex A, 1-96* approved by COMNAVBASE Seattle.

5.1.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Geologic Environment

DREDGING

One additional CVN berth would require dredging of 155,000 cy of material. Considerable dredging has previously been conducted at NAVSTA Everett along the piers and channel. Dredging would temporarily disrupt underwater depositional processes, however, similar to prior dredging episodes in this area, depositional equilibrium would be re-established within a short period of time. No regional, long-term depositional disruptions would occur as a result of dredging in this area. Therefore, the impact from the additional dredging on geological resources is less than significant. Sediments would be suitable for disposal at the designated Port Gardner Puget Sound Dredged Disposal Analysis (PSDDA) open-water disposal site, which is 2.2 miles west of the home port location.

FACILITY IMPROVEMENTS

Development of one additional CVN berth require construction of some new facilities. The new construction would include a multi-story parking structure (constructed at the location of an existing parking lot), improvements to the oily water separator system, and electrical upgrades.

OPERATIONS

Operations are not anticipated to result in additional disturbance or impacts to the geologic environment.

Geohazards

DREDGING

Geohazard impacts (i.e., seismicity, surface fault rupture) during dredging are considered unlikely and would not differ significantly from impacts absent dredging operations. They are therefore less than significant.

FACILITY IMPROVEMENTS

Construction would result in temporary soil disturbance and some temporary soil erosion on land. Because of the relatively flat terrain, short-term erosion resulting from construction would be limited. Standard erosion control measures and pollutant control measures are specified in the Storm Water Pollution Prevention Plan (SWPPP) currently in place. The SWPPP would be amended to incorporate the proposed project, thus further minimizing impacts to less than significant levels.

Potential impacts due to geohazards (seismicity, fault rupture, flooding) on facilities and personnel would be mitigated by the project design and are, therefore, considered less than significant.

A major earthquake could impact NAVSTA Everett during the life of the proposed facilities. Earthquake-related hazards, such as ground acceleration, ground shaking, liquefaction, and settlement are possible in this active seismic region and, in particular, in the project area where hydraulic fill soils with a high potential for liquefaction are pervasive. A maximum credible earthquake of Richter Magnitude 7.5 may occur at NAVSTA Everett, with a peak horizontal ground acceleration of 0.15 g. Severe ground shaking would occur as a result of an earthquake of this size at the project location. Soils in the upper 60 to 80 feet may liquefy at acceleration levels equal to or greater than 0.1 g. Potentially significant impacts could result from these seismic related phenomena.

However, the new facilities would incorporate the criteria and requirements for the seismic design of buildings on defense installations set forth in the Department of the Army, the Navy, and the Air Force technical manual (TM) 5-809-10/NAVFAC P-355/AFM 88-3 (DON 1992a). The home port design would also incorporate the criteria for the seismic design of waterfront structures provided in Naval Civil Engineering Laboratory (NCEL) Report R939 and Naval Facilities Engineering Command Design Manual DM26 (DON 1992c). The design would include requirements and guidelines to safeguard against major failures and loss of life, but would not limit damage. Structures designed in accordance with the guidelines are expected to (1) withstand minor earthquake ground motion without damage; (2) resist a moderate earthquake without structural damage, but allow for some nonstructural damage; and/or (3) resist major earthquake ground motion without collapse, but with possible structural damage.

To avoid potential damage to structures due to ground shaking, liquefaction, or differential settlement of foundation soils, fill materials would be compacted using standard geotechnical engineering techniques. Design guidelines and recommendations associated with settlement of soils due to the compressibility of structures is provided in NAVFAC Manual DM-7.01, 7.02, and 7.03 (DON 1992d). Settlement of a structure would be acceptable as long as activities normally conducted in or on the structure would not be adversely affected, and the structural integrity of the structure would not be jeopardized.

An effective earthquake preparedness plan is in place as part of the *Operations Plan, Annex A, 1-96* approved by COMNAVBASE Seattle.

Earthquake-related hazards would not be avoided in the region and, in particular, in the coastal area where hydraulic fill is pervasive. Implementation of the above design measures would reduce the effects of seismically induced structural failure. Engineering design criteria incorporated into the project would mitigate the geohazard impacts to less than significant.

To avoid potential damage to structures due to flooding, structures would be built outside of 100-year flood zones or designed to withstand such flooding events, thus reducing impacts to less than significant levels. In addition, because tsunamis and seiches are extremely rare, are unlikely to occur during the lifetime of the project, and are considered an unavoidable, acceptable risk, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant.

OPERATIONS

Impacts of geohazards (seismicity, fault rupture, liquefaction, settlement) on facilities and personnel during operations would be less than significant because they would be mitigated by the project design as discussed above. In addition, an effective earthquake preparedness plan is in place as part of the *Operations Plan, Annex A, 1-96* approved by COMNAVBASE Seattle.

Maps indicating areas vulnerable to tsunamis or seiches do not exist for the area. Tsunamis and seiches are associated with large seismic events and are considered rare. Because tsunamis and seiches are extremely rare, are unlikely to occur during the lifetime of the project, and are considered an unavoidable, acceptable risk, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant.

Geohazards could also result in the rupture of chemical storage containers and release of chemicals to the environment. However, as described above, these operation-related impacts would be reduced to levels that are less than significant by the implementation of the existing SWPPP, the existing safety and health programs described in section 5.15., and compliance with federal, state, and local statutes and regulations pertaining to storm water retention and treatment and soil and groundwater contamination.

5.1.2.5 *Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)*

Alternative Five consists of the possibility of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Geologic Environment

DREDGING

Movement of two AOEs from PSNS to the west side of the Carrier Pier would require relocation of FFGs to the North Wharf. An additional 50,000 cy of dredging would be required at North Wharf to accommodate these FFGs displaced by the AOEs. The proposed dredging is considered minor relative to the total dredging previously conducted in the area. Dredging would temporarily disrupt underwater depositional processes, however, similar to prior dredging episodes in this area, depositional equilibrium would be reestablished within a short period of time. No regional, long-term depositional disruptions would occur as a result of dredging in this area. Therefore, the impact from dredging on geological resources is considered less than significant.

FACILITY IMPROVEMENTS

Construction would result in temporary soil disturbance and some temporary soil erosion on land. Because of the relatively flat terrain, short-term erosion resulting from construction would be limited. Standard erosion control measures and pollutant control measures are specified in the SWPPP currently in place. The SWPPP would be amended to incorporate the proposed project, thus further minimizing impacts to less than significant levels.

OPERATIONS

Operations at the home port location would not impact the geologic environment.

Geohazards

DREDGING

Geohazard impacts (i.e., seismicity, surface fault rupture) during dredging are considered unlikely and would not differ significantly from impacts absent dredging operations. They are therefore less than significant.

FACILITY IMPROVEMENTS

Potential impacts due to geohazards (seismicity, fault rupture, flooding) on facilities and personnel would be mitigated by the project design and are, therefore, considered less than significant. Seismic design measures that would be incorporated into the project design, to reduce impacts to a level of insignificance, are discussed in section 5.1.2.4. To avoid potential damage to structures due to flooding, structures would be built outside of 100-year flood zones or designed to withstand such flooding events. In addition, because tsunamis and seiches are extremely rare, are unlikely to occur during construction of the project, and are considered an unavoidable, acceptable risk, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant.

To avoid potential damage to structures due to flooding, structures would be built outside of 100-year flood events or designed to withstand such flooding events.

OPERATIONS

Impacts of geohazards (seismicity, fault rupture, liquefaction, settlement, and flooding) on facilities and personnel during operations would be less than significant because they would be mitigated by the project design as discussed in section 5.1.2.4. In addition, an effective earthquake preparedness plan is in place as part of the *Operations Plan, Annex A, 1-96* approved by COMNAVBASE.

Maps indicating areas vulnerable to tsunamis or seiches do not exist for the area. Tsunamis and seiches are associated with large seismic events and are considered rare. Because tsunamis and seiches are extremely rare, are unlikely to occur during the lifetime of the project, and are considered an unavoidable, acceptable risk, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant.

5.1.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Geologic Environment

DREDGING

Dredging would not be required; therefore, no impacts are anticipated on the geologic environment at the home port location.

FACILITY IMPROVEMENTS

Construction would not be required; therefore, no impacts are anticipated on the geologic environment at the home port location.

OPERATIONS

No impacts are anticipated on the geologic environment at the home port location.

Geohazards

DREDGING

Because no dredging is proposed, impacts associated with geohazards are not anticipated at the home port location.

FACILITY IMPROVEMENTS

Because no demolition or construction is proposed, impacts associated with geologic hazards at the project location would remain unchanged and, therefore, would be less than significant.

OPERATIONS

The likelihood of substantial damage to the existing CVN during earthquakes due to shaking of the existing wharf is minimal; impacts would be less than significant. Tsunamis and seiches are associated with large seismic events and are considered rare. Based on the unlikely occurrence of a tsunami or seiche at the project area, impacts are less than significant. In addition, an effective earthquake preparedness plan is in place as part of the *Emergency Management Operations Plan, PP3440.10, Annex M.*

5.1.2.7 Mitigation Measures

Impacts on the geologic environment and geohazard are less than significant. No mitigation measures are proposed.

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5.2 TERRESTRIAL HYDROLOGY AND WATER QUALITY

5.2.1 Affected Environment

Surface Water

The NAVSTA Everett location is located on artificial fill deposits. Topography inhibits surface water run-on from adjacent properties. The mouth of the Snohomish River borders the location on the west, and the Puget Sound Inlet, known as Port Gardner, borders the south side. No perennial streams cross the location. Surface water from the location discharges into the drainage system, which is designed to contain a 1-in-10-year storm event, and a storm duration of 6 hours (DON 1993, 1995b). Guidance provided by the Council on Environmental Quality (CEQ 1993) has been considered concerning pollution prevention.

Groundwater

Observations made during several geotechnical and environmental investigations indicated that groundwater is present at a depth of approximately 2 feet in the eastern portion of the location and at a depth of 3 to 6 feet near the western shoreline of the property. Tidal fluctuations as great as four feet have been measured in monitoring wells on-location. The groundwater is substantially affected by the consistency of the fill material underlying the location, which is highly variable. The fill in the northern area and at the southern tip of the mole is very dense, resulting in a dampened movement of groundwater and tidal effects. Although variable depending on local fill types, the groundwater generally flows southwest toward the East Waterway. Total dissolved solids concentrations locally in excess of 10,000 milligrams per liter precludes use of the shallow groundwater beneath the location for municipal use. Deep aquifers have not been identified beneath the location (DON 1993, 1995b).

Soil and Groundwater Contamination

Groundwater is influenced by tidal fluctuations in the vicinity of the location. It is unlikely, due to salinity, that groundwater beneath the location would ever be used as a water supply source.

The NAVSTA Everett location has a history of industrial development that began around 1900. Studies completed in 1992 and 1993 (DON 1992, 1993) provided evidence of the presence of chemicals of potential concern in the soil and groundwater, including polycyclic aromatic hydrocarbons (PAHs), diesel, gasoline, arsenic, chromium, lead, manganese, nickel, vanadium, some volatile compounds, and one polychlorinated biphenyl (PCB) – Aroclor 1254 (see Volume 5, section 5.2). Many of these chemicals, such as the metals concentrations and total petroleum hydrocarbons (TPH) (which measures concentrations of gasoline and diesel), were determined to be widespread across the location and were detected in concentrations in excess of Washington State Model Toxics Control Act (MTCA) standards. Three to 5 feet of clean fill material have been placed over the entire location and much of the area has been paved. The clean fill and paved surface tend to minimize the potential for direct contact with contaminated soils and limit the infiltration of precipitation. The NAVSTA Everett location is not on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) list of hazardous waste sites. In addition, no remedial action is currently required by the state (personal communication, M. Matta 1997).

5.2.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Significant impacts on surface water or groundwater in the project area would occur if the project results in the following:

- Degradation of water quality, affecting existing and future beneficial uses of receiving waters.
- Discharge that creates pollution, contamination, or nuisance in violation of applicable federal or state standards.
- Release of substances that would result in substantial toxic effects to humans, animals, or plant life.

5.2.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)

Alternative Two would not require any new projects.

Dredging

Under this action, no dredging would occur; therefore, impacts to surface water and groundwater would not occur.

Facility Improvements

There would be no construction and therefore no impacts on hydrology.

Operations

Operations would not result in additional construction or excavations in potentially contaminated areas, therefore, no impacts would occur to surface water and groundwater at the location. In addition, operations associated with the existing CVN would not result in an increase in the quantity of chemicals handled, stored, and disposed at the home port location or a change in the potential for chemical releases to occur, which could result in potential adverse impacts to surface water or groundwater.

5.2.2.2 Removal of Existing CVN: Total of No CVNs (Alternative Three)

Alternative Three would not require any new projects.

Dredging

Under this action, no dredging would occur; therefore, impacts from dredging would not occur.

Facility Improvements

Because no improvements are proposed for this action, no impacts to surface water or groundwater would occur.

Operations

Removal of the existing CVN would result in a decrease in the quantity of chemicals handled, stored, and disposed at the home port location and a slight decrease in the potential for chemical releases to occur, resulting in beneficial impacts

5.2.2.3 *Removal of Existing CVN and Addition of Four AOEs: No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

No known potable or confined aquifers are present beneath NAVSTA Everett; therefore, dredging would not potentially intercept, and adversely impact, groundwater (i.e. to be used for municipal, industrial, or agricultural purposes) beneath the location. In addition, potentially artesian conditions (confined aquifer) would not be disrupted as a result of proposed dredging. Because dredging would only potentially impact marine water quality, an additional 50,000 cy of dredging required at North Wharf would not adversely impact surface water or groundwater in the project area.

Facility Improvements

Proposed construction of a mooring dolphin southwest of the end of the Carrier Pier, in approximately 80 feet of water, would eliminate the construction work at North Wharf. This construction would only potentially impact marine water quality, therefore impacts to surface water and groundwater would not occur. However, excavations completed for electrical and other utility upgrades could potentially encounter contaminated soil and/or groundwater and require remediation. These potential impacts would be reduced to less than significant levels by the implementation of the existing Storm Water Pollution Prevention Plan (SWPPP). NAVSTA Everett operates in accordance with NPDES SWPPP WAR 000.2062. NAVSTA Everett has prepared a SWPPP in compliance with the NPDES permit, which covers day-to-day operations. This SWPPP can be amended to reflect temporary water quality impacts associated with construction at the site. However, the schedules for development projects at NAVSTA Everett would carry them beyond changes anticipated for the preparation of individual construction project SWPPPs. These changes are expected to reduce the threshold for stormwater pollution prevention planning for projects of from 5 acres to 1 acre. Construction projects considered by this EIS for NAVSTA Everett would include the development of individual SWPPPs under a Washington State-wide General Permit for Stormwater Discharges from Construction Activities.

The SWPPP is designed to minimize water quality degradation through establishment of project-specific BMPs, implementation of standard erosion control measures, and implementation of spill prevention and containment measures. However, in accordance with Navy Specifications 01575, Temporary Environmental Controls, the SWPPP would be completed in accordance with 40 CFR

122.26, EPA 832-R-92-005. These specifications require that the following be implemented in association with construction and operation of the proposed project:

- Identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharge from the site.
- Describe and ensure implementation of practices that will be used to reduce the pollutants in storm water discharge associated with industrial activity at the construction site.
- Ensure compliance with terms of EPA general permit for storm water discharge.
- Select applicable management practices from EPA 832-R-92-005.
- Provide completed copy of Notice of Intent and Notice of Termination, except for effective date. Submit to the Contracting Officer a minimum of 14 days prior to start of construction the original Notice of Intent, completed and ready for signature, including the SWPPP, a Monitoring Program Plan, and other documents as required by Order No. 92-08-DWQ.

The SWPPP must be approved by the Environmental Protection Agency prior to initiation of construction and/or grading associated with the project. Additional erosion and sediment control requirements contained in State of Washington and Snohomish County guidance documents would also be followed during construction. The permit must be continually updated as necessary to reflect current and changing conditions on-site. In addition, design and construction would follow all applicable federal, state, and local regulations and ordinances regarding storm water retention and treatment. In addition, design and construction would follow all applicable federal, state, and local regulations and ordinances regarding storm water retention and treatment.

Excavations that would penetrate the 3 to 5 feet of clean fill material over the entire location could encounter documented or undocumented subsurface contamination, including concentrations of TPH, metals, PCBs, and PAHs.

If contaminated soil or groundwater is encountered or disturbed during demolition or construction-related activities, potentially significant impacts on surface water or groundwater could occur as a result of a discharge or accidental release. However, these potential impacts would be reduced to less than significant levels by implementation of the following project actions:

Prior to any demolition, excavation, or construction activities, all known utilities (including fuel, sewer, steam, and electrical) would be identified by the demolition and construction contractor. Remedial actions of contaminants encountered (or expected to be encountered) would be conducted prior to or in conjunction with construction activities. All remedial actions and excavations would be conducted in compliance with all federal and state statutes and regulations pertaining to soil and groundwater contamination, including the following regulations and guidance manuals:

- 29 C.F.R. 1910.120. Addresses hazardous waste releases and health and safety of workers.

- *Navy and Marine Corps Installation Restoration Manual* (February 1997). Methods to evaluate, characterize, and control the potential migration of possible contaminants resulting from past operations and disposal practices at DOD facilities.

- *EM 385-1-1 U.S. Army Corps of Engineers Safety and Health Requirement Manual* (September 1996). Addresses health and safety issues of workers handling potentially contaminated materials and waste,

- *Chief of Naval Operations Instruction (OPNAVINST) 5090.1B, Environmental and Natural Resources Program Manual* (1994).

- Washington State Hazardous Waste Management Act - Model Toxics Control Act (RCW 70.105D, Washington Administrative Code [WAC] 173-340). Defines cleanup standards for groundwater, surface water, soil, and industrial soil.

- Washington State Dangerous Waste Regulations (WAC 173-303). Addresses procedures to be used to designate waste as dangerous and the standards for handling, transporting, storing, and treating designated waste.

- State of Washington Transportation of Hazardous Waste Materials (WAC 446-50). Addresses requirements related to the transportation of hazardous materials/sediment waste using the public highways of the state.

These statutes and regulations are aimed at protecting human health and the environment. These statutes and regulations address worker safety, regulatory notification, clean-up requirements, and handling, storage, treatment, and disposal requirements for hazardous materials and waste. Compliance with all applicable federal, state, and local regulations would reduce the potential for significant adverse impacts from contaminants, if encountered, to less than significant levels.

As previously indicated, unknown or undocumented subsurface contamination could be encountered during facility construction excavations. Soil and/or groundwater remediation completed in association with proposed construction would reduce further impacts associated with exposure of contaminants to on-location workers and the general public. This is a beneficial impact.

Operations

Operations would not result in additional construction or excavations in potentially contaminated areas. In addition, potential impacts to surface water and groundwater quality would be reduced to levels that are less than significant by the ongoing implementation of the existing SWPPP and compliance with federal, state, and local statutes and regulations pertaining to soil and groundwater contamination as described above. The SWPPP is designed to minimize water quality degradation through the implementation of standard erosion control measures and spill prevention and containment measures. In accordance with Navy Specifications 01575, Temporary Environmental Controls, the Stormwater Pollution Prevention Plan would be completed in accordance with 40 CFR 122.26, EPA 832-R-92-005. These specifications require that the following be implemented in association construction and operation of the proposed project:

- Identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharge from the site.
- Describe and ensure implementation of practices that will be used to reduce the pollutants in storm water discharge associated with industrial activity at the construction site.
- Ensure compliance with terms of EPA general permit for storm water discharge.
- Select applicable management practices from EPA 832-R-92-005.
- Provide completed copy of Notice of Intent and Notice of Termination, except for effective date. Submit to the Contracting Officer a minimum of 14 days prior to start of construction the original Notice of Intent, completed and ready for signature, including the SWPPP, a Monitoring Program Plan, and other documents as required by Order No. 92-08-DWQ.

The SWPPP must be approved by the Environmental Protection Agency prior to initiation of construction and/or grading associated with the project. The permit must be continually updated as necessary to reflect current and changing conditions on-site. The statutes and regulations are aimed at protecting human health and the environment and include release/spill notification and clean-up requirements; and handling, storage, treatment, and disposal requirements for hazardous materials and waste. Implementation of the SWPPP and continued compliance with environmental regulations would reduce the potential for significant adverse impacts to less than significant levels.

5.2.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; dredging, utilities, and structural repairs at North Wharf.

Dredging

Impacts would be the same as those described in section 5.2.2.3, and impacts would be less than significant.

Facility Improvements

Development of one additional CVN home port would require construction of an expanded hazardous waste facility, a second transit shed, expansion of the steam plant, multi-story parking structure, electrical upgrades, and improvements to the oily water separator system. Excavations completed for these upgrades could potentially encounter contaminated soil and/or groundwater, resulting in potentially significant impacts. TPH, metals, PCBs, and PAHs are present in soils beneath a 3- to 5-foot thick layer of clean fill material. These impacts would be reduced to less than significant levels by implementation of the same project actions described in section 5.2.2.3.

Operations

Operations associated with the additional CVN would result in an increase in the quantity of chemicals handled, stored, and disposed at the home port location. Therefore, there is an increase in the potential for chemical releases to occur, resulting in potential adverse impacts to surface water, groundwater, and marine water. However, these operation-related impacts to water quality would be reduced to levels that are less than significant by the implementation of the existing SWPPP, the existing safety and health programs described in section 5.15, and compliance with federal, state, and local statutes and regulations pertaining to soil and groundwater contamination as described in section 5.2.2.3. The SWPPP is designed to minimize water quality degradation through the implementation of standard erosion control measures and spill prevention and containment measures. The statutes and regulations are aimed at protecting human health and the environment and include release/spill notification and clean-up requirements; and handling, storage, treatment, and disposal requirements for hazardous materials and waste. Implementation of the SWPPP and continued compliance with environmental regulations would reduce the potential for significant adverse impacts to less than significant levels.

5.2.2.5 *Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)*

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

Impacts would be the same as those described in section 5.2.2.3, and impacts would be less than significant.

Facility Improvements

Addition of two AOEs would require construction of a mooring dolphin and associated infrastructure and facilities. Excavations completed for utility upgrades could potentially encounter contaminated soil and/or groundwater, resulting in potentially significant impacts. However, these impacts would be reduced to less than significant levels by implementation of the same project actions described in section 5.2.2.3.

Operations

Operations associated with the two additional AOEs would result in chemicals being handled, stored, and disposed at the home port location. Therefore, there is a potential for chemical releases to occur, resulting in potential adverse impacts to surface water or groundwater. However, these operation-related impacts to water quality would be reduced to levels that are less than significant by the implementation of the existing SWPPP, the existing safety and health programs described in section 5.15, and compliance with federal, state, and local statutes and regulations pertaining to surface water retention and treatment and soil and groundwater contamination, as described in section 5.2.2.3.

5.2.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

No dredging would occur, therefore, impacts from dredging would not occur.

Facility Improvements

Because no improvements are proposed, no impacts to surface water or groundwater would occur.

Operations

Impacts would be similar to those impacts described in section 5.2.2.3. Impacts to surface water or groundwater would be less than significant.

5.2.2.7 Mitigation Measures

Because impacts on the surface water and groundwater are less than significant, no mitigation measures are required.

5.3 MARINE WATER QUALITY

5.3.1 Affected Environment

This section describes the marine waters at NAVSTA Everett that could be affected by the proposed project through dredging, construction, or operation of homeported ships. Marine waters potentially affected by the project are those of the proposed dredging and construction sites, and the adjacent waters of Port Gardner and the Snohomish River mouth. For these waters, this section describes circulation, fecal coliform levels, temperature, salinity, dissolved oxygen, and chemical contaminants. The quality of marine waters at NAVSTA Everett is affected by sediment quality at the site (section 5.4) and by inputs from terrestrial areas (section 5.2).

Water quality in the vicinity of NAVSTA Everett is influenced by the Snohomish River west of the site, and by properties of the East Waterway. The WDOE has classified the waters at the Snohomish River mouth and surrounding marine waters of Port Gardner as a Class A (excellent) resource, and the East Waterway as a Class B (good) resource (WAC 173-201 A; WDOE 1992). Class B is a lower water quality classification than Class A, and has less stringent water quality requirements.

Historically, monitoring of water quality in the East Waterway has been a priority due to the number of industrial discharges into the waterway. Since the early 1980s under the NPDES program, industrial discharges to the East Waterway have been reduced or eliminated. The discharges that remain, with the exception of the combined sewer outflows (CSOs), receive treatment prior to release.

Circulation

Circulation in the East Waterway and its vicinity is dependent upon fresh water discharges from the Snohomish River, tidal currents in Possession Sound, salinity wedge density currents, and configuration of the harbor. Average currents in the water column for the East Waterway are low, typically in the range of 2 to 5 cm/sec at the inner waterway, and 3 to 12 cm/s at the harbor entrance. Surface currents are also low. The near bottom current speeds in Possession Sound tend to be approximately 40 percent greater than the depth-averaged current speed (NORTEC 1985). Within the East Waterway and Snohomish River, this relationship is variable due to tide and river discharge. The volume of water exchanged in the East Waterway Harbor per tidal cycle is typically 20 to 30 percent based on modeling by Downing (1987) and URS (1989).

Temperature/Salinity

Water quality parameters vary considerably between the Snohomish River and the East Waterway. Temperature and salinity of site waters fluctuate due to periods of high fresh water outflow from the Snohomish River. Water quality analysis during site designation of the Puget Sound Dredged Disposal Analysis (PSDDA) disposal site in Port Gardner (COE 1988) indicated a temperature range of 8.6 to 17.5°C, and a salinity range of 15.4 to 30.3 ppt.

Dissolved Oxygen. The most recent water quality study at NAVSTA Everett was conducted from August 1992 to July 1993 as part of the baseline water and sediment quality certification monitoring program (Dames & Moore 1994). Dissolved oxygen readings ranged from 6 to 11.8 mg/L, with near-surface readings averaging 1 to 2 mg/L higher than near-bottom readings during the summer months; this difference was smaller during winter months. Highest average dissolved oxygen readings were recorded in near-surface waters during April and May. The lowest average readings occurred during October and November in the bottom water masses.

Earlier studies conducted during the Home Port EIS indicated a decrease of dissolved oxygen concentrations in the East Waterway due to continued degradation of water quality. (DON 1985). Bi-monthly water quality data at Pier 3 in Port Gardner, from 1980 to 1987 indicated a decrease in dissolved oxygen in the surface water from approximately 9.17 to 8.21 mg/L (DON 1994). The average dissolved oxygen concentration near Gedney Island for the same time period was 9.8 mg/L.

Total Suspended Solids

Levels of suspended solids in the East Waterway are influenced by discharges from Snohomish River during different periods of the year. Suspended solid levels measured between 1992 and 1993 showed variances in levels by month with two-fold increases during the winter (Dames & Moore 1994). Quarterly mean levels of suspended solid were approximately 20 to 25 mg/L during the spring and summer and 40 to 60 mg/L during the fall and winter for waters in the East Waterway and at the mouth of the Snohomish River.

Fecal Coliform Bacteria

Water quality studies for the Home Port EIS indicated continuing water quality degradation in the East Waterway, with low dissolved oxygen concentrations and elevated levels of fecal coliform (DON 1985). Fecal coliform levels in the East Waterway frequently exceeded the state guideline of 100 colony forming units (cfu)/100 mL due to CSOs and other point source outfalls that discharge to the waterway. It was concluded that water quality would continue to be adversely impacted in the entire waterway until point source outfalls are further regulated or eliminated.

Dames & Moore (1994) found the most guideline exceedances of coliform counts during the winter months, perhaps due to higher rainfall. Quarterly mean coliform counts in surface waters of the East Waterway had a range of 46 to 869 cfu/100 mL during the fall and winter. Coliform counts during the spring and summer had a range of 11 to 393 cfu/100 mL. Coliform levels at the North Wharf also exceeded state criteria, having quarterly coliform counts of 487 and 425 cfu/100 mL in the fall and winter 1992, respectively. Coliform levels in deep waters were generally found below the state coliform criteria.

Chemical Contaminants

The most recent water quality study of chemical contaminants in the East Waterway and Snohomish River was conducted by Dames and Moore (1994). Several metals were consistently detected in the water column including antimony, copper, lead, and zinc. Of these metals, copper and lead were found to exceed the EPA ambient water quality criteria on some occasion. The EPA ambient water quality criteria for copper is 2.9μg/L and for lead is 5.6 μg/L. Copper concentrations ranged from undetected to 30 μg/L. Lead concentrations ranged from undetected to 23 μg/L. Metals detected less frequently included arsenic, chromium, mercury, and nickel. Organic contaminants were generally absent from the water column.

Results of Marine Water Sampling for Radioactivity

To provide additional assurance that procedures used by the Navy to control radioactivity are adequate to protect the environment, the Navy conducts environmental monitoring in harbors frequented by its nuclear-powered ships. The current Navy environmental monitoring program in the Puget Sound area, including NAVSTA Everett, includes analyzing samples of marine water (see below), sediment (see section 5.4.1), and marine life (see section 5.5.1).

Navy sampling of marine water near NAVSTA Everett has shown no detectable radioactivity associated with Naval nuclear propulsion plant operation or servicing. In addition to Navy sampling, the EPA has conducted detailed environmental surveys of selected U.S. harbors. A previous 1987 EPA survey of NAVSTA Everett detected only naturally occurring radioactivity in marine water samples (EPA 1989b), and no NNPP radioactivity in sediment samples.

For further discussion on the Navy's radiological environmental monitoring program, see section 7.4.4.

5.3.2 Environmental Consequences and Mitigation Measures

Significance Criteria

An impact would be significant if one of the following occurred:

- Alteration of hydrological conditions of the project site to the extent that persistent adverse effects on water quality, navigation, or biological conditions result.
- Exceedance of state water quality standards or objectives, or the EPA National Ambient Water Quality Criteria, outside a specified discharge mixing zone or immediate construction area.
- Creation of turbidity (suspended solids), DO, contaminant, or other conditions that would result in significant mortality of aquatic organisms.

5.3.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)*

Alternative Two would not require any new projects.

Dredging

No dredging would occur for this alternative.

Facility Improvements

Because no improvements are proposed, no impacts to marine water quality would occur.

Operations

No changes in ships homeported at NAVSTA would occur, so there would be no operations-related impacts to marine water quality.

Navy policy and requirements for controlling ship discharges to the environment are presently contained in OPNAVINST 5090.1B. These requirements are applicable to all home port sites assessed in this EIS (NASNI, PSNS, NAVSTA Everett, and PHNSY). These requirements, along with local instructions at each action site, ensure that discharges as a result of the operation of Naval vessels are in compliance with the Federal Water Pollution Control Act (or "Clean Water Act") and present no significant impact to the environment.

Also, the National Defense Authorization Act of 1996 amended Section 213 of the Clean Water Act to require that the Secretary of Defense and the Administrator of the EPA jointly develop Uniform National Discharge Standards (UNDS) for discharges incidental to the normal operation of vessels of the Armed Forces. The intent of this act is to establish a consistent set of effluent standards that improves environmental protection while enhancing the operational flexibility of the Armed Forces vessels that visit various ports as part of their missions. The Navy and EPA are currently working together and in consultation with states and other stakeholders in a three-phase process to (1) determine those discharges that have the potential to cause environmental effects and that can be practically controlled with a marine pollution control device (MPCD); (2) to set performance standards for the MPCDs; and (3) to publish regulations governing the MPCD design, installation, and use. Completion of the UNDS regulatory development process is anticipated in late 2001. All vessels of the Armed Forces, including CVNs at NASNI, PSNS, NAVSTA Everett, and PHNSY, will operate in compliance with the requirements on the effective dates set forth in the final rules.

5.3.2.2 *Removal of Existing CVN: Total of No CVNs (Alternative Three)*

Alternative Three would not require any new projects.

This action would not have marine water quality impacts. No dredging or other construction would occur. The potential for marine water quality impacts due to CVN homeporting operations would be removed, but these impacts are minimal, as described in section 5.3.2.3. The redistribution of ships homeported at NAVSTA Everett would not affect water quality.

5.3.2.3 *Removal of Existing CVN and Addition of Four AOEs: No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Under this action, none of the above water quality impact significance criteria would occur or be exceeded. Therefore, water quality impacts would be less than significant. The following sections explain this conclusion.

Dredging

Approximately 50,000 cy of sediment would be dredged from the North Wharf. The procedures used at NAVSTA Everett would be the same as those described for PSNS in section 4.3.2.1. The principal water quality impact of dredging is increased suspended solids (sediments) at and near the dredging site, which in turn results in reduced DO levels, reduced light transmittance, increased nutrient levels, and increased levels of toxic chemicals associated with the suspended sediments. The potential for increased levels of toxic chemicals is lower than at PSNS, however, because the levels of these chemicals in NAVSTA sediments are lower than in PSNS sediments. As described in section 4.3.2, these effects of dredging would be temporary and limited to the immediate area of dredging. Sediments at NAVSTA are primarily fine-grained, which tend to remain suspended in the water column longer than coarser sediments. Because of the relatively low concentration of sediment contaminants at NAVSTA, the "environmental" dredging methods proposed for PSNS (section 4.3.2) would not be needed. Currents at NAVSTA are not particularly strong (2 to 12 cm/sec). Based on the above information, turbidity plumes caused by dredging would be expected to extend beyond a 300-foot radius dilution zone, but TSS levels outside the dilution zone would be well below levels needed to cause adverse biological effects. In addition, applicable water quality standards would not be exceeded outside a dilution zone specified by the permitting agencies (section 4.3.2.1). Resulting impacts would be less than significant. If additional analysis conducted during the permitting process indicates that applicable standards or levels expected to cause adverse biological effects would be exceeded outside the dilution zone, or if dredge monitoring indicates such exceedances, the Navy, in consultation with permitting agencies, would develop additional control measures to prevent adverse impacts.

Available information (Dames & Moore 1994) indicates that the sediments that would be dredged at NAVSTA Everett are relatively free of contaminants and toxicity, and would be suitable for disposal at the designated Port Gardner PSDDA open-water disposal site. This site is located 2.2 miles southwest of the home port site (see Figure 1-2). The water quality impacts of disposal would be temporary and localized, and within the accepted impacts of normal use of the site, as assessed and mitigated for in the EIS for site designation (COE 1988). Therefore, no significant impacts attributable to the proposed project would result from dredged material disposal.

Facility Improvements

A mooring dolphin would be installed approximately 200 feet southwest of the end of the Carrier Pier, in approximately 80 feet of water, and structural improvements would be made to the North Wharf. Installation of the dolphin by pile driving, and the pier improvements, would result in temporary suspension of bottom sediments, with the types of associated water quality effects described above for dredging. The effects would be relatively minor, localized, and transient. This construction would have no long-term impacts on water quality. Planned utility upgrades would not affect marine water quality.

Operations

Homeporting of ships at NAVSTA Everett could affect water quality through fuel spills, ship maintenance, accidental discharges of various wastewater from ships, and discharge of stormwater from NAVSTA Everett. For the reasons similar to those described for PSNS in section 4.3.2, existing water quality impacts from these sources are less than significant, and this would not change under the proposed project. Measures are in place to minimize spills of fuel and other hazardous substances, and to contain and clean up such spills. All ship wastewaters are pumped ashore for treatment, with little to no potential to impact surface water quality. Changes in ships homeported at NAVSTA Everett would not have a significant effect on stormwater discharge. All ship and NAVSTA Everett operations would be conducted in accordance with NAVSTA Everett's hazardous waste management plan, oil and hazardous substance spill contingency plan, and oil and hazardous substance spill prevention, control and countermeasures plan.

Navy policy and requirements for controlling ship discharges to the environment are presently contained in OPNAVINST 5090.1B. These requirements are applicable to all home port sites assessed in this EIS (NASNI, PSNS, NAVSTA Everett, and PHNSY). These requirements, along with local instructions at each action site, ensure that discharges as a result of the operation of Naval vessels are in compliance with the Clean Water Act and present no significant impact to the environment.

5.3.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; dredging, utilities, and structural repairs at North Wharf.

None of the above water quality impact significance criteria would occur or be exceeded. Therefore, water quality impacts would be less than significant. The following sections explain this conclusion.

Dredging

Approximately 105,000 cy of sediment would be dredged from the west side of the Carrier Pier and 50,000 cy from the North Wharf. The dredged material would be disposed at the Port Gardner PSDDA disposal site. Impacts on water quality associated with dredging activities would be similar to those described in section 5.3.2.3. At NAVSTA Everett, applicable water quality standards would not be exceeded outside a specified dilution zone. Dredging and disposal activities would result in less than significant water quality impacts.

Facility Improvements

As described in section 5.2.3.2, structural repairs to the North Wharf and utility upgrades would also not have significant impacts on marine water quality. SWPPPs would be applied to the other land-based construction projects; this would prevent adverse impacts to marine water quality from these projects. Stormwater Pollution Prevention Plans (SWPPPs) would minimize water quality impacts during the construction of these facilities. This construction would not have significant water quality impacts. To prevent erosion during construction and any subsequent down stream erosion or water quality impacts, SWPPPs would be prepared prior to construction for each project, as required by EPA NPDES general permit #WA-R-10-00F: General Construction of Federal Facilities in the State of Washington. Preparation of these SWPPPs is the responsibility of the individual construction contractors. The Navy requires contractors to prepare SWPPPs consistent with WDOE's Stormwater Management Manual for the Puget Sound Basin, including best management practices (BMPs) needed to ensure adequate water quality during the construction period. SWPPPs govern site actions during the construction period.

Operations

With the addition of a homeported CVN at NAVSTA Everett, the potential for related water quality impacts would be increased. However, the potential for the in-berth operation of a ship homeported at NAVSTA Everett to adversely affect water quality is very small, as described under section 5.3.2.3. All ship and NAVSTA Everett operations would be conducted in accordance with NAVSTA Everett's hazardous waste management plan, oil and hazardous substance spill contingency plan, and oil and hazardous substance spill prevention, control and countermeasures plan. Therefore, the addition of a second CVN homeported at NAVSTA Everett would result in less than significant water quality impacts.

Navy policy and requirements for controlling ship discharges to the environment are presently contained in OPNAVINST 5090.1B. These requirements are applicable to all home port sites assessed in this EIS (NASNI, PSNS, NAVSTA Everett, and PHNSY). These requirements, along with local instructions at each action site, ensure that discharges as a result of the operation of Naval vessels are in compliance with the Clean Water Act and present no significant impact to the environment.

NNPP RADIOLOGICAL IMPACTS. Since the early 1970s, the Navy has prohibited intentional discharges of even negligible NNPP radioactivity into harbors. Stringent, long-standing NNPP controls have proven effective in protecting the marine environment from radioactivity. The total amount of long-lived gamma radioactivity released into harbors and seas within 12 nautical miles of shore has been less than 0.002 Curie during each of the last 26 years. This is from the Naval nuclear-powered ships and from the supporting nuclear-capable shipyards, tenders, and operating bases, and at other U.S. and foreign ports that were visited by Naval nuclear-powered ships. To put this small quantity of radioactivity into perspective, it is less than the quantity of naturally occurring radioactivity in the volume of saline harbor water occupied by a single nuclear-powered submarine (NNPP 1997). Because these controls would continue, there would be no significant long-term onshore maintenance facilities or vessel-related operational impacts on water quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at NAVSTA Everett.

5.3.2.5 *Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)*

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

Under this action, approximately 50,000 cy of sediment would be dredged at the North Wharf. The dredged material would be disposed at the Port Gardner PSDDA disposal site. Impacts to water quality would be similar to those described in section 5.3.2.3, and as such would not be significant.

Facility Improvements

Facility improvements for this action include the installation of a mooring dolphin near the Carrier Pier, structural repairs to the North Wharf, and utility upgrades. As described in sections 5.3.2.1 and 5.3.2.3, these construction activities would not have a significant impact on water quality.

Operations

The measures described in section 5.3.2.3 would be implemented to control discharges associated with operation of homeported ships. As a result, such discharges would be infrequent and would be contained. Therefore, resulting water quality impacts would not be significant.

5.3.2.6 *No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging, Facility Improvements, and Operations

Under this alternative, no construction or dredging would occur at NAVSTA Everett, and there would be no changes to the number and types of ships homeported there. Therefore, no impacts to marine water quality would result.

5.3.2.7 *Mitigation Measures*

The project would be implemented in conformance with permit conditions to protect water quality (see section 4.3.2). No additional mitigation measures are proposed.

5.4 SEDIMENT QUALITY

Regulatory Setting

As discussed in section 4.4, the two major sets of regulations that govern sediment issues are those promulgated under the PSDDA program, which imposes constraints on the disposal of dredged sediments based on sediment contaminant levels, and the Sediment Management Standards, which regulate the cleanup of contaminated sediments (COE 1988). This section describes the implications to these regulations to the dredging of sediments from selected sites at NAVSTA Everett. These regulations are discussed in sections 4.4.1.1 and 4.4.1.2, respectively (see also Appendix A, Volume 2).

Criteria

PSDDA regulations establish disposal criterion for sediments, based on the results of chemical, and biological toxicity testing of sediments and assessments of the relative contamination. The selection of dredged material disposal sites and options depends on the degree of contamination associated with the dredged material. Sediments that meet PSDDA criteria may be approved for disposal at an unconfined open-water site in Puget Sound. Sediments with contaminant concentrations below the PSDDA screening level (SL) can be disposed of at an unconfined open-water site without further testing. Sediments with contaminant concentrations above the PSDDA maximum level (ML) cannot be disposed of at an open-water site. Sediments with contaminant concentrations between the SL and ML must undergo biological testing to determine their suitability for open-water disposal. Sediments that exceed the PSDDA criteria, but are below the Dangerous Waste Standards (WAC 173-303), may be further considered for confined disposal. The WADOE is currently developing standards for the confined disposal of such sediments. The confined disposal standards address sediment testing, site design, dredging, material transport, and site monitoring for upland, nearshore, and aquatic disposal environments.

5.4.1 Affected Environment

The most recent survey of sediments in the vicinity of the proposed dredging area west of the existing Carrier Pier was conducted in May 1993 as part of the baseline water and sediment quality certification monitoring for NAVSTA Everett (Dames & Moore 1994). This study evaluated sediment quality at 11 locations within and outside of the East Waterway and provides the most recent data for assessing the acceptability of sediments for dredging and subsequent disposal in an unconfined open-water disposal site. Two stations (SQ07, SQ08) are in the vicinity of the Carrier Pier, while station SQ10 is near the North Wharf (see Figure 5.4-1 in Volume 5, section 5.4). Sediment samples were collected from the upper 2 cm at each station location using a grab sampler. Samples were tested for conventional and contaminant chemistry, bioassay toxicity, and biological community characteristics. Surface sediments from control and reference sites were also collected for each sampling event and used in comparisons for interpreting biological toxicity and biological community conditions.

The baseline study was the first sediment quality study performed after the Carrier Pier construction. Since sediments were dredged and thereby removed during the construction of the pier, previous sediment studies such as those conducted for the earlier NAVSTA Everett home port projects are not representative of current conditions and therefore are not discussed in this EIS.

The existing sedimentation rate at NAVSTA is approximately 4 to 5 cm/yr. The primary source of sediments is the Snohomish River.

Organic Carbon and Grain Size

The physical and chemical characteristics of the NAVSTA Everett sediments from this study are presented in Volume 5, section 5.4, Table 5.4-1.

Contaminant Chemistry

All metals were detected in the sediments except antimony. The concentrations of metals were slightly higher at station SQ08 than SQ07, and SQ10, although arsenic and nickel concentrations were higher at SQ10. No PSDDA exceedances were reported for metals at stations SQ07, SQ08, and SQ10. A few of the organics analyzed exceeded the PSDDA SL for at least one of these stations, but were less than the PSDDA ML. These analytes included acenaphthalene, acenaphthene, 2-methylnaphthalene, and indeno(1,2,3-cd)pyrene. Total LPAHs were exceeded at SQ08.

Sediments collected in the proposed dredge area were primarily fine-grained (66 to 70 percent silt and clay) with total organic compound (TOC) content ranging from 1.32 to 1.42 percent.

Toxicity

Sediment bioassays were conducted on selected sediment samples collected at NAVSTA Everett to evaluate the acute toxicity to benthic (sediment-dwelling) organisms (Dames & Moore 1994). The acute bioassay performed was with the amphipod *Rhepoxynius abronius*. Measured amphipod mortality was 20 percent for SQ07 and 26 percent (average of three replicates) for SQ08, and 3 percent for SQ10. The reference sediment and laboratory control mortality were reported at 9 percent and 7 percent, respectively. Based on the results of this test, sediments dredged from the west side of the Carrier Pier and at the North Wharf are likely to be acceptable for disposal at a PSDDA open-water disposal site.

Benthic Infauna

Sediment samples were collected at selected stations during the baseline sediment quality study to identify and count organisms making up the benthic community. Two stations representing the west side of the Carrier Pier (BI07 and BI08) were reported in this study. Station BI10, located within the Snohomish River near the North Wharf, was also reported.

General patterns of abundance show decreasing numbers of animals of all types from deeper open water (including BI07 and BI08) to shallower water of the East Waterway and Snohomish River (including BI10). Based on the relative numbers of organisms reported at BI07 and BI08, sediments west of the Carrier Pier appear to have a healthy benthic community (refer to section 5.5.1 for more information).

Results of Sediment Sampling for Radioactivity

Naval nuclear-powered ships have only recently been located at NAVSTA Everett. Environmental sampling around NAVSTA Everett has not detected any historical NNPP-related radioactivity.

5.4.2 Environmental Consequences and Mitigation Measures

Significance Criteria

An impact would be significant if the following occurred:

- A discharge of dredged material occurs at the surface of a disposal site or sediments are exposed at a dredging site, which would cause substantial toxicity or bioaccumulation of contaminants in aquatic biota.

5.4.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)*

Alternative Two would not require any new projects.

This action would not have sediment quality impacts. No dredging or other in-water construction would occur. No changes in operations-related impacts would occur.

5.4.2.2 *Removal of Existing CVN: Total of No CVNs (Alternative Three)*

Alternative Three would not require any new projects.

This action would not have sediment quality impacts. No dredging or other construction would occur. The potential for sediment quality impacts due to CVN homeporting operations would be removed, but these impacts are minimal, as described in section 5.4.2.3. The redistribution of ships homeported at NAVSTA Everett would not affect sediment quality.

5.4.2.3 *Removal of Existing CVN and Addition of Four AOEs: No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Under this action, 50,000 cy of sediment would be dredged from the North Wharf. The principal effect of this dredging on sediment would be removal of the surface layer of sediment and exposure of underlying sediment. The thickness of the removed layer would be approximately 5 feet at the North Wharf. Surface sediments are important because they are the sediments to which the water column and biological community are exposed. The newly exposed sediments are not expected to be very different from the old surface sediments in terms of physical characteristics (grain size — both are primarily fine-grained but with a major amount of sand), and total organic carbon. Regarding toxic constituents, in general existing surface sediments at NAVSTA Everett have slightly higher concentrations than sediment at depth, so that dredging would improve the quality of surface sediments slightly. This effect would be smaller than at PSNS (section 4.5.4), however, because NAVSTA Everett sediments have generally lower concentrations of toxic chemicals than PSNS sediments. This effect would also be reduced by the tendency of surface sediments to be suspended into the water column during dredging, and then to be redeposited at the dredging site, creating a new sediment surface similar in character to the previous one. The toxicity of site sediments, and their potential to promote bioaccumulation of contaminants, would not increase. In conclusion, the impacts of dredging on the sediments of the dredging site would be less than significant.

Disposal at PSDDA Site

Dredged material is expected to be disposed of at the Port Gardner PSDDA disposal site (Figure 1-2). The impacts of this disposal would be minor and within the accepted impacts of normal use of the site, as addressed in the EIS for site designation (COE 1988). Therefore, no significant impacts attributable to the homeporting project would occur at this site.

Facility Improvements

Under this action, a mooring dolphin would be installed approximately 200 feet southwest of the end of the Carrier Pier in approximately 80 feet of water and structural improvements would be made to the North Wharf. Driving of piles for the dolphin would result in considerable physical disruption of the bottom sediments at the site. Sediment would be resuspended into the water column, and following construction activity, would be redeposited at the site or in adjacent areas. If currents are strong at the time of construction, resuspended sediments may be transported considerable distances before being redeposited. However, the effects of this would be minor. Accumulation at any one site would be no more than a few centimeters thick. The physical and chemical characteristics of the suspended sediments are not likely to be substantially different from those of the deposition site; the proposed dolphin site is not located in an area of sediment contamination. The biological effects of this redeposition would be minor. Improvements to the wharf would have similar types of, but much smaller, effects on sediments. The upland utility improvements that would occur under this alternative component would not impact marine sediment quality. Consequently, facility improvements would have less than significant impacts on sediment quality. Structural repairs to the North Wharf would have similar types of, but smaller and not significant, impacts to sediments.

Operations

Any fuel or other hazardous substances discharged from homeported ships or NAVSTA Everett could be incorporated into marine sediments at NAVSTA Everett and degrade the quality of those sediments. Discharged organic matter could result in reduced oxygen content of sediment. NAVSTA Everett implements a series of hazardous material and water quality protection plans to minimize and respond to such discharges. As discussed for water quality in section 5.3.2, such discharges would be infrequent and small, and/or would be contained and cleaned up, so that water quality impacts would not be significant. Therefore, sediment quality impacts would also be less than significant.

5.4.2.4 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; dredging, utilities, and structural repairs at North Wharf.

Dredging

Under this action, approximately 105,000 cy of sediment would be dredged from the west side of the Carrier Pier, and 50,000 cy would be dredged from the North Wharf. The thickness of the removed layer would be approximately 8 feet at the Carrier Pier and 5 feet at the North Wharf. Impacts on sediment quality associated with dredging activities would be similar to those described in section 5.4.2.3. These impacts would be less than significant.

Disposal at PSDDA Site

Dredged material is expected to be disposed of at the Port Gardner PSDDA disposal site (Figure 1-2). The impacts of this disposal would be minor and within the accepted impacts of normal use of the site, as addressed in the EIS for site designation (COE 1988). Therefore, no significant impacts attributable to the homeporting project would occur at this site.

Facility Improvements

Under this action, structural repairs would be made to the North Wharf and various other land-based facilities would be built. Construction of these facilities could affect marine sediment quality through impacts to marine water quality. These impacts would not be significant, however. Stormwater from the construction sites would be controlled and managed according to SWPPPs developed for each project (section 5.3.2), so that adverse impacts to water and sediment quality would be negligible.

Operations

With the addition of a homeported CVN, the potential for discharges of fuel, oil, or other hazardous substances from homeported ships to adversely affect sediment quality would be increased slightly. However, the potential for homeported ships to impact sediment quality would be very low, as described in section 5.4.3.1. Therefore, homeporting one additional CVN at NAVSTA Everett would result in less than significant impacts to sediment quality.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 5.3.2 would continue, there would be no significant impacts on sediment quality due to NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at NAVSTA Everett.

5.4.2.5 *Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)*

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

Under this action, approximately 50,000 cy of sediment would be dredged at the North Wharf. The dredged material would be disposed at the Port Gardner disposal site. Impacts to sediment quality would be similar to those described in section 5.4.2.3, and as such would not be significant.

Facility Improvements

Facility improvements for this action include structural improvements to the North Wharf, installation of a mooring dolphin near the Carrier Pier, and utility upgrades. As described in sections 5.4.2.3 and 5.4.2.4, these construction activities would not have a significant impact on sediment quality.

Operations

Impacts associated with ship operations would be similar to those described in section 5.4.2.3, and as such would not be significant.

5.4.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Under no action alternative, no construction or dredging would occur at NAVSTA Everett, and there would be no change in the ships homeported there. Therefore, no impacts to sediment quality would result.

Dredging

Under this alternative, no construction or dredging would occur at NAVSTA Everett. Therefore, no impacts to sediment quality would result.

Facility Improvements

Under this alternative, no facility construction would occur at NAVSTA Everett. Therefore, no impacts to sediment quality would result.

Operations

Under this alternative, there would be no change in the ships homeported at NAVSTA Everett. Therefore, no impacts to sediment quality would result.

5.4.2.7 Mitigation Measures

Sediment impacts would not be significant for any alternative. Permit conditions to minimize water quality impacts would be adhered to during project implementation, as described in section 4.3.2. These measures would also serve to minimize sediment impacts. No additional mitigation measures are proposed.

5.5 MARINE BIOLOGY

5.5.1 Affected Environment

This section describes the existing biological community at NAVSTA Everett that would be affected by dredging and construction activities for the proposed project. The communities addressed in this section include plankton, eelgrass and algae, invertebrates, fishes, birds, and marine mammals. This section also discusses threatened and endangered species and the results of marine life sampling for radioactivity. The general descriptions apply to all locations at the Everett homeport site that would be affected by the proposed project.

Plankton

Phytoplankton and zooplankton populations vary according to seasonal changes in physical and chemical parameters such as light, temperature, salinity, available nutrients, current regimes, and hydraulic conditions. In Puget Sound, multiple phytoplankton blooms occur from May to September (DON 1992b). Predominant species include diatoms, dinoflagellates, and various other nanoflagellates. Zooplankton abundances generally reflect phytoplankton changes in abundance. Dominant zooplankton found in Port Gardner include copepods, cladocerans, and other small crustaceans (DON 1992b). Predominant phytoplankton and zooplankton species are listed in Volume 5, section 5.5.

Eelgrass and Algae

Macrophytic algae (seaweeds) occurring in the vicinity of the NAVSTA Everett home port site are generally found on rip-rap along the inside and outside shores of the breakwater, south mole, and the river mouth, and along intertidal rocks. In past surveys, the predominant species along the rip-rap was the rockweed, *Fucus* sp., with small growths of sea lettuce, *Ulva* sp. (DON 1984, 1992b). Green algae *Enteromorpha* sp., *Bryopsis* sp., and *Ulva* sp., and brown algae, *Fucus* sp., were abundant on intertidal rocks (DON 1984).

In addition to the macrophytic algae are eelgrass and periphyton. Eelgrass, *Zostera marina*, is found on the sand and mudflats to the north and west of Jetty Island (DON 1984). Eelgrass beds provide important habitat for aquatic organisms and wildlife because they are highly productive and serve as a food source for a variety of aquatic organisms including fish, invertebrates, seabirds, and waterfowl. The beds also provide shelter for fish and invertebrates, and are used as a spawning substrate for some fish, including herring.

Periphyton are attached to subsurface substrates and include minute filamentous algaes and benthic diatoms. Although surveys of these organisms were not conducted near the proposed project area, abundant genera found in closest survey conducted (Elliott Bay) included *Melosira, Achnanthes, Synadra, Navicula,* and *Fragillaria* (DON 1984, 1992b).

Invertebrates

Benthic infauna and epibenthic invertebrates serve as a valuable food source for fish and birds inhabiting the area. In surveys conducted by Dames & Moore in 1993, 189 species of benthic infauna were identified in samples collected from the home port area (Dames & Moore 1994). Benthic communities within the inner East Waterway were dominated by opportunistic polychaetes and small crustaceans that are characteristic of a recently disturbed area. Infaunal abundances and species richness tended to increase in deeper open water, away from the shallower water of the Snohomish River and East Waterway. In addition, the proportional abundance of bivalves in outer stations were higher than inner stations. Because bivalves are generally longer-lived, they are indicative of areas that are more stable over time or less disturbed (Dames & Moore 1994).

The lower abundances and diversity in the East Waterway and the relatively stressed benthic community (as characterized by small and opportunistic species), are likely a result of recent dredging to accommodate the home port project. Boat traffic contributed to sediment disturbance caused by propeller wash (Dames & Moore 1994). The inner East Waterway locations have also been affected in the past by wood waste and organic enrichment from pulpmill and sewage outflow (DON 1994c).

Epibenthic invertebrates observed in past surveys in the proposed home port area have included various small crustaceans including copepods, amphipods, cumaceans, and tanaids. Commercially important epifauna that have occurred in the area include Dungeness crab (*Cancer magister*) and Pandalid shrimp (*Pandalus* spp. and *Pandalopsis* spp.). In past surveys, both juvenile and adult crabs and shrimp were abundant near the mouth of the Snohomish River, as well as shorelines in the vicinity of the home port site. Densities of Dungeness crabs tended to be lower near the NAVSTA Everett breakwater/pier and East Waterway (DON 1992b).

Fishes

Fish species that occur in the vicinity of the Everett home port site include a variety of anadromous, demersal, and pelagic fishes. Anadromous fishes include salmon, trout, char, and shad that migrate up the Snohomish River to spawn. The offspring of the various naturally occurring anadromous fish species migrate downstream in the spring, and use the shorelines as rearing areas as the juveniles migrate out to sea. In addition, the Washington Department of Fish and Wildlife (WDFW) hatcheries and rearing facilities augment the naturally occurring steelhead population by releasing steelhead (*Oncorhynchus mykiss*) on the Snoqualmie, Stillaquamish, Skagit, and Skykomish Rivers (DON 1994c).

Some of the predominant pelagic and demersal fish species observed in and around the East Waterway included cod, herring, hake, surfperch, perch, dogfish, sole, sanddabs, tomcod and sculpin. Demersal fish tended to be less diverse and numerous than pelagic species in past fish surveys in the project area (DON 1994c). Predominant fish species are listed in Volume 5, section 5.5.

Birds

Port Gardner and the Snohomish River floodplain provide important habitat for waterbirds. Jetty Island provides nesting habitat for Arctic terns (*Sterna paradisaea*) and glaucous-winged gulls (*Larus glaucescens*). Large numbers of wigeon and mallards are found in the Snohomish River delta, north of Port Gardner, and east of Jetty Island. The primary waterbirds observed in the Port Gardner vicinity include various gulls, wigeon, mallards, western grebes, cormorants, and scoters (DON 1985 Appendix W, 1992b). Important bird species are listed in Volume 5, section 5.5.

Marine Mammals

Marine mammals found in central Puget Sound include the Pacific harbor seal (*Phoca vitulina*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatas*), orca (*Orcinus orca*), gray whale (*Eschrichtius robustus*), Dall's porpoise (*Phocoenoides dalli*), and harbor porpoise (*Phocoena phocoena*). Whales and porpoises are infrequent or rare around the NAVSTA Everett proposed home port site. However, gray whales have been sighted in Possession Sound near the home port project area, and off Kayak Point northwest of the site (DON 1993 Appendix C). Evidence of their foraging was observed approximately 2.5 miles north of the site in sandflats west of Jetty Island. Pacific harbor seals and California sea lions have been observed feeding and swimming in the Snohomish River channel and East Waterway throughout the year. In addition, small numbers (one to six individuals in the East Waterway and Port Gardner) of Steller sea lions have been observed from October to June in the vicinity of the NAVSTA Everett proposed home port site. The seals and sea lions have used log rafts near Jetty Island and the lower Snohomish River as hauling-out areas (DON 1989, 1992b).

Threatened and Endangered Species

As discussed in section 4.5.1, the threatened and endangered species identified, through the EIS scoping process, as being of concern for both Puget Sound sites under consideration for homeporting are the bald eagle, marbled murrelet, and depleted stocks of anadromous fish. The occurrence of relevant anadromous fish species in the NAVSTA vicinity is described here. The bald eagle and marbled murrelet are discussed under Terrestrial Biology, section 5.6.

Anadromous fishes include salmon, trout, char, and shad that migrate up the Snohomish River to spawn. The offspring migrate downstream in the spring (salmon peak numbers in April-May), and use the shorelines of the Snohomish River, Everett Harbor, and Port Gardner as a rearing area as they migrate out to sea.

The Snohomish River is the second largest drainage system in Puget Sound and provides an important transit habitat for salmon during their migration and outmigration phases. Salmon species inhabiting the Snohomish River system include chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), pink (*O. gorbuscha*), and chum (*O. keta*) salmon (DON 1992b, 1985). Both spring and fall races of chinook salmon utilize the Snohomish River. Puget Sound chinook salmon were listed as threatened in March 1999. None of the other salmon species occurring at the project site are listed or proposed for listing.

Salmon juveniles migrate downstream in the spring (peak numbers occur in April and May), using the shallow shoreline areas of the Snohomish River, Everett Harbor, and Port Gardner as rearing areas as they migrate out to sea. Juveniles feed on small epibenthic invertebrates such as copepods and amphipods in the shallow nearshore areas, and feed on pelagic prey further offshore as they increase in size. The different salmon species peak in numbers at slightly different times during the spring. The pink salmon arrive first in early April, followed by chum, coho, and then chinook salmon. Juvenile pink salmon peak in numbers in the general home port area between mid-April and mid-May, and chum salmon peak between mid-April and mid-June. Low numbers of juvenile coho salmon move through the area in late May to early June, and chinook juveniles peak from mid-June to early July (DON 1994c).

In addition to the naturally occurring populations of salmon species, the Tulalip Tribe and WDFW hatcheries release numerous juvenile salmon into the river system (DON 1994c). The Tulalip Hatchery releases chum salmon in late April to early May, coho salmon in mid to late May, and fall-run chinook salmon in mid-May (1.5 million in 1992). The Skykomish WDFW Hatchery on the Wallace River releases pink, coho, and chinook salmon each year. The Skykomish hatchery has released fall-run chinook fingerling in May and summer-run chinook fingerling in June, yearling summer chinook in March, and fingerling coho in April (DON 1994c).

Results of Marine Life Sampling for Radioactivity

Naval nuclear-powered ships have only recently been located at NAVSTA Everett. However, the Navy has prohibited intentional discharges of even negligible NNPP radioactivity into harbors since the early 1970s. Also, environmental sampling around NAVSTA Everett has not detected any historical NNPP-related radioactivity.

5.5.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Significant impacts would occur if the project results in the following:

- There would be a substantial adverse effect on threatened or endangered species, including state and federally listed or proposed species. A substantial adverse effect would include destruction or adverse modification of critical habitat or reductions in the abundance or long-term viability of the species. Such an effect may result from direct harm to individuals, or through effects on the competitors, predators, prey, or habitat of the species that could result in increased mortality or reduced reproductive success. Consideration would also be given to "species of concern" that could meet criteria for listing.

- The impact would violate applicable federal or state laws with respect to the protection of biological resources.

- Consideration would be given to impacts involving the loss or long-term degradation of sensitive habitat, defined as habitat that (1) provides essential resources that are otherwise limited on a regional scale; (2) serves as a concentrated breeding, nursery, or foraging area; or (3) supports substantial concentrations of one or more sensitive species.

- Consideration would also be given to effects resulting from interference with the movement of resident or migratory fish and wildlife, to the extent that substantial adverse impacts threatened the survival or reproductive success of a population.

5.5.2.1 Facilities for No Additional CVN: Capacity for No Change — Total of One CVN (Alternative Two)

Alternative Two would not require any new projects.

Dredging, Facility Improvements, and Operations

Under this action, there would be no impacts to the marine biological community. No dredging or other in-water activities would occur. No changes in operations-related impacts would occur.

5.5.2.2 *Removal of Existing CVN: Total of No CVNs (Alternative Three)*

Alternative Three would not require any new projects.

Dredging, Facility Improvements, and Operations

No marine biological impacts would occur under this action. No dredging or other in-water construction would occur, and any potential impacts due to CVN homeporting operations would be mitigated. The redistribution of ships homeported at NAVSTA Everett would not significantly affect the biological community.

5.5.2.3 *Removal of Existing CVN and Addition of Four AOEs: No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

In order to accommodate the addition of four AOEs, approximately 50,000 cy would be dredged at the North Wharf (to accept the frigates currently moored at the carrier pier). The dredged material is considered likely to be suitable for disposal at the Port Gardner PSDDA disposal site (Figure 1-2).

PLANKTON

The types of impacts to plankton associated with the dredging activities that would be required for the addition of four AOEs at NAVSTA Everett would be similar to those described for dredging operations at PSNS (see section 4.5.2.1). Although the increased suspended solids resulting from dredging operations could interfere with phytoplankton productivity, the increased turbidity conditions are expected to be localized and temporary. In addition, due to fishery protection, disposal operation would likely be avoided during the spring bloom period, when phytoplankton productivity is high. The overall effects on phytoplankton would be less than significant.

Impacts to zooplankton due to increased suspended solid resulting from dredging activities include clogging of gills and feeding appendages, which would reduce the zooplanktonic organism's ability to feed. The corresponding reduction in phytoplankton would also decrease the available food supply for the zooplankton. However, as described for phytoplankton, these impacts are expected to be negligible and less than significant as the increased turbidity conditions are expected to be localized and temporary, lasting only while dredging persists.

EELGRASS AND ALGAE

Impacts to the macrophytic algae due to dredging activities would include physical removal of any macrophytic algae attached to shell or other debris on the bottom sediment; inhibited primary production as a result of suspended particulates or settling of the material on the plants; or burial at the disposal site. However, most of the macrophytic algae present is attached to rip-rap along the breakwater, south mole, and along intertidal rocks so that removal of the algae would not be significant. The temporary and localized nature of the turbidity increase associated with dredging would not result in significant impacts to the productivity of the algae. Therefore, impacts associated with dredging operations would be less than significant.

Eelgrass beds, which provide important habitat for aquatic organisms and wildlife, are found on the sand and mudflats to the north and west of Jetty Island (DON 1984). These beds could potentially be affected by increased suspended particulates associated with dredging activities, which would inhibit primary productivity. The impacts to the beds would depend on the amount of suspended solids and turbidity produced, the velocity of the local currents, and the season. Impacts would be greatest during the growing season (late spring and summer). Any adverse effects on eelgrass habitat would also affect associated benthos, fish, marine mammals, and birds. However, siltation is typically heavy at the Snohomish River delta, where the eelgrass beds are located, from river-transported silts (DON 1985). These particular plants are likely adapted to such conditions. In addition, tidal action in the area sloughs off particulates that settle on the blades (DON 1985). Since these eelgrass beds are over 1 mile from the proposed dredging site, impacts are very unlikely. Impacts to eelgrass beds would not be significant at the disposal site.

INVERTEBRATES

As described in section 4.5.2.1, impacts to the benthic invertebrate populations due to dredging activities may initially involve loss of the community resulting from removal during dredging or burial during disposal of dredged material. However, these impacts would be temporary, minimal, and less than significant as recolonization of benthic invertebrates tends to be relatively rapid. The community that first establishes at the sites would consist of small, surface-dwelling opportunistic species. The benthic invertebrate communities that currently exist at the dredging site are likely to be adapted to frequent disturbance. Impacts to the commercially important Dungeness crab would be minimal. This species occurs in relatively low numbers at the Port Gardner disposal site, and is abundant near the mouth of the Snohomish River, although densities tended to be lower near the project area and East Waterway. In addition, the crabs are highly mobile and are capable of relocating to avoid dredging operations. Overall, impacts to this species would be less than significant, although the crabs may be more susceptible to dredging effects during the stage in which they molt into juveniles (late spring).

FISH

Similar types of impacts to fish associated with dredging activities described in section 4.5.2.1 would be expected for dredging operations planned for this action. Anadromous fish, including salmon, trout, char, and shad, migrate up the Snohomish River to spawn. Potential impacts to these fish are described under Threatened and Endangered Species. Most adult fish would be able to avoid the area during dredging operations, and the turbid conditions would be temporary. Initially, there would be losses of prey items for demersal fish in the immediate dredge area and fish would be temporarily displaced. In time (1 to 2 years), the benthic community would recover, and fish would recolonize the area. Long-term impacts would be less than significant.

Toxic effects on fish associated with contaminated particulates suspended in the water column due to dredging activities would be minimal. The presence of these sediments suspended in the water column would be limited to the immediate dredging area and fish would likely avoid the area. In addition, measures would be implemented to avoid spillage of contaminated sediments (e.g., watertight clamshell dredging or filling the barge partially full to avoid overflow). Dredging may also remove some of the more contaminated surface layer, so that sediment conditions at the dredge site may actually improve for a period. Therefore, toxic effects associated with dredging would be less than significant.

BIRDS

Port Gardner and the Snohomish River floodplain provide important habitat for waterbirds. Impacts to the birds occurring in the area would include disturbance during dredging activities; increased turbidity, which may inhibit foraging; reduced food availability; and bioaccumulation of contaminants. As described in section 4.5.2.1, the birds would likely avoid the area during dredging operations and forage elsewhere, thus reducing exposure to potentially contaminated prey and resulting in less than significant impacts. The area to be avoided represents a small part of the birds' normal foraging and resting habitat, and interference with bird activity in the area would end once dredging activities conclude. In addition, some bird species such as cormorants, gulls, and guillemots are adapted to industrial, commercial, and recreational boating activities, and other port activities (DON 1985). These birds would not be substantially influenced by the dredging activities.

MAMMALS

Impacts to marine mammals occurring in the vicinity of NAVSTA Everett and the Port Gardner disposal site would be similar to those described in section 4.5.2.1. The mammals would avoid the area during dredging operations, and the effects of turbidity and operations disturbance would be temporary and localized. There would be no substantial reduction in food availability for these species from their temporary avoidance of the immediate sites. Ships under navigation would deter the occasional gray or humpback whale using Puget Sound, although the Naval vessels would be a small proportion of the total marine shipping occurring in the area (DON 1985). Naval vessel activity would therefore have a less than significant impact on these transitory species (DON 1985).

THREATENED AND ENDANGERED SPECIES

Threatened, endangered, or species of concern for the NAVSTA Everett home port alternatives include the bald eagle, marbled murrelet, and depleted stocks of anadromous fish, including chinook salmon.

Salmon and other anadromous fish migrate up the Snohomish River to spawn. The offspring migrate downstream during the spring, and use the shorelines of the Snohomish River, Everett Harbor, and Port Gardner as a rearing area as they migrate out to sea. These juveniles would be particularly susceptible to the increased suspended particulates associated with dredging and disposal operations. Without avoidance of these impacts, the survival or reproductive success of the salmon could be adversely affected. In order to avoid impacts on these species, dredging would occur outside the peak period of outmigration (March 15 to June 15).

Disposal at the PSDDA Site

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

The impacts of dredged material disposal at the marine biological community at the Port Gardner PSDDA disposal site would be within the accepted limits of normal use of the site, as addressed and mitigated for in the EIS for site designation (COE 1988). Material would be disposed of at the site in accordance with PSDDA program requirements. Therefore, no significant impacts associated with the homeporting project at NAVSTA Everett would occur at this site.

Facility Improvements

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Under this action, a single mooring dolphin would be installed by driving piles, approximately 200 feet southwest of the end of the Carrier Pier, in approximately 50 feet of water. The seafloor and benthic community would be disrupted over a small area. Water quality would be degraded in a very localized and transient fashion due to suspension of sediments during construction; related biological effects would be correspondingly localized and transient. Fish, birds, and mammals would avoid the site during construction; these species would feed at other nearby locations with negligible impacts. Noise impacts from pile driving for the dolphin would be similar to those described for Pier D at PSNS (section 4.5.2), but of shorter duration due to the smaller number of sites. Spills of fuel or other hazardous substances from the construction barge would be improbable and small; a surface boom would be installed around the construction site to contain spills and facilitate their cleanup. Related biological effects would be less than significant. In the long term, the dolphin would add a small amount of hard substrate for the development of a typical piling community (algae, anemones, barnacles, mussels, sponges, tunicates, etc., along with associated small crustaceans and fish). As a result, the marine biological impacts of dolphin mooring installation would be less than significant. Structural repairs to the North Wharf would have similar types of, but smaller and therefore not significant, biological impacts. Utility upgrades would not affect marine biological resources.

Operations

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

The removal of the existing CVN homeported at NAVSTA Everett and addition of four AOEs could affect marine biological resources through the effects of these actions on water quality. As described in section 5.3.2, the effects of a homeported ship on water quality would be minimal, and the water quality impacts of the increased number of homeported ships under this action would be less than significant. Therefore, any related marine biological impacts would also be less than significant. The increase in ship movements that would occur under this action would represent a very small fraction of the total ship traffic in the Port Gardner and Puget Sound areas. Interference with the movement of marine birds or mammals, including threatened and endangered species, would be correspondingly small; impacts would therefore be less than significant.

5.5.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; dredging, utilities, and structural repairs at North Wharf.

Dredging

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Under this action, approximately 105,000 cy of sediment would be dredged from the west side of the Carrier Pier and 50,000 cy from the North Wharf. The dredged material would be disposed at the Port Gardner PSDDA disposal site. Overall, impacts would not result in significant long-term adverse effects on the biological community at NAVSTA Everett. However, juvenile salmon could be negatively impacted should dredging occur during the peak period of outmigration (March 15 and June 15). Although impacts to Dungeness crabs are expected to be less than significant, the crabs may be more susceptible to dredging effects during the stage in which they molt into juveniles (late spring). In addition, the amount of suspended dredged material that reaches the eelgrass beds to the north and west of Jetty Island may be small. However, monitoring would be conducted in order to determine if large quantities of dredged material are reaching the eelgrass beds. It may be necessary to minimize impacts by use of measures (e.g., silt curtains) to reduce the amount of suspended material reaching the eelgrass beds.

Facility Improvements

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

As described in section 5.3.2, the construction of the parking structure, structural repairs to the North Wharf, utility upgrades, and other construction for this action would not have significant impacts on water quality; resulting marine biological impacts would also be less than significant.

Operations

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

The water quality impacts, and related marine biological impacts of homeporting additional ships at NAVSTA Everett would be less than significant.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 5.3.2 would continue, there would be no significant impacts on marine biology from NNPP radioactivity from homeporting additional NIMITZ-class aircraft carriers at NAVSTA Everett.

5.5.2.5 *Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)*

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Under this action, approximately 50,000 cy of sediment would be dredged at the North Wharf to accommodate the addition of two AOEs. The dredged material would be disposed at the Port Gardner disposal site. Impacts to the biological community would be similar to those described in section 5.5.2.3. Adverse impacts to salmon and Dungeness crab would be minimized by dredging outside the salmon outmigration period (March 15 to June 15) and the crab molting during late spring. Eelgrass beds would be monitored in order to ensure that adverse impacts from increased suspended particulates do not occur.

Facility Improvements

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Facility improvements for this action would include installation of a mooring dolphin near the Carrier Pier, structural improvements to the North Wharf, and utility upgrades. As described in section 5.3.2, these construction projects would not have significant impacts on water quality. Therefore, related marine biological impacts would be less than significant.

Operations

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Impacts associated with ship operations would be similar to those described in section 5.5.2.3. Marine biological impacts of homeporting additional ships at NAVSTA Everett would be less than significant.

5.5.2.6 No Additional CVN: No Change —Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Under this action, no dredging would occur at NAVSTA Everett. Therefore, no impacts to marine biological resources would result.

Facility Improvements

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Under this action, no construction of facilities would occur at NAVSTA Everett, Therefore, no impacts to marine biological resources would result.

Operations

PLANKTON, EELGRASS AND ALGAE, INVERTEBRATES, FISHES, BIRDS, MARINE MAMMALS, AND THREATENED AND ENDANGERED SPECIES

Under this action, there would be no changes to the number or types of ships homeported there. Therefore, no changes to ship operations would occur, and no impacts to marine biological resources would result.

5.5.2.7 *Mitigation Measures*

Overall, impacts on marine biological resources at NAVSTA Everett would be less than significant. However, juvenile salmon could be negatively impacted should dredging and construction occur during the peak period of their outmigration (March 15 to June 15 or as designated by the WDFW). To avoid impacts to the survival and reproductive success of the salmon, dredging and construction would be limited to periods outside of the outmigration window. Adult salmon are not expected to be adversely affected during their migration upstream to spawn. Should an alternative be selected that entails dredging or other in-water construction at NAVSTA, issues related to impacts to threatened and endangered species, and associated mitigation, would be resolved through Section 7 consultation with the NMFS and USFWS, as described in Section 4.5.2.4.

Dungeness crabs may be more susceptible to dredging effects during the stage in which they molt into juveniles (late spring). This period would coincide with the salmon outmigration period.

In addition, permit conditions to minimize water quality impacts and impacts to the biological community would be adhered to during implementation of the project (refer to section 4.5.2.5). No additional mitigation measures are proposed.

5.6 TERRESTRIAL BIOLOGY

5.6.1 Affected Environment

This section addresses terrestrial biology at NAVSTA Everett. NAVSTA Everett consists of approximately 120 acres of land with the Navy property boundary extending into the East Waterway. The station is mostly developed and hard surfaced. It consists of three general areas: (1) an industrial and logistics support center that includes maintenance and warehouse facilities; (2) the station and personnel support area that consists of administrative, recreational, and residential quarters, along with parking facilities; and (3) the waterfront zone consisting of ship-related facilities such as piers, wharves, and utility support structures.

Land uses adjacent to the facility include the Port of Everett port and piers, and several industrial businesses. This shoreline is heavily developed and has a manufacturing zone classification. Consequently, vegetation and wildlife habitats within or adjacent to the station are limited. Small, isolated patches of landscaped vegetation with native and ornamental trees and shrubs exist. There are no streams, rivers, ponds, lakes, or freshwater wetlands located within the station. However, approximately 1 mile to the north is Jetty Island, which provides habitat to numerous shorebirds. In addition, the mouth of the Snohomish River enters Puget Sound about 3 miles north of NAVSTA Everett.

Plants

Because most of the NAVSTA Everett home port site is extensively developed, vegetation is limited to small patches of grass lawns and ornamental plants. Extensive native vegetation is found north of the site within the Snohomish River estuary and at Jetty Island, which consist of wetland and shoreline habitats, respectively. These habitats provide food, shelter, and nesting conditions for a variety of wildlife assemblages. Common plants of these habitats include saltgrass (*Distichlis spicata*), arrowgrasses (*Triglochin spp.*), spike rush (*Eleocharis plaustris*), cattail (*Typha latifolia*), sedges (*Carex* spp., *Scirpus* spp.), and willows (*Salix* spp.).

Animals

Due to the general lack of habitat at NAVSTA Everett, small mammals are limited to mice, squirrels, and other rodents, and only a few reptiles and amphibians. The diversity of terrestrial avian species is limited to starlings, crows, robins, pigeons, sparrows, and other passerine birds. The number and diversity of species increases in nearby areas away from the NAVSTA Everett port area.

During a study of waterbird populations at the NAVSTA Everett site (DON 1985 Appendix W), several waterbird species including double-crested cormorants (*Phalacrocorax auritus*), great blue herons (*Ardea herodias*), western grebes (*Aechmophorus occidentalis*), red-necked grebes (*Podiceps grisegena*), Barrow's goldeneye (*Bucephala islandica*), and mallard ducks (*Anus platyrhynchos*) were observed. The cormorants, which feed on decapods and fish are more common during the winter and early spring. Great blue herons are more common in the autumn months. The grebes and Barrow's goldeneye are among the most abundant in the study area. Other species inhabiting the Everett waterway include dunlin (*Calidris alpina*), American coots (*Fulica americana*), and black turnstones (*Arenaria melanocephala*).

Threatened and Endangered Species

Previous biological assessments addressed the following threatened or endangered species: the bald eagle, American peregrine falcon (*Falco peregrinus*), and marbled murrelet (DON 1992a, 1993). Bald eagles are present in the vicinity of the home port site throughout most of the year, particularly from November to March. Four bald eagle nesting territories have been identified within 7 miles of the NAVSTA Everett home port site. The closest nest is located at Pigeon Creek, 1 mile south of the home port site. During the spring, immature bald eagles are common near the site, perching and foraging at Jetty Island. The eagles feed on fish and water birds of the area and in East Waterway.

Peregrine falcons are known to nest in the San Juan Islands and coastal areas, over 40 miles from the site. The falcons migrate through the area and have been observed foraging at Jetty Island and flying over NAVSTA Everett and the Snohomish River estuary (DON 1993).

Marbled murrelets are listed as a threatened species under the Endangered Species Act. Over 1,000 breeding pairs have been estimated to occur in the northern Puget Sound region. Murrelets have been observed near the home port site west and southwest of Jetty Island.

5.6.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Significant impacts would occur if the project results in the following:

- There would be a substantial adverse effect on threatened or endangered species, including state and federally listed or proposed species. A substantial adverse effect would include destruction or adverse modification of critical habitat or reductions in the abundance or long-term viability of the species. Such an effect may result from direct harm to individuals, or through effects on the competitors, predators, prey, or habitat of the species that could result in increased mortality or reduced reproductive success. Consideration would also be given to "species of concern" that could meet criteria for listing.

- The impact would violate applicable federal or state laws with respect to the protection of biological resources.

- Consideration would be given to impacts involving the loss or long-term degradation of sensitive habitat, defined as habitat that (1) provides essential resources that are otherwise limited on a regional scale; (2) serves as a concentrated breeding, nursery, or foraging area; or (3) supports substantial concentrations of one or more sensitive species.

- Consideration would also be given to effects resulting from interference with the movement of resident or migratory fish and wildlife, to the extent that substantial adverse impacts threatened the survival or reproductive success of a population.

5.6.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of Once CVN (Alternative Two)

Alternative Two would not require any new projects.

Dredging

Because there would be no dredging associated with this action, there would be no terrestrial biological impacts.

Facility Improvements

Because facilities would not be constructed, there would be no terrestrial biological impacts.

Operations

There would be no change in terrestrial biological impacts associated with moving the existing CVN to and from Carrier Pier.

5.6.2.2 *Removal of Existing CVN: Total of No CVNs (Alternative Three)*

Alternative Three would not require any new projects.

Dredging

Because there would be no dredging associated with this action, there would be no terrestrial biological impacts.

Facility Improvements

Because there would be no facility improvements associated with the action, there would be no terrestrial biological impacts.

Operations

With the removal of the existing CVN, there would be a slight decrease in terrestrial biological impacts over the existing conditions. This would be a slight beneficial effect.

5.6.2.3 *Removal of Existing CVN and Addition of Four AOEs: No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Under this action, it is proposed that approximately 50,000 cy of sediment would be dredged and disposed of at the Port Gardner PSDDA site. Disposal into the approved open-water disposal site would not affect any upland bird species. Some open-water species of waterfowl (e.g., coots, grebes, and mergansers) could be temporarily impacted if the dredging occurs during their winter migration season. This effect would not be significant because of the extensive amount of other open-water habitats available.

Dredging operations would be located too far from known bald eagle nests to disturb eagle nesting. Eagles are known to forage in the NAVSTA Everett area, but could easily avoid the dredging area without a substantial loss in foraging habitat. Therefore, impacts to bald eagles would be less than significant. Impacts to marbled murrelets would also be less than significant.

This species does not nest in the NAVSTA Everett area. Marbled murrelets are known to feed occasionally in the Jetty Island area, and may feed farther offshore as well. However, the immediate dredging and disposal sites represent a very small part of the foraging area for these species, and avoiding these areas during dredging would not affect their feeding in any substantial way.

Facility Improvements

A single mooring dolphin would be installed under this action, which includes driving piles about 200 feet southwest at the end of the Carrier Pier. Impacts of noise and other temporary disturbance from this construction to waterfowl and shorebirds (e.g., great blue herons, double-crested cormorants, glaucous-winged gulls, over-wintering Barrow's goldeneye, grebes, and pigeon guillemots) that use the East Waterway would not be significant. Many of these species have successfully adapted to the industrial, commercial, and boating activities that characterize the area. In addition, other construction for this action would pose no serious threat to upland terrestrial birds at NAVSTA Everett, which are primarily urban species such as house sparrows, European starlings, and rock doves.

Operations

Large populations of overwintering western grebes, double-crested cormorants, and moderate numbers of common mergansers and red-breasted mergansers present in the Snohomish River between the mainland and Jetty Island may be temporarily stressed as noise, material shipment, and equipment deliveries associated with three additional ships occur. Birds currently using the west side of Jetty Island and the shoreline along the mainland south of the site would not be disturbed by noise and other operation activities.

In the unlikely event of oil or chemical spills in the project area, there is a potential for the spill plume to reach sensitive feeding areas of shallow waters and wildlife habitats. These temporary discharges could have a direct effect on birds that feed exclusively on fish. They could also affect the food chain and food sources upon which other species are dependent. The existing spill contingency plans are designed to minimize the potential for spills and provide procedures for containment and clean up.

Due to the general lack of vegetation at NAVSTA Everett, no impacts to either terrestrial or wetland vegetation are anticipated in the vicinity of either the North Wharf or South Wharf. However, some impacts to terrestrial wetlands bordering the south end of Jetty Island could occur during ship movements. These wetlands, which consist of high and low salt marshes, could be subjected to erosion from the wakes of the ships as they move to and from the home port. Because these ships would be moving only four to five times per year, and because of their low speeds in the vicinity of Jetty Island, the potential for shoreline erosion is not significant.

It is unlikely that any threatened or endangered species or any species of concern would be significantly affected by site operations for this action. Noise and other disturbance from routine operations may temporally preclude the use of the immediate area by bald eagles and marbled murrelets, or sensitive species such as great blue herons.

5.6.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Under this action, it is proposed that approximately 155,000 cy of sediment would be dredged and disposed of at the Port Gardner PSDDA site. Disposal into the approved open-water disposal site would not affect any upland bird species. Some open-water species of waterfowl (e.g., coots, grebes, and mergansers) could be temporarily impacted if the dredging occurs during their winter migration season. This effect would not be significant because of the extensive amount of other open-water habitats available.

Facility Improvements

Impacts to terrestrial biological resources occurring from facility improvements would be similar but greater than those described in section 5.6.2.3. These impacts would be not significant.

Operations

Operational impacts would be similar but less than those discussed in section 5.6.2.3 (not significant).

5.6.2.5 *Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)*

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

Dredging impacts to terrestrial biological resources occurring under this action would be similar but greater than described in section 5.6.2.3.

Facility Improvements

Facility improvement impacts associated with construction of the mooring dolphin and other projects under this action would be similar to those described in section 5.6.2.3.

Operations

Because of the existing high levels of industrial activity, lack of vegetative cover, and the general disturbed nature of the entire site, operations under this action would have no significant impact on terrestrial wildlife.

5.6.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

Because there would be no dredging associated with this alternative, there would be no terrestrial biological impacts.

Facility Improvements

Because there would be no facility improvements associated this alternative, there would be no terrestrial biological impacts.

Operations

There would be no change in terrestrial biological impacts associated with moving the existing CVN to and from Carrier Pier.

5.6.2.7 Mitigation Measures

The impacts to terrestrial biological resources would be short term and temporary. No mitigation measures are proposed.

5.7 LAND USE

5.7.1 Affected Environment

This section describes existing land uses and land use plans for NAVSTA Everett, for the City of Everett, and for the region.

5.7.1.1 NAVSTA Everett

NAVSTA Everett, which was officially dedicated in April 1994, is the Navy's newest and most modern facility. Under the command of the Pacific Northwest (PACNORWEST) Fleet Support Officer, NAVSTA Everett consists of two installations: the Waterfront Site and the Family Support Complex (FSC). The 117-acre Waterfront Site, which is located within the Everett city limits, provides ship berthing, industrial support, and an administrative center. The 52-acre FSC, which is located about 12 miles northeast of the Waterfront Site, provides family and personnel support services. NAVSTA Everett currently homeports seven ships: one CVN, two guided-missile destroyers, two destroyers, and two guided-missile frigates.

The Waterfront Site is configured into three land use zones: waterfront, industrial/logistics support, and station/personnel support. The boundaries of these land use zones are indicated in Figure 5.7-1. Each zone provides specific functions related to ship and station operational support. The Waterfront Zone contains the wharves, piers, and access roads needed to berth and service the ships. The Industrial and Logistics Support Zone includes industrial and logistical activities and storage facilities that need to be located as close as possible to the ships. The Station and Personnel Support Zone provides the administrative and personnel support services for the station including administration, communication, training, data processing, and base fire and security protection as well as medical, dental, barracks, galley, retail, exchange, and recreation.

As outlined in the *NAVSTA Everett Master Plan* (DON 1994), a number of constraints limit land use decisionmaking at this installation. The constraints are listed as follows:

- *Site Area.* The Waterfront Site has 117 acres of developable land. When all of the Navy's land use requirements and operational needs are considered, the program as outlined in the Master Plan potentially requires over 140 acres. The need to conserve land area puts severe planning constraints on the site's ability to respond efficiently to all siting requirements.

- *Site Configuration.* The site has a linear L-shaped configuration with the bulk of the site area located in its northern zone. This area is farthest from ship berthing areas at the south end. This location requires placing the recreational support functions a substantial distance from the ships' crews.

- *Physical Security.* The perimeter of the station must meet specific security requirements. A 20- to 30-foot-wide enclosure of open, undeveloped land must surround the site perimeter. The industrial/logistics and waterfront areas of the base must conform to security requirements that place restrictions on building siting, site circulation, and parking locations.

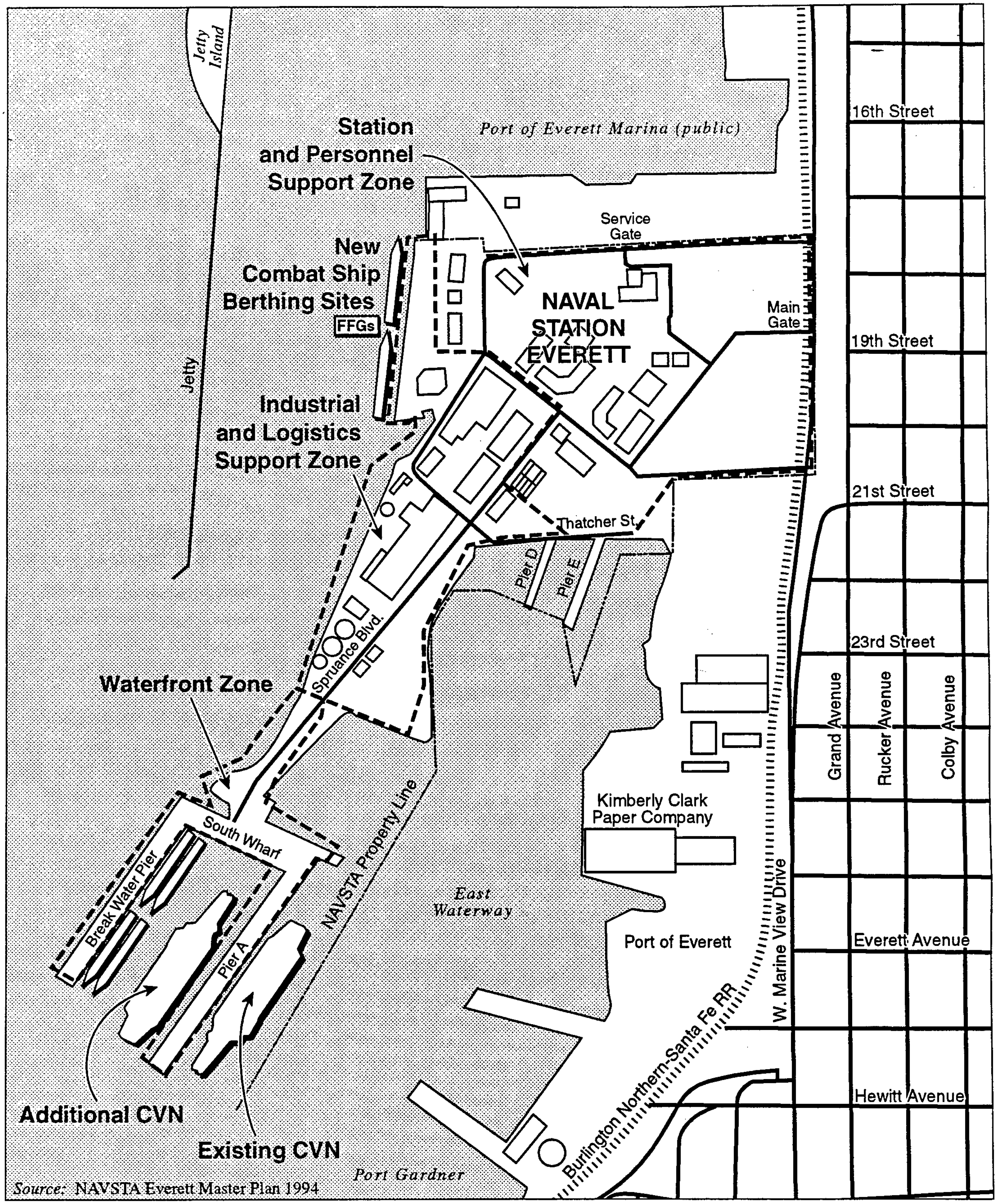

Figure 5.7-1. NAVSTA Everett Major Land Use Zones

- *Adjacent Land Uses.* The southern edge of the site abuts compatible industrial uses. The northern edge of the site is adjacent to a major recreational marina, restaurants, motels, and other retail activities. The relationship between these uses and adjacent Navy facilities is a planning constraint. The issues involved include land use compatibility, visual aesthetics, public access, and perimeter security.

- *Explosive Safety Quantity Distance (ESQD) Arcs.* Explosives handling operations are authorized anywhere on the Carrier Pier except the last 100 feet on both ends of the pier. The ESQD arcs include the Carrier Pier, Pier B, and the surrounding water areas; no land areas lie within the arcs.

5.7.1.2 *City of Everett*

The NAVSTA Everett waterfront is located within the western limits of the City of Everett. Other major land uses in the immediate vicinity include the Kimberly Clark Paper Mill, timber loading and storage facilities, the U.S. Navy Reserve Center, and the Port of Everett. The Port of Everett Marina and parking as well as the Marina Village commercial shopping area are located directly north of the Waterfront Site. Public access to the waterfront via a Navy-constructed park is provided at the northern end of this commercial development. The Waterfront Site is separated from single-family and multi-family housing to the east by steep slopes and two major transportation corridors: West Marine View Drive (including the 21st Street Bridge) and a Burlington Northern-Santa Fe Railroad main line.

The *City of Everett Comprehensive Plan* (1994), written in compliance with the state's Growth Management Act, provides an urban growth plan for the next 20 years. The NAVSTA Everett waterfront is located in an industrial portion of the city's North End Sub-area as identified in the plan and near the northern boundary of an area designated as Heavy Industrial. North of NAVSTA Everett is an area designated as Waterfront Commercial. The city's Comprehensive Plan land use designations in the vicinity of NAVSTA Everett are presented in Figure 5.7-2.

The Port of Everett and the City of Everett have plans for improvements to the waterfront areas adjacent to the Waterfront Site. The port received a permit for a substantial development south of the Kimberly Clark Paper Mill. This project will upgrade piers and develop upland areas to expand the port's shipping capabilities, including new deep water berths, and a barge berth.

The City of Everett also has plans to upgrade the city's waterfront appearance and to enhance public access. These improvements are in the planning stages but include an esplanade along Marine View Drive, pedestrian access to the water's edge, street furniture, lighting and paving, a sidewalk and view tower on the waterfront, and improved landscaping.

5.7.1.3 *Regional Land Use*

Urban lands in Snohomish County are concentrated in the Interstate 5 corridor south of Marysville, including the cities of Everett, Montlake Terrace, Edmonds, and Lynnwood. Much of this land is developed with single-family residential uses. Higher-density, multi-family residential and commercial uses occur along major transportation routes and in the various city centers. Industrial uses are located in the areas around Snohomish County Airport, along U.S. 99,

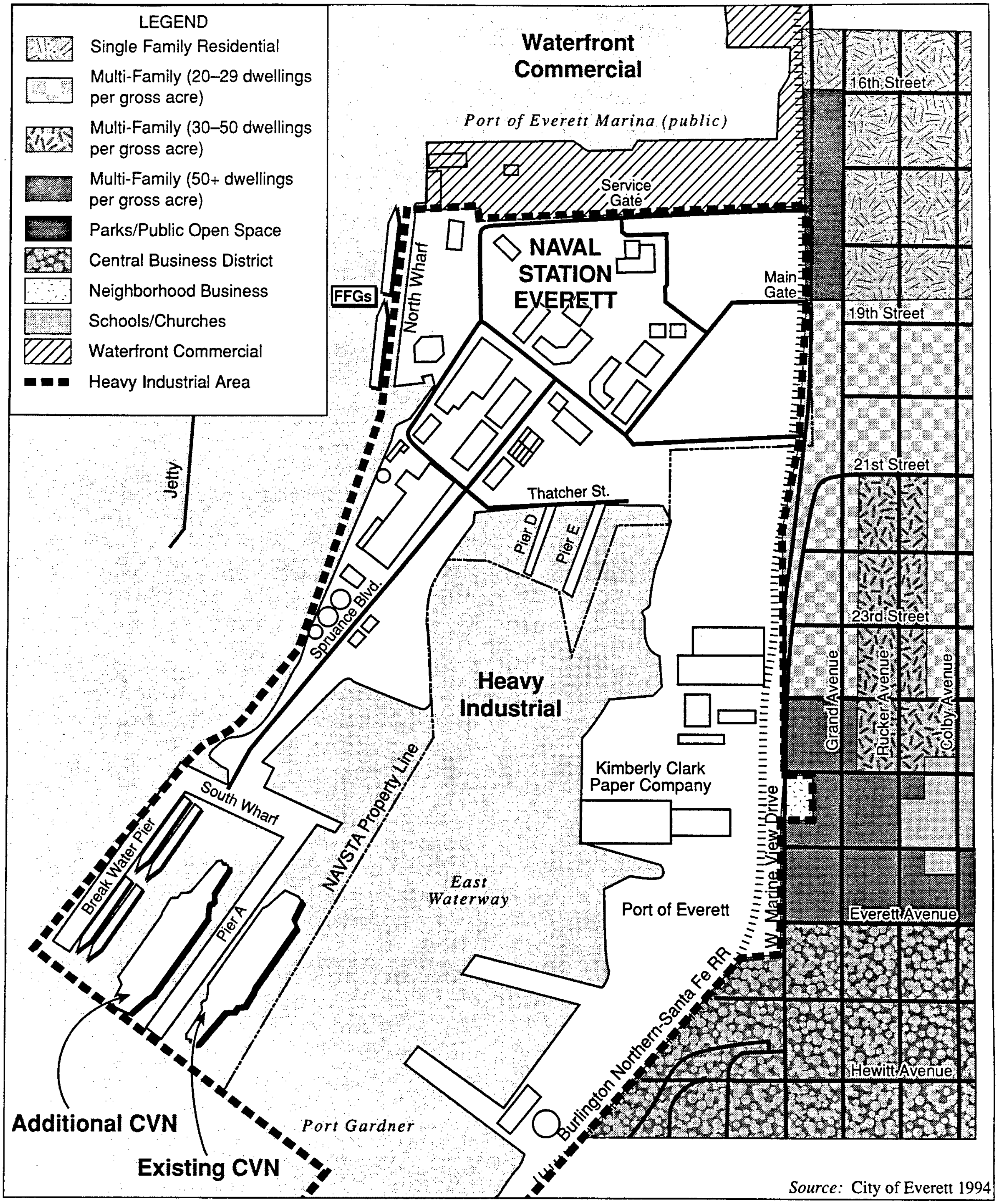

Figure 5.7-2. City of Everett Land Use in the NAVSTA Everett Vicinity

around Arlington and Marysville, and in the vicinity of the Port of Everett (Snohomish County 1994).

The federal *Coastal Zone Management Act* (CZMA) of 1972 requires, that "Any federal agency which shall undertake any development project in the coastal zone of a state shall insure that the project is, to the maximum extent practicable, consistent with the enforceable policies of approved State management programs." (Chapter 33 Title 16, U.S.C. Section 1456(c)) The State of Washington's *Shoreline Management Act* (SMA) of 1971 (Chapter 90.58 RCW), which was approved under the CZMA in 1974, established a generalized set of shoreline environments and developed standards for evaluating shoreline uses for consistency with those environments. In accordance with the State SMA, the City of Everett adopted a *Shoreline Master Program* (SMP) in 1976 that includes goals, policies, and regulations relating to development in all shoreline areas within the City's jurisdiction.

Federal actions on federal lands are exempt from state or local permitting requirements. The U.S. Navy, however, would ensure that all actions at NAVSTA Everett are consistent with the State SMA and the Everett SMP to the maximum extent practicable. To document the degree of consistency, preparation of a Coastal Consistency Determination (CCD) is required when a federal project could have a direct effect on the coastal zone. The CCD provides a description of the proposed action, identifies each relevant policy of the State SMA, discusses the proposed action's consistency with each of those policies, and, where applicable, describes measures, which when implemented would result in project consistency with the policies.

5.7.2 Environmental Consequences and Mitigation Measures

Significance Criteria

A land use impact is significant if one or more of the following result:

- Inconsistency and/or conflict with the environmental goals, objectives, or guidelines of the *NAVSTA Everett Master Plan;*

- Incompatibility with existing land uses on site; or

- Incompatibility with surrounding land uses.

5.7.2.1 *Facilities for No Additional CVN: No Change – Capacity for Total of One CVN (Alternative Two)*

Alternative Two would not require any new projects.

Dredging

No dredging would be required. Therefore, no dredging-related land use impacts would occur.

Facility Improvements

No new facilities would be constructed. Thus, no potential land use compatibility impacts or inconsistency with land use plans would occur.

Operations

Industrial land use would not increase and no conflicts with the existing land use plans or policies of NAVSTA Everett or the City of Everett would result. Therefore, operations would not result in any significant land use impacts.

5.7.2.2 *Removal of Existing CVN: Total of No CVNs (Alternative Three)*

Alternative Three would not require any new projects.

Dredging

No dredging would be required. Therefore, no dredging-related land use impacts would occur.

Facility Improvements

No construction would be required. Therefore, no construction-related land use impacts would occur.

Operations

Removal of the existing CVN from the east side of the Carrier Pier would allow redistribution of the six vessels (two DDGs, two DDs, and two FFGs) currently berthed on the west side of the Carrier Pier and along the Breakwater Pier. This redistribution would not change any existing land uses, and would not conflict with any land use plans or policies. Therefore, no adverse land use impacts would occur.

5.7.2.3 *Removal of Existing CVN and Addition of Four AOEs: No CVNs (Alternative One)*

Alternative One would include a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

The addition of four AOEs would result in two ships being moved to the North Wharf. An additional 50,000 cy of dredging would be required at the North Wharf to accommodate two ships. The presence two ships at North Wharf would not constitute significant changes in use of this berthing facility, and the dredging activity would not significantly interfere with existing uses in the area. Therefore, the dredging would result in a less than significant adverse land use impact.

Facility Improvements

Four AOEs could be homeported at NASNI with a minimal amount of construction. Therefore, no significant construction-related land use impacts would occur.

Operations

Replacement of the existing CVN with four AOEs would be a change in operations, but it would not result in any significant change in existing land uses. Furthermore, it would not result in any incompatible land uses in the vicinity of the Carrier Pier, nor would it conflict with any land use plans or policies. Therefore, the change in operations at the Carrier Pier would not constitute an adverse land use impact.

5.7.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Development of one additional CVN home port at NAVSTA Everett would require approximately 105,000 cy of dredging to accommodate an additional CVN on the west side of the Carrier Pier. The west side of the Carrier Pier is currently used to berth two smaller ships that would be moved to accommodate the additional CVN. This move would result in two FFGs being moved to the North Wharf. An additional 50,000 cy of dredging would be required at the North Wharf to accommodate the two FFGs. The presence of a CVN on the west side of the Carrier Pier and two FFGs at North Wharf would not constitute significant changes in use of these berthing facilities, and the dredging activity would not significantly interfere with existing uses in the area. Therefore, the dredging would result in a less than significant adverse land use impact.

Facility Improvements

Development of one additional CVN home port at NAVSTA Everett would require construction of some new facilities. The new construction would include a multi-story parking structure (constructed at the site of an existing parking lot), improvements to the oily water separator system, and electrical upgrades.

The new facilities would result in little change to existing land use, and the new facilities would be consistent with the land use designations in the *NAVSTA Everett Master Plan* (DON 1994). Therefore, no significant land use compatibility impacts or inconsistency with land use plans would occur as a result of construction.

Operations

Homeporting one additional CVN at NAVSTA Everett would expand the shipberthing operations that currently exist within the home port area. Several of the smaller surface combat ships currently located on the west side of the Carrier Pier would be shifted to the North Wharf (see Figure 2-9). These expanded shipberthing operations and new facilities would not introduce any new or incompatible land uses. No conflicts with existing land use plans or policies of NAVSTA Everett or the City of Everett would result. Therefore, implementation would not result in any significant land use impacts.

5.7.2.5 *Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)*

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

The two additional AOEs would be berthed on the west side of the Carrier Pier, which is currently used to berth smaller ships. The addition of two AOEs would require that two FFGs be moved to North Wharf. An additional 50,000 cy of dredging would be required at North Wharf to accommodate these ships. The presence of two AOEs on the west side of the Carrier Pier and two FFGs at North Wharf would not constitute significant changes in use of these berthing facilities, and the dredging activity would not significantly interfere with existing uses in the area. Therefore, the dredging would result in a less than significant adverse land use impact.

Facility Improvements

Development of two AOE home ports at NAVSTA Everett would require minimal construction of new facilities. The new facilities would result in little change to existing land use, and the new facilities would be consistent with the land use designations in the *NAVSTA Everett Master Plan* (DON 1994). Therefore, no significant land use compatibility impacts or inconsistency with land use plans would occur as a result of construction.

Operations

The two additional AOEs would be berthed on the west side of the Carrier Pier, which is currently used to berth smaller ships. The addition of two AOEs would require that two FFGs be moved to North Wharf. These new facilities and expanded shipberthing operations would not introduce any new or incompatible land uses. No conflicts with existing land use plans or policies of NAVSTA Everett or the City of Everett would result. Therefore, implementation would not result in any significant land use impacts.

5.7.2.6 *No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging

No dredging would be required. Therefore, no dredging-related land use impacts would occur.

Facility Improvements

No construction would be required. Therefore, no construction-related land use impacts would occur.

Operations

No changes to existing land uses or conflicts with any land use plans or policies would occur. Therefore, no adverse land use impacts would occur.

5.7.2.7 *Mitigation Measures*

Because land use impacts would be less than significant, no mitigation is proposed.

5.8 SOCIOECONOMICS

5.8.1 Affected Environment

NAVSTA Everett is located within the City of Everett in Snohomish County, Washington. Everett, located approximately 30 miles north of the City of Seattle, had a population of 70,000 in 1990. The affected environment includes Snohomish County as well as King County to the south.

Snohomish County is part of the Central Puget Sound Region that also includes King, Kitsap, and Pierce counties. Everett and the southern part of Snohomish County have been experiencing large population increases over the last 5 years. Snohomish County has grown from 465,000 in 1990 to an estimated 525,600 by 1995, averaging about 2.45 percent per year. In 1995, there was an in-migration of 4,000 people. Seventeen percent of the regional population resides in Snohomish County.

Local Economy

The major component of Snohomish County's economy is the aerospace industry. Manufacturing accounts for over 34 percent of earnings in the county, services account for 17 percent, and state and local government account for 14 percent of earnings. With the strong growth in the aerospace industry, unemployment has fallen to 3.8 percent in the greater Seattle area. Approximately 92,000 workers are employed in the industry. Boeing hired 15,000 workers in 1996. With strong sales of commercial aircraft, employment is expected to increase by 8,000 jobs over the next year in this sector alone (U.S. Department of Housing and Urban Development 1997).

Of total non-farm employment in Snohomish County, the share contributed by military personnel is low and has fluctuated over the period 1970 through 1995. In 1970, military personnel comprised 1.9 percent of the total county employment. This share fell to 1.1 percent in 1980, rose to 1.2 percent in 1990 and 1.3 percent in 1995. The contribution made to total employment by federal civilian employment stood at 1.0 percent in 1970, and stabilized at 0.8 percent over the rest of the time period.

Housing

The average selling price of new and existing homes in the area during the first quarter of 1997 was $191,500. New single-family detached homes sold for an average of $220,500. Building activity increased only slightly from 1996 levels. The average number of permits issued is 5,400. In 1995, an additional 1,350 multi-family units were permitted in the county. Affordable housing, particularly to enlisted personnel, is limited in the Everett area.

The rental market is particularly constrained in the Everett area. Rental vacancy rates are estimated to be 2.3 percent in Everett and Snohomish counties. The average rent is $615 per month with rents expected to rise 15 percent over the next year.

In efforts designed to eliminate the housing deficit at NAVSTA Everett, the Navy is utilizing legislation that authorized the government to enter into partnerships with private entities to provide housing for military members (and their families). A number of such private sector financed initiatives (known as Public-Private Ventures or PPVs) exist in various stages of completion within the housing market area of NAVSTA Everett (a geographical area contained within a one-hour commute radius to the installation).

PPV-1, in which the Navy is a minor partner, is complete. It provides 185 housing units that were constructed and occupied in 1997 and is located in unincorporated Snohomish County approximately 11 miles north of NAVSTA Everett.

PPV-2 is an FY97 MILCON project that will ultimately provide 300 units to which military members (and their families) have first right of refusal to rent.

PPV-3 is a project that will provide approximately 175 housing units. The contribution on the part of the Navy will be the proceeds ($6 million) received by the Navy from Snohomish County from the sale of Paine Field, a previous government-owned military housing area.

In addition to the PPVs described immediately above, the Navy owns 86 military family housing units and has received authorization to lease 70 additional units, all within the housing market area. It is anticipated that the housing deficit of NAVSTA Everett will be met when all housing is available for occupancy.

Schools

The U.S. Department of Education provides federal impact aid in the form of basic support payments for school districts where there are at least 400 federally connected students or where 3 percent of the average daily attendance is federally connected. Basic support payments are made for dependents living either with military or civilian employees who are working for or assigned to federal military installations. The minimum eligibility requirement for funding off-base civilian students is 1,000 students and at least 10 percent of average daily attendance.

The potentially affected area contains six school districts that have approximately 80 percent of the federally connected students associated with NAVSTA Everett. These school districts include Edmonds, Everett, Marysville, Mukilteo, Northshore, and Snohomish. Table 5.8-1 presents information for each of these school districts

Table 5.8-1. Fall Enrollments and Impact Aid for School Districts

School District	*Enrollment 1995*	*Enrollment 1996*	*Enrollment 1997*	*Navy Dependents*	*Federal Impact Aid Funding*
Edmonds School District	20,686	21,288	21,763	N/A	none
Everett School District	16,787	17,356	17,976	N/A	none
Marysville School District	9,385	9,844	10,143	194	$409,000 [a]
Mukilteo School District	12,676	13,451	14,000	412	none
Northshore School District	19,050	19,466	19,962	none	none
Snohomish School District	7,963	8,108	8,356	N/A	none

Notes: N/A indicates that the information is not available. Numbers are for 1996.

a. Funding estimate was obtained from the National Association of Federally Impacted Schools (NAFIS 1996a). Most of the funding is attributable to funds paid for students residing on Indian lands.

Edmonds School District has 26 elementary schools, four middle schools, and five high schools. Total enrollment in autumn 1997 was 21,763 students. The school district projects that enrollments will increase by 1.5 percent annually over the next 5 years. The district's elementary schools are currently operating at approximately 81 percent of capacity, the middle schools at 114 percent of capacity, and the high schools at 116 percent of capacity. The district does not currently complete the federal impact aid application and the number of enrolled Navy dependents is not known. No federal impact aid is currently received.

Everett School District has 15 elementary schools, four middle schools, and four high schools. Total enrollment in autumn 1997 was 17,976 students. The school district anticipates that enrollments will increase by 1.5 percent annually over the next 5 years. The district's elementary schools are operating at 101 percent of capacity, the middle schools operate at 110 percent of capacity, and the high schools operate at 88 percent of capacity. The number of enrolled Navy dependents is not known by the district. The last year for which students were surveyed for federal impact aid purposes was 1995-96, at which time the district reported average daily attendance of approximately 140 military dependents living off-base (i.e., none on-base) and 147 civilian dependents (NAFIS 1996a). The district received no federal impact aid basic support payments in 1996-97.

Marysville School District has 10 elementary schools, three middle schools, and one high school. Total enrollment in autumn 1997 was 10,144 students. The school district anticipates that enrollments will increase by 3 percent annually over the next 5 years. The district is currently operating its elementary schools at approximately 94 percent of capacity, its middle schools at 118 percent of capacity, and its high school at 102 percent of capacity. Navy dependents comprised 194 students or 2 percent of total enrollments in 1996. Estimated federal impact aid in 1996 was approximately $409,900, most of which was attributable to students living on Indian lands, not to Navy dependents.

Mukilteo School District has 11 elementary schools, four middle schools, two high schools, one alternative high school, and a skills center. Total enrollment in the autumn 1997 was approximately 14,000 students. The school district projects that enrollments will increase by 3-5 percent annually over the next 5 years. The district is currently operating at approximately 111 percent of capacity in its elementary schools, 100 percent of capacity in its middle schools, and 106 percent of capacity in its high schools. Navy dependents comprised 412 students or 3.1 percent of total enrollments in 1996. The district received no federal impact aid in 1996.

Northshore School District has 21 elementary schools, six junior high schools, three senior high schools, and one alternative school. Total enrollment in autumn 1997 was 19,962 students. The school district projects that enrollments will increase by 1.5 to 2 percent annually over the next 5 years. The district is currently operating at approximately 119 percent of capacity in its elementary schools, 108 percent of capacity in its junior high schools, and 105 percent of capacity in its senior high schools. The district reported no Navy dependents in 1996-97 and it received no federal impact aid in that year.

Snohomish School District has nine elementary schools, two middle schools, and one high school. Total enrollment in autumn 1997 was 8,356 students. The school district projects that enrollments will increase by 3 percent annually over the next 5 years. Information on school capacity is not available from the school district, but new construction of elementary, middle, and high schools is planned for the years 2000-2003. Information on Navy dependents is not collected by the school district. No federal impact aid was reported for 1996.

5.8.2 Environmental Consequences and Mitigation Measures

Potential consequences in the areas of employment, population, housing, and public schools are addressed below for each of the alternatives.

Significance Criteria

Socioeconomic impacts would be significant if one or more of the following occur as a result of project implementation:

- Direct and indirect civilian jobs created by the action cannot be filled by the current population and cause a major in-migration of new residents.
- Changes in demand in the housing market are substantial enough to cause dislocation in the market, reflected by accelerated price increase or decrease and vacancy rates below or above historic levels.
- Educational resources are burdened to the point that the overall quality of these services declines.

5.8.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)

Alternative Two would not require any new projects.

Dredging

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

No dredging activity would occur, so no impacts would result.

Facility Improvements

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

No construction would be required. Therefore, no construction-related employment, population, housing, or school impacts would occur.

Operations

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

In the absence of in-migrating workers and their dependents, no adverse impacts would result.

5.8.2.2 Removal of Existing CVN: Total of No CVNs (Alternative Three)

Alternative Three would not require any new projects.

Dredging

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

Because no dredging activity is proposed under this alternative component, no adverse effects on employment, population, housing, and schools would occur.

Facility Improvements

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

Because no facility improvements are proposed under this alternative component, no adverse effects on employment, population, housing, and schools would occur.

Operations

EMPLOYMENT

The removal of the existing CVN (with 3,217 military personnel) under this action would result in a net decrease of 3,217 military personnel.

Permanent military personnel at NAVSTA Everett numbered 5,698 in 1996. A decrease of 3,217 personnel would represent 56.5 percent of this level. Such a net future decrease of 3,217 personnel represents only 1.3 percent of the full- and part-time employment in 1995 in Snohomish County. From 1990 through 1995, employment in the county increased an average of 5,237 jobs annually. A potential reduction of 3,217 military jobs represents only a fraction of 1 year's employment growth. A decrease in military personnel would also be accompanied by a reduction in the federal civilian workforce at the installation, which would create further reductions in secondary civilian employment. Such reductions in the workforce would not result in major dislocations and no significant impacts to employment would result.

POPULATION

The net decrease of 3,217 assigned military personnel would result in a decrease of 3,059 accompanying dependents, resulting in a direct population loss of 6,276 persons.

The departure of 3,217 military personnel and their dependents would represent 1.1 percent of the estimated population of Snohomish County in 1996. Further, such a reduction represents 46.8 percent of the average annual gain in population that occurred in the county between 1990 and 1996. Even with potential reductions in civilian employment taken into consideration, and the possible out-migration of workers and their families, impacts to population would be less than significant.

HOUSING

With a potential decrease in the number of both accompanied and unaccompanied personnel, both government-owned and civilian housing units could be vacated. The departure of unaccompanied personnel would result in a lower occupancy rate in Bachelor Officer Quarters (BOQ) and Bachelor Enlisted Quarters (BEQ) facilities and especially apartment buildings in surrounding communities.

Accompanied military personnel would occupy both military family housing and housing in surrounding communities. The decrease in demand for family housing would result in an estimated vacancy of 1,415 units. Vacated military family housing units would be filled by personnel who currently reside in surrounding communities but who would prefer to live in military family housing. Should this potential shift not be adequate to fill all military family housing vacancies, other personnel currently residing in civilian housing would potentially be assigned to government housing. Thus, the major effect of the reduction in housing demand would be experienced in surrounding civilian communities.

This number of housing units represents only 0.7 percent of the total number of housing units present in Snohomish County in 1996 and 26.7 percent of the annual addition to the housing stock from 1990 to 1996. Due to the small reduction in demand for housing, the impact to housing would be less than significant.

SCHOOLS

This action would reduce enrollments by a total of 741 students, including a potential loss of 232 students in the Edmonds School District, 170 students in the Everett School District, 85 students in the Marysville School District, 116 students in the Mukilteo School District, 64 students in the Northshore School District, and 74 students in the Snohomish School District. These enrollment reductions would be beneficial because the school districts (except for Edmonds School District elementary schools, Everett School District high schools, and Marysville School District elementary schools) are operating schools at or above their capacity. Table 5.8-2 presents projected enrollment changes by school district for the NAVSTA Everett homeporting alternative components.

Table 5.8-2. Projected Enrollment Changes by School District

Alternative	*Edmonds School District*	*Everett School District*	*Marysville School District*	*Mukilteo School District*	*Northshore School District*	*Snohomish School District*	*Total Change*
No Additional CVN	0	0	0	0	0	0	0
Removal of Existing CVN	(232)	(170)	(85)	(116)	(64)	(74)	(741)
Removal of Existing CVN and Addition of Four AOEs	(59)	(43)	(21)	(30)	(16)	(19)	(188)
One Additional CVN	232	170	85	116	64	74	741
No Additional CVN and Addition of Two AOEs	86	63	32	43	24	28	276
No Action Alternative: No Additional CVN	0	0	0	0	0	0	0

Note: Parentheses indicate a reduction of students with implementation of an alternative component.

5.8.2.3 *Facilities for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

EMPLOYMENT, POPULATION, AND HOUSING

Because local labor would be employed for the dredging activity proposed for this action, no impacts to employment, population, and housing would occur.

SCHOOLS

Dredging and mitigation site construction would be temporary. Because local labor would be used for this activity, no increase in school enrollments or impacts to schools would occur.

Facility Improvements

EMPLOYMENT

The installation of a mooring dolphin is required for this action. This activity would require less than 25 construction workers for a period of less than 6 months. Because workers would be available in the local labor force, no adverse effects on employment would occur.

POPULATION

Labor requirements would be drawn from the existing local labor market and would not involve in-migration of additional workers. Therefore, no change in regional population is anticipated and impacts on regional population levels would not be significant.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian housing market.

SCHOOLS

Facility improvements construction would be temporary. Because local labor would be used for this activity, no increase in school enrollments and no impacts to schools would occur.

Operations

EMPLOYMENT

The removal of the existing CVN (with 3,217 military personnel) and the addition of four AOEs (with 2,400 military personnel) under this action would result in a net decrease of 817 military personnel.

Permanent military personnel at NAVSTA Everett numbered 5,698 in 1996. A decrease of 817 personnel would represent 14.3 percent of this level. Such a net future decrease of 817 personnel represents only 0.3 percent of the full- and part-time employment in 1995 in Snohomish County. From 1990 through 1995, employment in the county increased an average of 5,237 jobs annually. A potential reduction of 817 military jobs represents only a fraction of 1 year's employment growth. A decrease in military personnel would also be accompanied by a reduction in the federal civilian workforce at the installation, which would create further reductions in secondary civilian employment. Such reductions in the workforce would not result in major dislocations and no significant impacts to employment would result.

POPULATION

The net decease of 817 assigned military personnel would result in a decrease of 777 accompanying dependents, resulting in a direct population loss of 1,594 persons.

The departure of 1,594 military personnel and their dependents would represent 0.3 percent of the estimated population of Snohomish County in 1996. Further, such a reduction represents 11.8 percent of the average annual gain in population that occurred in the county between 1990 and 1996. Even with potential reductions in civilian employment taken into consideration, and the possible out-migration of workers and their families, impacts to population would be less than significant.

HOUSING

With a potential decrease in the number of both accompanied and unaccompanied personnel, both government- and civilian-owned housing units could be vacated. The departure of unaccompanied personnel would result in a lower occupancy rate in BOQ and BEQ facilities and especially apartment buildings in surrounding communities.

Accompanied military personnel would occupy both military family housing and housing in surrounding communities. The decrease in demand for family housing would result in an estimated vacancy of 359 units. Vacated military family housing units would be filled by personnel who currently reside in surrounding communities but who would prefer to live in military family housing. Should this potential shift not be adequate to fill all military family housing vacancies, other personnel currently residing in civilian housing would potentially be assigned to government housing. Thus, the major effect of the reduction in housing demand would be experienced in surrounding civilian communities.

This number of housing units represents only 0.2 percent of the total number of housing units present in Snohomish County in 1996 and 6.8 percent of the annual addition to the housing stock from 1990 to 1996. Due to the small magnitude of this change, the impact to housing would be less than significant.

SCHOOLS

This action would reduce enrollments by a total of 188 students, including a potential loss of 59 students in the Edmonds School District, 43 students in the Everett School District, 21 students in the Marysville School District, 30 students in the Mukilteo School District, 16 students in the Northshore School District, and 19 students in the Snohomish School District. These enrollment reductions would be beneficial because the school districts (except for Edmonds School District elementary schools, Everett School District high schools, and Marysville School District elementary schools) are operating schools at or above their capacity. Table 5.8-2 presents projected enrollment changes by school district for the NAVSTA Everett homeporting actions.

5.8.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

EMPLOYMENT

The dredging and disposal of approximately 155,000 cy of sediment would occur over less than 1 year and involve an estimated 25-person workforce drawn from the existing local labor market. Therefore, no adverse impacts on regional employment would occur.

POPULATION

Labor requirements would be drawn from the existing local labor market and would not involve in-migration of additional workers. Thus, no change in regional population is anticipated and no adverse impacts on regional population levels would occur.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian housing market.

SCHOOLS

Dredging and mitigation site construction would be temporary. Local labor would be used for this activity, so that no increase in school enrollments and no impacts on schools would occur.

Facility Improvements

EMPLOYMENT

The construction of the parking structure, electrical upgrades, and water system improvements would employ approximately 50 workers drawn from the local labor market for approximately 18 months. No adverse impacts would occur.

POPULATION

Labor requirements would be drawn from the existing local labor market and would not involve in-migration of additional workers. Therefore, no change in regional population is anticipated and no adverse impacts on regional population levels would occur.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian housing market.

SCHOOLS

Facility improvements construction would be temporary. Because local labor would be used for this activity, no increase in school enrollments or impacts to schools would occur.

Operations

EMPLOYMENT

The addition of another CVN would result in a net future increase of 3,217 military personnel. Permanent military personnel at NAVSTA Everett numbered 5,698 in 1996. An increase of 3,217 personnel would represent 56.5 percent of this level. An increase of 3,217 personnel represents 1.3 percent of the full- and part-time employment in 1995 in Snohomish County. From 1990 through 1995, the economy of the county added an average of 5,237 jobs annually. A potential net future increase of 3,217 military jobs represents over one-half of 1 year's employment growth. An increase of this magnitude in military personnel would also be accompanied by an increase in the federal civilian workforce at the installation, which would create further increments in secondary civilian employment. The potential magnitude of such increases in the civilian workforce could create dislocations in the local labor market, but not of a significant nature.

POPULATION

The net increase of 3,217 assigned military personnel would result in an increase in accompanying dependents. This increase would number an estimated 3,059 persons, resulting in a direct population gain of 6,276 persons.

The arrival of 6,276 military personnel and their dependents would represent 1.2 percent of the estimated population of Snohomish County in 1996. Further, such an increase represents 46.8 percent of the average annual gain in population that occurred in the county between 1990 and 1996. With additional potential increases in civilian employment, impacts to population in the county could be adverse, but not significant.

HOUSING

With an increase in the number of both accompanied and unaccompanied personnel, the demand for both government- and civilian-owned housing units would increase. The arrival of unaccompanied personnel would result in a higher occupancy rate in BOQ and BEQ facilities and especially apartment buildings in surrounding communities.

Accompanied military personnel would occupy both military family housing and housing in surrounding communities. The increase in demand for family housing would result in the need for an estimated additional 1,415 housing units. Existing military family housing assets are extremely limited and this increased demand for housing would further exacerbate these conditions.

This number of housing units represents 0.7 percent of the total number of housing units in Snohomish County in 1996 and 26.7 percent of the annual addition to the housing stock from 1990 to 1996. Such an increase in the demand for housing could contribute to adverse effects in the regional housing market, though not of a significant nature. This would be mitigated by development of housing under a public-private venture.

SCHOOLS

This action would increase enrollments by a total of 741 students, including a potential gain of 232 students in the Edmonds School District, 170 students in the Everett School District, 85 students in the Marysville School District, 116 students in the Mukilteo School District, 64 students in the Northshore School District, and 74 students in the Snohomish School District. These increases constitute 0.8 to 1.1 percent of autumn 1997 enrollments in each school district except for the Northshore School District, where the increase would constitute only 0.3 percent of 1997 enrollments. Based on the projected 5-year growth rates for the districts, if the above changes occur in a single school year, they would increase that year's projected enrollment change for the Edmonds School District by approximately 71 percent, adding 232 students to the 326 student baseline increase in a single year, after which they would be absorbed. This assumes a 1.5 percent growth rate and 21,763 students. Similar percentages for the other districts are 57 percent for Everett (170 students added to an annual baseline increase of 297 in a single year) and 22 to 29 percent for the other four districts.

Military families moving into the area are expected to live in one of three housing types: (1) existing vacant private-sector housing, in which case a new student would likely replace an existing student; (2) new private-sector housing, for which the school districts, except Edmonds and Everett, receive development impact fees; and (3) existing government-owned military family housing. Of the six districts, only the Marysville School District reported receiving federal impact aid in the 1996-97 school year. No new military family housing is proposed as part of the homeporting action. Impacts on these six districts are considered to be adverse but less than significant, based on the magnitude of projected enrollment changes, the existence of some capacity constraints, the existence of developer impact fees in some but not all districts, and the receipt of some federal impact aid.

5.8.2.5 Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

EMPLOYMENT

The dredging and disposal of approximately 50,000 cy of sediment would occur over less than 1 year and involve an estimated 25-person workforce drawn from the existing local labor market. Therefore, no adverse impacts on regional employment would occur.

POPULATION

Labor requirements would be drawn from the existing local labor market and would not involve in-migration of additional workers. Thus, no change in regional population is anticipated and no adverse impacts on regional population levels would occur.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian housing market.

SCHOOLS

Dredging and mitigation site construction would be temporary. Local labor would be used for this activity, so that no increase in school enrollments and no impacts on schools would occur.

Facility Improvements

EMPLOYMENT

A mooring dolphin, electrical upgrades, and improvements to the oily water separator system. This construction activity would employ approximately 25 workers drawn from the existing local labor market for approximately 1 to 2 months. No adverse impacts on regional employment are anticipated.

POPULATION

Labor requirements would be drawn from the existing local labor market and would not involve in-migration of additional workers. Therefore, no change in regional population is anticipated and no adverse impacts on regional population levels would occur.

HOUSING

In the absence of in-migrating workers and their dependents, there would be no adverse effects on the regional civilian housing market.

SCHOOLS

Facility improvements construction would be temporary. Because local labor would be used for this activity, no increase in school enrollments or impacts to schools would occur.

Operations

EMPLOYMENT

The addition of two AOEs would result in a net future increase of 1,200 military personnel. Permanent military personnel at NAVSTA Everett numbered 5,698 in 1996. An increase of 1,200 personnel would represent 21.1 percent of this level. An increase of 1,200 personnel represents 0.5 percent of the full- and part-time employment in 1995 in Snohomish County. From 1990 through 1995, the economy of the county added an average of 5,237 jobs annually. A potential net future increase of 1,200 military jobs represents well below 1 year's employment growth. An increase of this magnitude in military personnel would also be accompanied by an increase in the federal civilian workforce at the installation, which would create further increments in secondary civilian employment. The potential magnitude of such increases in the civilian workforce would not be associated with significant impacts in the local labor market.

POPULATION

The net increase of 1,200 assigned military personnel would result in an increase in accompanying dependents. This increase would number an estimated 1,141 persons, resulting in a direct population gain of 2,341 persons.

The arrival of 2,341 military personnel and their dependents would represent 0.4 percent of the estimated population of Snohomish County in 1996. Further, such an increase represents 17.5 percent of the average annual gain in population that occurred in the county between 1990 and 1996. There could be additional increases in civilian employment and possible in-migration of workers and their families, however, impacts to population in the county would not be significant.

HOUSING

With a potential increase in the number of both accompanied and unaccompanied personnel, the demand for both government- and civilian-owned housing units would increase. The arrival of unaccompanied personnel would result in a higher occupancy rate in BOQ and BEQ facilities and especially apartment buildings in surrounding communities.

Accompanied military personnel would occupy both military family housing and housing in surrounding communities. The increase in demand for family housing would result in the need for an estimated additional 528 housing units. Existing military family housing assets are extremely limited and this increased demand for housing would further exacerbate these conditions.

This number of housing units represents 0.2 percent of the total number of housing units in Snohomish County in 1996 and 10.0 percent of the annual addition to the housing stock from 1990 to 1996. Such an increase in the demand for housing would not contribute to adverse effects in the regional housing market and not constitute a significant impact.

SCHOOLS

This action would increase enrollments by a total of 276 students, including a potential gain of 86 students in the Edmonds School District, 63 students in the Everett School District, 32 students in the Marysville School District, 43 students in the Mukilteo School District, 24 students in the Northshore School District, and 28 students in the Snohomish School District. These increases constitute 0.3 to 0.4 percent of autumn 1997 enrollments in each school district except for the Northshore School District, where the increase would constitute only 0.1 percent of 1997 enrollments. Based on the projected 5-year growth rates for the districts, if the above changes occur in a single school year, they would increase that year's projected enrollment change for the Edmonds School District by approximately 26 percent (less in later years), adding 86 students to the 326 student baseline increase in a single year, after which they would be absorbed. This assumes a 1.5 percent growth rate and 21,763 students. Similar percentages for the other districts are 21 percent for Everett (63 students added to an annual baseline increase of at 297) and 8 to 11 percent for the other four districts.

Military families moving into the area are expected to live in one of three housing types: (1) existing vacant private-sector housing, in which case a new student would likely replace an existing student; (2) new private-sector housing, for which the school districts, except Edmonds and Everett, receive development impact fees; and (3) existing government-owned military family housing. Of the six districts, only the Marysville School District reported receiving federal impact aid in the 1996-97 school year. No new military family housing is proposed as part of the homeporting action. Impacts on these six districts are considered to be adverse but less than significant, based on the magnitude of projected enrollment changes, the existence of some capacity constraints, the existence of developer impact fees in some but not all districts, and the receipt of some federal impact aid.

5.8.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

Because no dredging activity is proposed under this action, no adverse effects on employment, population, housing, and schools would occur.

Facility Improvements

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

Because no facility improvements would be required under this action, no adverse effects on employment, population, housing, and schools would occur.

Operations

EMPLOYMENT

Because there would be no change in current operations under this action, no associated adverse impacts to local and regional employment would occur.

POPULATION

Because no net increase in the number of assigned military personnel would occur under this alternative, no impacts to population would occur.

HOUSING

Because there would be no net increase in the demand for housing units under this action, no impacts to housing would occur.

SCHOOLS

Because there would be no changes in baseline enrollments under this alternative, no adverse impacts to schools would occur.

5.8.2.7 *Mitigation Measures*

EMPLOYMENT

Because no significant impacts on employment would result, no mitigation measures are proposed.

POPULATION

Because no significant impacts on population would result, no mitigation measures are proposed.

HOUSING

Because no significant impacts on housing would result, no mitigation measures are proposed.

SCHOOLS

Because no significant impacts on schools would result, no mitigation measures are proposed.

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5.9 TRANSPORTATION

The following subsections describe the ground transportation system that provides access to NAVSTA Everett. Because any substantial change in population or activity at the station would result in an increase in the number of commuters and the number of deliveries, there would be a corresponding increase in the volume of traffic (automobiles and trucks) traveling to and from the base. The primary objective of the ground transportation analysis is to quantify the change in traffic levels that would occur as a result of the proposed homeporting activities and evaluate the ability of the street and roadway network to accommodate the projected traffic volumes.

5.9.1 Ground Transportation

5.9.1.1 Affected Environment

The ground transportation system includes the local street and regional highway network in and around the City of Everett that provides access to NAVSTA Everett. The existing conditions relative to this roadway network are described below, and the key streets and highways are illustrated on Figure 5.9-1.

Roadways

Regional access to the City of Everett and NAVSTA Everett is provided by Interstate (I-) 5, U.S. Route 2, and State Route (SR) 529. I-5 is a north-south freeway that runs through the Seattle metropolitan area on the east side of Puget Sound. It is located approximately 2 miles east of NAVSTA Everett and connects the City of Everett with Seattle to the south and Marysville to the north. U.S. Route 2 is an east-west highway that intersects I-5 on the northeast side of Everett and extends east through Snohomish County. SR 529 intersects with I-5 north of Everett near Marysville and extends south into Everett to the NAVSTA vicinity.

Local access is provided by the street network within the City of Everett, which is generally arranged in a grid pattern. The key east-west streets that serve as access routes to/from NAVSTA Everett are Everett Avenue, Hewitt Avenue, and Pacific Avenue. The key north-south streets in Everett are West Marine View Drive, Rucker Avenue, Broadway Avenue, and East Marine View Drive. These streets are all located between NAVSTA Everett and I-5. SR 529 runs along Broadway and Marine View Drive.

Table 5.9-1 describes roadway conditions for the Everett area. Roadway classifications are from the Everett General Plan. The number of lanes were observed during field reconnaissance, and the daily traffic volumes were collected from the City of Everett and the Navy (DON 1995b).

Traffic Conditions

Eleven potentially affected intersections were analyzed to determine their operating conditions during the afternoon peak period (typically between 3:00 P.M. and 5:00 P.M.) on a typical weekday, as summarized in Table 5.9-2. Based on peak hour traffic volumes, turning movement counts, and the existing number of lanes at each intersection, the average vehicular delay, volume to capacity (V/C) ratios, and levels of service (LOS) were determined for each intersection using the methodology outlined in the *Highway Capacity Manual* (Transportation Research Board 1994) for

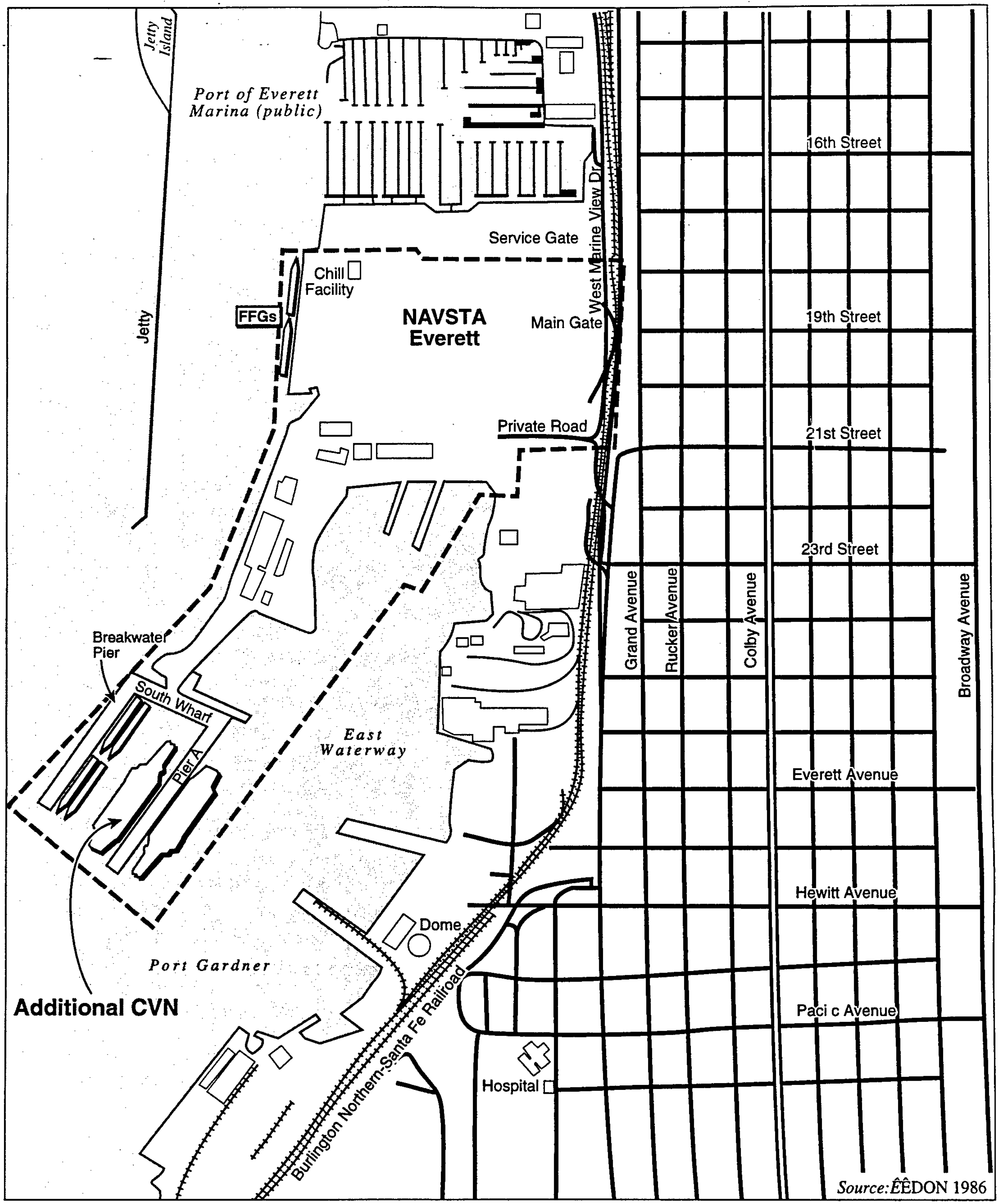

Figure 5.9-1. NAVSTA Everett Ground Transportation Network

Table 5.9-1. Existing Roadway Conditions

Roadway/Location	*Classification*	*Number of Lanes*	*Daily Traffic Volume*
Interstate 5			
North of US Route 2	Freeway	6/8	111,000
South of US Route 2	Freeway	6/8	140,000
Everett Avenue	Minor Arterial	4	15,900
Hewitt Avenue	Principal Arterial	4	13,000
Pacific Avenue	Minor Arterial	4	15,200
W. Marine View Drive	Principal Arterial	4	11,200
E. Marine View Drive	Principal Arterial	4	8,700
Rucker Avenue	Minor Arterial	4	25,400
Broadway Avenue	Minor Arterial	4	27,800

Table 5.9-2. Existing Intersection Levels of Service

	P.M. PEAK HOUR	
Intersection	*Delay (sec)& V/C Ratio*	*LOS*
Marine View/NAVSTA Gate	11.1 - 0.57	B
Marine View/18th	8.3 - 0.38	B
Marine View/Everett	7.1 - 0.28	B
Marine View/Hewitt	6.2 - 0.34	B
Marine View/Pacific	12.0 - 0.57	B
Rucker/Everett	11.9 - 0.73	B
Rucker/Hewitt	9.9 - 0.65	B
Rucker/Pacific	21.9 - 0.89	C
Broadway/Everett	27.3 - 0.88	D
Broadway/Hewitt	29.7 - 0.95	D
Broadway/Pacific	25.5 - 0.86	D

signalized intersections. Only the afternoon peak hour is addressed because City of Everett staff has indicated that the morning peak hour has substantially lower traffic volumes and is not an issue.

LOS is a qualitative indicator of an intersection's operating conditions as represented by congestion, delay, and V/C ratio. It is measured from LOS A (excellent conditions, little or no delay) to LOS F (extreme congestion and delay) with LOS D typically considered to be the threshold of acceptability. Table 5.9-2 indicates that all of the 11 intersections are operating at acceptable levels (LOS A through D) during the P.M. peak hour.

NAVSTA Everett currently has two access gates: the Main Gate and the Service Gate, both of which have access onto West Marine View Drive. NAVSTA Everett generates approximately 8,520 vehicle trips per day (inbound and outbound).

5.9.1.2 *Environmental Consequences and Mitigation Measures*

Significance Criteria

The project's impacts to the ground transportation system would be considered significant if one or more of the following impacts occur:

- Additional traffic generated by the homeporting activities would result in average daily traffic volumes that are above the planned capacity of a roadway segment.
- Additional traffic generated by the homeporting activities would result in an increase of 0.02 or greater in the V/C ratio of an intersection that is projected to operate at LOS E or F.
- Homeporting activities would result in a substantial traffic or parking intrusion.
- Homeporting activities would generate a demand for public transit services that could not be accommodated by the existing or planned transit system.

Impact Methodology

A traffic impact analysis has been conducted to quantify the impacts of the facilities and infrastructure needed to support CVN homeporting on traffic conditions in the vicinity of NAVSTA Everett. Because there are various scenarios regarding the distribution of the homeported CVNs among the four home port locations addressed in this EIS, the traffic analysis considers the various scenarios that would occur at NAVSTA Everett relative to the number and type of homeported ships, the associated number of personnel, and the resulting level of traffic that would be generated.

The approach for the traffic impact analysis was to quantify the change (increase or decrease) in site-generated traffic volumes that would occur as a result of each scenario, then analyze the corresponding impacts on traffic conditions on the roadway network that provides access to the base. The controlling factor used to estimate the increase or decrease in site-generated traffic is the number of personnel associated with each scenario. Traffic counts at the NAVSTA Everett gates indicate that the base, as a whole, generates an average of 1.304 daily vehicle trips per person. This rate has been used for the NAVSTA Everett traffic analysis. A peak hour rate of 0.265 trips per person was assumed, with 91 percent of the traffic entering and 9 percent exiting during the morning peak hour, and with 9 percent entering and 91 percent exiting during the afternoon peak hour. These peak hour rates were developed for the *Puget Sound Aircraft Carrier Homeporting Environmental Assessment* (DON 1995b). The trip generation rates represent all vehicle trips entering and leaving the base, including commuter trips, truck deliveries, and visitors.

The personnel loading for each development scenario is presented in Table 5.9-3, which indicates that two scenarios would result in a decrease in the number of personnel, one scenario would result in an increase of 3,217 people, one scenario would result in an increase of 1,200 people, and one would result in no change in personnel levels.

Table 5.9-3. Personnel Loading — NAVSTA Everett				
Development Scenario	*CVN*	*AOE*	*Total*	*Change from Existing*
Existing				
Ships	1	0	1	0
Personnel	3,217	0	3,217	0
Remove CVN, +4 AOEs				
Ships	0	4	4	+ 3
Personnel	0	2,400	2,400	- 817
1 Additional CVN				
Ships	2	0	2	+ 1
Personnel	6,434	0	6,434	+ 3,217
No Additional CVN, + 2 AOEs				
Ships	1	2	3	+ 2
Personnel	3,217	1,200	4,417	+ 1,200
No Action Alternative (No Additional CVN)				
Ships	1	0	1	0
Personnel	3,217	0	3,217	0
Remove Existing CVN				
Ships	0	0	0	-1
Personnel	0	0	0	-3,217

5.9.1.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)*

Alternative Two would not require any new projects.

DREDGING

Because no dredging would take place under this action, there would be no impacts to traffic.

FACILITY IMPROVEMENTS

No construction would be required. Therefore, no construction-related transportation impacts would occur.

OPERATIONS

A transportation impact associated with this action is the need to transport approximately 900 married members of the CVN's crew from Everett to Bremerton during the PIAs, which would occur for a 6-month duration twice each 77-month period. NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN. The PIA maintenance tasks would be performed at PSNS. Consequently, the approximately 900 crew members would need to commute from the east side of Puget Sound to Bremerton. Bachelors, for the most part, will continue to live aboard the ship or in Bachelor Quarters in the shipyard if parts of the ship become uninhabitable due to ongoing work.

If needed, plans are in the final stages for providing the required commuting. The plan contains multiple routes and quantities of crewmembers with the goal of providing the required numbers of the proper ratings at the shipyard by approximately 7:15 A.M. daily for commencement of the work day. The plan includes use of buses from NAVSTA Everett to Seattle and passenger-only fast ferries from there to Bremerton and return; the use of passenger-only fast ferries from NAVSTA Everett to Bremerton and return; and the use of buses and ferries from NAVSTA Everett to Bremerton and return utilizing the Edmonds to Kingston route. Two-thirds of the commuting personnel would be able to make the trip in one hour and 40 minutes or less. The other third would require two hours and 15 minutes. This closely approximates Navy policy goals of one hour and 30 minutes [DON 1995c]. The 12 buses involved in this plan would represent a small contribution to projected traffic volumes along these routes, and would not significantly degrade intersection level of service. The periodic, short-term impacts would be less than significant.

5.9.1.2.2 Removal of Existing CVN: Total of No CVNs (Alternative Three)

Alternative Three would not require any new projects.

DREDGING

Because no dredging would take place, there would be no impacts to traffic.

FACILITY IMPROVEMENTS

Because no construction would take place, there would be no impacts to traffic.

OPERATIONS

The change in site-generated traffic is shown on Table 5.9-4. This scenario with the removal of the existing CVN would result in a decrease in traffic of 4,190 trips per day and 855 trips during the peak hour. Because there would be a decrease in the site-generated traffic, there would be no adverse traffic impacts.

Table 5.9-4. Traffic Generation Estimates — NAVSTA Everett

Development Scenario	*Personnel Change*	*Peak Hour Traffic*	*Average Daily Traffic*
Trip Rate (per person)	NA	0.265	1.304
Remove CVN, +4 AOEs	- 817	- 215	- 1,070
1 Additional CVN	+ 3,217	+ 855	+ 4,190
No Additional CVN, + 2 AOEs	+ 1,200	+ 320	+ 1,560
No Action Alternative (No Additional CVN)	0	0	0
Remove Existing CVN	-3,217	-855	- 4,190

5.9.1.2.3 Facilities for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs (Alternative One)

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

DREDGING

The dredging operations proposed at NAVSTA Everett would result in little or no increase in vehicular traffic as the dredged material would be transported by barge to the disposal site(s).

FACILITY IMPROVEMENTS

During construction of the various facilities that would be developed to support the proposed homeporting action, there would be a short-term increase in traffic associated with workers driving to and from the base and trucks delivering materials to the base. It is estimated that the construction activities would generate approximately 100 additional trips per day for light-duty vehicles and up to 30 truck trips per day (15 round trips). As compared to the existing volume of 8,520 total trips per day and an estimated 400 truck trips per day generated by the base, the additional construction traffic would not be significant, particularly since it is temporary.

OPERATIONS

The change in site-generated traffic is shown on Table 5.9-4. The development scenario with the removal of the existing CVN and the addition of four AOEs would result in a decrease in traffic of 1,070 trips per day and 215 trips during the peak hour. As there would be a decrease in the site-generated traffic, there would be no adverse traffic impacts.

5.9.1.2.4 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

DREDGING

The dredging operations proposed at NAVSTA Everett would result in little or no increase in vehicular traffic as the dredged material would be transported by barge to the disposal site(s).

FACILITY IMPROVEMENTS

During construction of the various facilities that would be developed to support the proposed homeporting action, there would be a short-term increase in traffic associated with workers driving to and from the base and trucks delivering materials to the base. It is estimated that the construction activities would generate approximately 100 additional trips per day for light-duty vehicles and up to 30 truck trips per day (15 round trips). As compared to the existing volume of 8,520 total trips per day and an estimated 400 truck trips per day generated by the base, the additional construction traffic would not be significant, particularly since it is temporary.

OPERATIONS

As shown on Table 5.9-4, the one additional CVN would result in an increase of 4,190 trips per day and 855 trips during the peak hours. This increase in traffic would occur because of the increased number of personnel that would be at NAVSTA Everett.

An analysis was conducted to determine the impacts of the additional traffic that would be generated by the additional CVN. Table 5.9-5, which is in section 5.9 of Volume 5, shows the estimated increase in daily traffic volumes on each study area roadway segment and the before-and-after V/C ratios. The future traffic volumes were developed by using forecasts for the traffic analysis that was prepared for the *Puget Sound Aircraft Carrier Homeporting Environmental Assessment* (DON 1995b). The impacts of the additional traffic on peak hour levels of service at the study area intersections are shown on Table 5.9-6 in Section 5.9 of Volume 5. The additional traffic generated by the CVN would have a significant impact at the intersection of Rucker Avenue at Pacific Avenue because this intersection is projected to operate at LOS E and the project would increase the volume/capacity ratio by 0.02 or more.

A transportation impact associated with this action is the need to transport approximately 900 married members of the CVN's crew from Everett to Bremerton during the PIAs, which would occur for a 6-month duration twice each 77-month period. NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN. The PIA maintenance tasks would be performed at PSNS. Consequently, the approximately 900 crew members would need to commute from the east side of Puget Sound to Bremerton. Bachelors, for the most part, will continue to live aboard the ship or in Bachelor Quarters in the shipyard if parts of the ship become uninhabitable due to ongoing work.

If needed, plans are in the final stages for providing the required commuting. The plan contains multiple routes and quantities of crewmembers with the goal of providing the required numbers of the proper ratings at the shipyard by approximately 7:15 A.M. daily for commencement of the work day. The plan includes use of buses from NAVSTA Everett to Seattle and passenger-only fast ferries from there to Bremerton and return; the use of passenger-only fast ferries from NAVSTA Everett to Bremerton and return; and the use of buses and ferries from NAVSTA Everett to Bremerton and return utilizing the Edmonds to Kingston route. Two-thirds of the commuting personnel would be able to make the trip in one hour and 40 minutes or less. The other third would require two hours and 15 minutes. This closely approximates Navy policy goals of one hour and 30 minutes [DON 1995c]. The 12 buses involved in this plan would represent a small contribution to projected traffic volumes along these routes, and would not significantly degrade intersection level of service. The periodic, short-term impacts would be less than significant.

5.9.1.2.5 Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

DREDGING

The dredging operations proposed at NAVSTA Everett would result in little or no increase in vehicular traffic as the dredged material would be transported by barge to the disposal site(s).

FACILITY IMPROVEMENTS

During construction of the various facilities that would be developed to support the proposed homeporting of two AOEs, there would be a short-term increase in traffic associated with workers driving to/from the base and trucks delivering materials to the base. It is estimated that the construction activities would generate approximately 100 additional trips per day for light-duty vehicles and up to 30 truck trips per day (15 round trips). As compared to the existing volume of 8,520 total trips per day and an estimated 400 truck trips per day generated by the base, the additional construction traffic would not be significant, particularly since it is temporary.

OPERATIONS

As shown on Table 5.9-4, the two additional AOEs would result in an increase of 1,560 trips per day and 320 trips during the peak hours. This increase in traffic would occur because of the increased number of personnel that would be at NAVSTA Everett.

An analysis was conducted to determine the impacts of the additional traffic that would be generated by the two AOEs. Table 5.9-7, which is in Section 5.9 of Volume 5, shows the estimated increase in daily traffic volumes on each study area roadway segment and the before-and-after volume/capacity ratios. The future traffic volumes without the project were developed by using forecasts for the traffic analysis that was prepared for the *Puget Sound Aircraft Carrier Homeporting Environmental Assessment* (DON 1995b). The impacts of the additional traffic on peak hour levels of service at the study area intersections are shown on Table 5.9-8 in Section 5.9 of Volume 5. The additional traffic generated by the two AOEs would not have a significant impact at any of the study area intersections because the changes in traffic volumes and levels of service are below the significance criteria thresholds.

A transportation impact associated with this action is the need to transport approximately 900 married members of the CVN's crew from Everett to Bremerton during the PIAs, which would occur for a 6-month duration twice each 77-month period. NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN. The PIA maintenance tasks would be performed at PSNS. Consequently, the approximately 900 crew members would need to commute from the east side of Puget Sound to Bremerton. Bachelors, for the most part, will continue to live aboard the ship or in Bachelor Quarters in the shipyard if parts of the ship become uninhabitable due to ongoing work.

If needed, plans are in the final stages for providing the required commuting. The plan contains multiple routes and quantities of crewmembers with the goal of providing the required numbers of the proper ratings at the shipyard by approximately 7:15 A.M. daily for commencement of the work day. The plan includes use of buses from NAVSTA Everett to Seattle and passenger-only fast ferries from there to Bremerton and return; the use of passenger-only fast ferries from NAVSTA Everett to Bremerton and return; and the use of buses and ferries from NAVSTA Everett to Bremerton and return utilizing the Edmonds to Kingston route. Two-thirds of the commuting personnel would be able to make the trip in one hour and 40 minutes or less. The other third would require two hours and 15 minutes. This closely approximates Navy policy goals of one hour and 30 minutes [DON 1995c]. The 12 buses involved in this plan would represent a small contribution to projected traffic volumes along these routes, and would not significantly degrade intersection level of service. The periodic, short-term impacts would be less than significant.

5.9.1.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

DREDGING

Because no dredging would take place, there would be no related impacts to traffic.

FACILITY IMPROVEMENTS

Because no construction would take place, there would be no related impacts to traffic.

OPERATIONS

Because traffic would remain the same, there would be no additional impacts.

A transportation impact associated with this action is the need to transport approximately 900 married members of the CVN's crew from Everett to Bremerton during the PIAs, which would occur for a 6-month duration twice each 77-month period. NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN. The PIA maintenance tasks would be performed at PSNS. Consequently, the approximately 900 crew members would need to commute from the east side of Puget Sound to Bremerton. Bachelors, for the most part, will continue to live aboard the ship or in Bachelor Quarters in the shipyard if parts of the ship become uninhabitable due to on-going work.

If needed, plans are in the final stages for providing the required commuting. The plan contains multiple routes and quantities of crewmembers with the goal of providing the required numbers of the proper ratings at the shipyard by approximately 7:15 A.M. daily for commencement of the work day. The plan includes use of buses from NAVSTA Everett to Seattle and passenger-only fast ferries from there to Bremerton and return; the use of passenger-only fast ferries from NAVSTA Everett to Bremerton and return; and the use of buses and ferries from NAVSTA Everett to Bremerton and return utilizing the Edmonds to Kingston route. Two-thirds of the commuting personnel would be able to make the trip in one hour and 40 minutes or less. The other third would require two hours and 15 minutes. This closely approximates Navy policy goals of one hour and 30 minutes [DON 1995c]. The 12 buses involved in this plan would represent a small contribution to projected traffic volumes along these routes, and would not significantly degrade intersection level of service. The periodic, short-term impacts would be less than significant.

5.9.1.2.7 Mitigation Measures

For an additional CVN at NAVSTA Everett, street widening and intersection improvements could be implemented by the City of Everett at the intersection of Rucker Avenue at Pacific Avenue to reduce the significant impact.

The Navy is evaluating transporting the CVN crew between NAVSTA Everett and PSNS during the 6-month PIA period by providing buses to Seattle, then transporting the crew to the Bremerton Terminal using a 293-passenger-only fast ferry. This transportation scheme would take approximately one hour and 40 minutes, closely approximating the Navy's policy to maintain commutes of 1.5 hours or less between Navy housing and the workplace.

5.9.2 Vessel Transportation

5.9.2.1 Affected Environment

Access to and from Puget Sound berthing sites is accomplished by traveling the major ship navigation channel, which is well defined and charted. Marine vessel circulation in the Sound is regulated by the U.S. Coast Guard. Compliance with the International Rules of the Road for lighting and day markers is required. Strict control of all shipping is maintained through a common radio channel.

Vessel travel to and from NAVSTA Everett requires sailing around the southern end of Whidbey Island and sailing up the eastern side of the island to the Everett berthing piers. Other than the CVN and Destroyer Squadron 9 (two FFGs, two DDGs and two DDs) that are homeported at NAVSTA Everett, the only other large ship calling at Everett is an occasional log carrier. This ship calls at the piers directly east of the carrier berth, which provides visual contact at all times. Transition from the navigation channel to the CVN berthing pier, approximately 1,500 yards, is executed under pilot advice and with the assistance of tugs. Since the pier is located close to the channel and deep water is available at the pier end, there is no other shipping traffic of concern during this movement. Recreational boating in the area is unaffected by CVN movements and no commercial fishing is allowed in the area. When the CVN departs, the tugs and pilot move the ship into the channel and assist until steerage is available. With the proximity of the piers to the channel and water depth, these vessel movements are easily managed.

5.9.2.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The project's impacts to the vessel transportation system would be considered significant if one or more of the following impacts occur:

- Substantial reduction in current safety levels during either proposed action construction or operation related to:
  - vessel maneuvering room;
  - vessel congestion;
  - vessel anchorages;
  - recreational boating access; and
  - commercial fishing activity.

5.9.2.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)

Alternative Two would not require any new projects.

DREDGING

There would be no dredging and consequently no impacts.

FACILITY IMPROVEMENTS

No construction would be required. Therefore, there would be no impacts.

OPERATIONS

There would be no change in vessel movements and therefore no impact on operations.

A transportation impact associated with this action is the need to transport approximately 900 married members of the CVN's crew from Everett to Bremerton during the PIAs, which would occur for a 6-month duration twice each 77-month period. NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN. The PIA maintenance tasks would be performed at PSNS. Consequently, the approximately 900 crew members would need to commute from the east side of Puget Sound to Bremerton. Bachelors, for the most part, will continue to live aboard the ship or in Bachelor Quarters in the shipyard if parts of the ship become uninhabitable due to on-going work.

If needed, plans are in the final stages for providing the required commuting. The plan contains multiple routes and quantities of crewmembers with the goal of providing the required numbers of the proper ratings at the shipyard by approximately 7:15 A.M. daily for commencement of the work day. The plan includes use of buses from NAVSTA Everett to Seattle and passenger-only fast ferries from there to Bremerton and return; the use of passenger-only fast ferries from NAVSTA Everett to Bremerton and return; and the use of buses and ferries from NAVSTA Everett to Bremerton and return utilizing the Edmonds to Kingston route. Two-thirds of the commuting personnel would be able to make the trip in one hour and 40 minutes or less. The other third would require two hours and 15 minutes. This closely approximates Navy policy goals of one hour and 30 minutes [DON 1995c]. The plan would require one additional fast ferry passage across Puget Sound in the morning and evening during 3 months of the 6-month PIA. During the other 3 months, the Navy would contract with existing Washington State ferries for crew transport, resulting in no new vessel trips. The additional ferry trip for a 3-month period would not be a substantial addition to existing cross-sound vessel traffic, and would be a periodic, short-term, less than significant impact.

5.9.2.2.2 Removal of Existing CVN: Total of No CVNs (Alternative Three)

Alternative Three would not require any new projects.

DREDGING

There would be no dredging and consequently no impacts.

FACILITY IMPROVEMENTS

There would be no facility construction and consequently no impacts .

OPERATIONS

Removing the existing CVN homeported at NAVSTA Everett would reduce the number of vessel movements into the area would result in a slight beneficial effect.

5.9.2.2.3 Removal of Existing CVN and Addition of Four AOEs: No CVNs (Alternative One)

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

DREDGING

Dredging at the North Wharf would occur. Dredging activity would not be expected to impede vessel movements. The impact is insignificant.

FACILITY IMPROVEMENTS

The impact is insignificant. The construction required would not impact ship movements.

OPERATIONS

The impact is insignificant. While the net effect is the addition of three deep-draft ships, the configuration of the piers with relation to the commercial piers and the channel is such that ample maneuvering room and transit area is available to permit safe operations. Once the ship is in the channel, there is ample waterway to transit safely to the Pacific Ocean.

5.9.2.2.4 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

DREDGING

Dredging at the North Wharf and on the west side of Carrier Pier would occur. Dredging activity would not be expected to impede vessel movements. The impact is insignificant.

FACILITY IMPROVEMENTS

The construction required would not impact ship movements. The impact is insignificant.

OPERATIONS

A transportation impact associated with this action is the need to transport approximately 900 married members of the CVN's crew from Everett to Bremerton during the PIAs, which would occur for a 6-month duration twice each 77-month period. NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN. The PIA maintenance tasks would be performed at PSNS. Consequently, the approximately 900 crew members would need to commute from the east side of Puget Sound to Bremerton. Bachelors, for the most part, will continue to live aboard the ship or in Bachelor Quarters in the shipyard if parts of the ship become uninhabitable due to on-going work.

If needed, plans are in the final stages for providing the required commuting. The plan contains multiple routes and quantities of crewmembers with the goal of providing the required numbers of the proper ratings at the shipyard by approximately 7:15 A.M. daily for commencement of the work day. The plan includes use of buses from NAVSTA Everett to Seattle and passenger-only fast ferries from there to Bremerton and return; the use of passenger-only fast ferries from NAVSTA Everett to Bremerton and return; and the use of buses and ferries from NAVSTA Everett to Bremerton and return utilizing the Edmonds to Kingston route. Two-thirds of the commuting personnel would be able to make the trip in one hour and 40 minutes or less. The other third would require two hours and 15 minutes. This closely approximates Navy policy goals of one hour and 30 minutes [DON 1995c]. The plan would require one additional fast ferry passage across Puget Sound in the morning and evening during 3 months of the 6-month PIA. During the other 3 months, the Navy would contract with existing Washington State ferries for crew transport, resulting in no new vessel trips. The additional ferry trip for a 3-month period would not be a substantial addition to existing cross-sound vessel traffic, and would be a periodic, short-term, less than significant impact.

5.9.2.2.5 Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

DREDGING

Dredging at the North Wharf would occur. Dredging activity would not be expected to impede vessel movements. The impact is insignificant.

FACILITY IMPROVEMENTS

No in-water facility improvements would be required except the placement of a dolphin would occur. The impact of this activity would be insignificant.

OPERATIONS

The net effect is the addition of two deep-draft ships, and impacts would be similar to those described above for Alternative One. Impacts would be less than significant.

A transportation impact associated with this action is the need to transport approximately 900 married members of the CVN's crew from Everett to Bremerton during the PIAs, which would occur for a 6-month duration twice each 77-month period. NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN. The PIA maintenance tasks would be performed at PSNS. Consequently, the approximately 900 crew members would need to commute from the east side of Puget Sound to Bremerton. Bachelors, for the most part, will continue to live aboard the ship or in Bachelor Quarters in the shipyard if parts of the ship become uninhabitable due to on-going work.

If needed, plans are in the final stages for providing the required commuting. The plan contains multiple routes and quantities of crewmembers with the goal of providing the required numbers of the proper ratings at the shipyard by approximately 7:15 A.M. daily for commencement of the work day. The plan includes use of buses from NAVSTA Everett to Seattle and passenger-only fast ferries from there to Bremerton and return; the use of passenger-only fast ferries from NAVSTA Everett to Bremerton and return; and the use of buses and ferries from NAVSTA Everett to Bremerton and return utilizing the Edmonds to Kingston route. Two-thirds of the commuting personnel would be able to make the trip in one hour and 40 minutes or less. The other third would require two hours and 15 minutes. This closely approximates Navy policy goals of one hour and 30 minutes [DON 1995c]. The plan would require one additional fast ferry passage across Puget Sound in the morning and evening during 3 months of the 6-month PIA. During the other 3 months, the Navy would contract with existing Washington State ferries for crew transport, resulting in no new vessel trips. The additional ferry trip for a 3-month period would not be a substantial addition to existing cross-sound vessel traffic, and would be a periodic, short-term, less than significant impact.

5.9.2.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

DREDGING

No dredging would occur. The impact is insignificant.

FACILITY IMPROVEMENTS

No facility improvements would occur. The impact of this activity would be insignificant.

OPERATIONS

There is no change and therefore no impact.

A transportation impact associated with this action is the need to transport approximately 900 married members of the CVN's crew from Everett to Bremerton during the PIAs, which would occur for a 6-month duration twice each 77-month period. NAVSTA Everett does not have a depot-level maintenance facility with the capabilities needed for a CVN. The PIA maintenance tasks would be performed at PSNS. Consequently, the approximately 900 crew members would need to commute from the east side of Puget Sound to Bremerton. Bachelors, for the most part, will continue to live aboard the ship or in Bachelor Quarters in the shipyard if parts of the ship become uninhabitable due to on-going work.

If needed, plans are in the final stages for providing the required commuting. The plan contains multiple routes and quantities of crewmembers with the goal of providing the required numbers of the proper ratings at the shipyard by approximately 7:15 A.M. daily for commencement of the work day. The plan includes use of buses from NAVSTA Everett to Seattle and passenger-only fast ferries from there to Bremerton and return; the use of passenger-only fast ferries from NAVSTA Everett to Bremerton and return; and the use of buses and ferries from NAVSTA Everett to Bremerton and return utilizing the Edmonds to Kingston route. Two-thirds of the commuting personnel would be able to make the trip in one hour and 40 minutes or less. The other third would require two hours and 15 minutes. This closely approximates Navy policy goals of one hour and 30 minutes [DON 1995c]. The plan would require one additional fast ferry passage across Puget Sound in the morning and evening during 3 months of the 6-month PIA. During the other 3 months, the Navy would contract with existing Washington State ferries for crew transport, resulting in no new vessel trips. The additional ferry trip for a 3-month period would not be a substantial addition to existing cross-sound vessel traffic, and would be a periodic, short-term, less than significant impact.

5.9.2.2.7 *Mitigation Measures*

None of the facilities and infrastructure required to support an additional CVN at NAVSTA Everett would result in significant impacts; therefore no mitigation measures are proposed.

5.10 AIR QUALITY

Air quality in the NAVSTA Everett home port area and surrounding region would be affected by emissions from operation of the project alternatives. The following section describes the existing air quality resource, predicted impacts of the proposed actions, and mitigations that would lessen significant project impacts.

The main pollutants of concern considered in this air quality analysis include volatile organic compounds (VOCs), ozone (O_3), carbon monoxide CO, nitrogen oxides (NO_x), sulfur dioxide (SO_2), and particulate matter less than 10 microns in diameter (PM_{10}). Although there are no ambient standards for VOCs or NO_x, they are important as precursors to O_3 formation.

5.10.1 Affected Environment

Region of Influence

The area affected by project emission sources would include Everett and the Eastern Puget Sound. The ROI for inert pollutant emissions (pollutants other than O_3 and its precursors) would be limited to a few miles downwind from project emission sources (see section 4.10 for additional discussion). The ROI for O_3 extends much farther downwind than for inert pollutants and could include much of the Eastern Puget Sound and regions inland from Everett, depending on the wind conditions.

Baseline Air Quality and Emissions

Air Quality

Snohomish County is presently in attainment of all state and national ambient air quality standards. However, the western portion of the county that includes NAVSTA Everett is part of the Central Puget Sound Region (CPSR) that was historically in nonattainment of the NAAQS for CO and O_3. The main sources of emissions that contributed to elevated levels of these pollutants were on-road vehicles. Due to a reduction in emissions caused by national emission standards for new vehicles and a state vehicle emissions testing program, the region has attained both standards since 1991. The Puget Sound Air Pollution Control Agency (PSAPCA) developed *O_3 and CO Maintenance Plans* to outline how they will ensure attainment of these national standards in the region. The EPA approved these plans in November 1996 and redesignated the CPSR from nonattainment to attainment of the CO and O_3 NAAQS. Consequently, the region is now considered a maintenance area for these two pollutants.

In 1994, the air quality monitoring station maintained by the PSAPCA in Everett recorded an exceedance of the state 1-hour SO_2 standard. This exceedance was mainly due to emissions from a paper company located in the Port of Everett. No other exceedances of any SO_2 standard have occurred in the region since 1988.

NAVSTA Everett Baseline Emissions

The total stationary and area source emissions that occurred at NAVSTA Everett and the Smokey Point Family Support Complex (FSC) in 1995 are shown in Volume 5, section 5.10, Tables 5.10-1 and 5.10-2, respectively (DON 1995c, 1997a). These data show that (1) natural gas-fired boilers and diesel-powered emergency generators were the main sources of combustive emissions and (2) use of janitorial supplies, paints, and solvent generated the majority of VOC emissions. The 1995 emissions inventory does not include the homeporting of a CVN at NAVSTA Everett. A summary of emissions estimated to occur at NAVSTA Everett for 1997 are also provided in Tables 5.10-1 and 5.10-2 of Volume 5. These data are based on the assumption that the facility would be fully operational, with the presence of (1) one homeported CVN, (2) seven combat vessels, (3) full shore intermediate maintenance activity (SIMA) capability, (4) 7,700 personnel on station, and (5) 16,000 dependents using the FSC (DON 1997a). The 1997 projected emissions inventory will be used for comparative purposes to evaluate the magnitude of emissions that would occur from the project alternatives.

Radiological Air Emissions

Naval nuclear reactors and their support facilities are designed to ensure that there are no significant discharges of radioactivity in air exhausts. Radiological controls are exercised in support facilities to preclude exposure of working personnel to airborne radioactivity exceeding one-tenth of the limits specified in 10 CFR 20. These controls include containment for radioactive materials and provide a barrier to prevent significant radioactivity from becoming airborne. Further, all air exhausted from these facilities is passed through High Efficiency Particulate Air (HEPA) filters and monitored during discharge. Comparison of sensitive airborne radioactivity measurements in shipyards demonstrates that air exhausted from facilities actually contained a smaller amount of particulate radioactivity than this same air contained when it was drawn from the environment into the facilities. There were no discharges of airborne radioactivity above concentrations normally present in the atmosphere from these facilities (NNPP 1997).

Regional Climate

The regional climate of Everett is nearly identical to the climate of Bremerton, which is described in section 4.10 of this EIS. Site-specific conditions of the Everett climate are presented below.

Precipitation

The annual average precipitation at Everett is 37 inches (National Weather Service 1997b). The highest monthly precipitation occurs in December, at an average rate of 5.2 inches. In July, the lowest amount of monthly precipitation occurs, with an average of 1.22 inches. Snow occurs in Everett at an annual average rate of 5.8 inches.

Temperature

The annual average temperature in Everett is 51°F. Daily mean high and low temperatures for January are 45°F and 33°F, respectively. Daily mean high and low temperatures for August are 73°F and 53°F, respectively.

Prevailing Winds

Winds recorded at the PSAPCA air quality monitoring station in Everett are used to describe the wind conditions at the site (PSAPCA 1997a). Winds in the area are dominated by two main conditions: (1) west-to-northwest sea breezes and (2) east-to-southeast land breezes. The Snoqualmie River Valley just east of the project alternative site helps to move local winds along its northwest-to-southeast orientation. During the warmer months of the year, the onshore sea breeze system prevails and during the wintertime, land breezes and storm winds from the southeast are more common.

Applicable Regulations and Standards

The following is a summary of the air quality regulations that would apply to each project alternative in the NAVSTA Everett home port region. Additional federal and state regulations that would apply to the project alternatives are presented in sections 3.10 and 4.10, respectively, of this EIS (see also Volume 2, Appendix A).

Federal Regulations

Since the Everett region is a maintenance area for O_3 and CO, Section 176(c) of the 1990 CAA requires that the Navy determine whether the project alternatives proposed at NAVSTA Everett would conform to the most recent federally approved Washington SIP. If project emissions are less than 100 tons per year for VOC, CO, and NO_x, the project alternatives would conform with the goals of the SIP.

Local Regulations

The PSAPCA is responsible for regulating stationary sources of air pollution in Kitsap, Pierce, King, and Snohomish counties. The following is a summary of the more pertinent PSAPCA rules that would apply to the project alternatives that have not already been identified in Volume 4, section 4.10.

- *Regulation I, Article 6, New Source Review.* Project sources subject to this rule would be required to obtain an approved Notice of Construction (NC) and Application for Approval from the PSAPCA prior to construction. NAVSTA Everett presently operates sources grouped under five NC permits (personal communication, C. Williams 1997).
- *Regulation I, Article 7, Operating Permits.* The 1997 projected emissions inventory for NAVSTA Everett was generated to determine if the facility would exceed the operating permit thresholds defined in Title V of the 1990 CAA (DON 1997a). Review of these data, as shown in Volume 5, section 5.10, Table 5.10-1, shows that no regulated pollutant would exceed the 100 tons per year threshold. Additionally, the maximum potential to emit also would not exceed these thresholds, or the 10/25 tons per year thresholds for individual/combined HAPs. Consequently, the facility is a natural minor source and is presently exempt from the requirements of Title V and Regulation I, Article 7.
- *Central Puget Sound Region Redesignation Request and Maintenance Plan for the National Ambient O_3 Standard* (PSAPCA 1995). The PSAPCA developed this *O_3 Maintenance Plan* to outline how they will document and continue attainment of the NAAQS for O_3 in the region through 2010. To accomplish this goal, the PSAPCA will (1) maintain VOC and NO_x control measures outlined in the existing O_3 SIP that in the past have been used to attain the O_3 standard and (2) periodically review assumptions and control measures identified in the *O_3 Maintenance Plan*. To be consistent with the *O_3 Maintenance Plan*, a project must comply with its emission growth factors and applicable control measures.

- *Central Puget Sound Region Redesignation Request and Maintenance Plan for the National Ambient CO Standard* (PSAPCA 1997b). The *CO Maintenance Plan* is a continuation of the CO attainment process that began with the Washington CO SIP that was approved by the EPA in February 1983. This plan describes how the PSAPCA will continue to attain the NAAQS for CO in the region through 2010. The *CO Maintenance Plan* retains control measures outlined in the existing CO SIP, but eliminates the wintertime oxygenated gasoline program. Additionally, the PSAPCA periodically reviews assumptions and control measures identified in the plan. To be consistent with the *CO Maintenance Plan,* a project must comply with its emission growth factors and applicable control measures.

5.10.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Criteria to determine the significance of air quality impacts are based on federal, state, and local air pollution standards and regulations. Impacts would be considered significant if project emission sources (1) increase ambient pollutant levels from below to above a national or state ambient air quality standard, (2) require an operating permit under PSAPCA Regulation I, Article 7 by exceeding 100 tons per year of a regulated pollutant, 10 tons per year of a hazardous air pollutant (HAP), or 25 tons per year of combined HAPs, (3) impair visibility in the Olympic National Park Class I area (about 45 miles to the west-southwest), or (4) exceed the emission thresholds that trigger a conformity determination under Section 176(c) of the 1990 CAA (100 tons per year of CO, NO_x, or VOC). Volume 2, Appendix K of this DEIS presents a conformity applicability analysis for actions at NAVSTA Everett.

5.10.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)

Alternative Two would not require any new projects.

Dredging

Since no dredging would occur with the action, there would be no associated air quality impacts.

Facility Improvements

Since facility improvements would not occur with the alternative, there would be no air quality impacts from this activity.

Operations

Since no new operations would occur from the alternative, air emissions and associated air quality impacts would remain unchanged at NAVSTA Everett. Therefore, emissions from the action would not trigger a conformity determination under Section 176(c) of the 1990 CAA. All air quality impacts from the action would therefore be insignificant.

5.10.2.2 Removal of Existing CVN: Total of No CVNs (Alternative Three)

Alternative Three would not require any new projects.

Dredging

Since no dredging would occur from the action, no air quality impacts would be associated with this activity.

Facility Improvements

Since no facility improvements would occur from the action, no air quality impacts would be associated with this activity.

Operations

Emissions for the homeporting of one CVN were estimated with the same methodology used in section 4.10. Emission source types affected by the homeporting of a CVN at NAVSTA Everett would be similar to those that would be affected at PSNS. For example, vessel steam demand would be provided by on-site natural-gas fired boilers at NAVSTA Everett. Vehicle trips derived in section 5.9 (Transportation) were used to estimate commuter vehicle emissions. The alternative would eliminate 4,194 average daily work trips to and from NAVSTA Everett and 11,050 daily trips within the project region that would be associated with dependents at off-base housing. The average lengths of work and dependent vehicle trip used in the analysis was 8 and 3 miles, respectively, and is based on the geographic distribution of housing locations for future CVN personnel. Additionally, the action would eliminate bus trips associated with the transportation of crew between NAVSTA Everett and PSNS to conduct bi-annual PIA maintenance. Volume 5, section 5.10 presents calculations used to estimate emissions from each project alternative at NAVSTA Everett.

Table 5.10-1 shows that the removal of one CVN would reduce annual emissions within the NAVSTA Everett project region by (1) 53.3 tons of VOC, (2) 361.8 tons of CO, (3) 71.0 tons of NO_x, (4) 0.6 tons of SO_2, and (5) 1.6 tons of PM_{10}. Implementation of the action would produce a net air quality benefit within the project region. Since emissions from the action would not exceed 100 tons per year of NO_x, VOC, or CO, the action would not trigger a conformity determination under Section 176(c) of the 1990 CAA.

5.10.2.3 *Facilities for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Air quality impacts from dredging in proximity to the North Wharf and associated disposal activities would mainly occur from combustive emissions due to the operation of diesel-powered tug boats and dredges. It was assumed that the 50,000 yd^3 of material would be removed with a clamshell dredge and disposal technique, similar to the methodology used in section 3.10.2.2. The annual emissions associated with these activities would be (1) 0.1 tons of VOC, (2) 1.2 tons of CO, and (3) 5.5 tons of NO_x. Air quality impacts from dredging activities would be insignificant, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Emissions from the proposed dredging and disposal activities would remain well below 100 tons per year of NO_x, VOC, or CO. Consequently, construction of the facilities would not trigger a conformity determination under Section 176(c) of the 1990 CAA and would produce insignificant air quality impacts within the home port region. Air quality impacts would be temporary and would cease at the end of construction activities.

Table 5.10-1. Annual Operational Emissions from the Project Alternatives at NAVSTA Everett

Sources	AIR POLLUTANT EMISSIONS (TONS/YEAR)				
	VOC	*CO*	*NO_x*	*SO_x*	*PM_{10}*
Removal of 1 CVN					
Vessels and Auxiliary Equipment	(0.40)	(1.80)	(8.28)	(0.54)	(0.59)
Onshore Infrastructure	(6.87)	(1.53)	(6.17)	(0.03)	(0.61)
Routine Maintenance	(2.64)	(0.00)	(0.00)	(0.00)	(0.00)
On-road Vehicles	(43.33)	(358.46)	(56.50)	(0.00)	(0.39)
Total and Net Change for -1 CVN	**(53.25)**	**(361.80)**	**(70.96)**	**(0.57)**	**(1.59)**
Removal of 1 CVN					
Vessels and Auxiliary Equipment	(0.40)	(1.80)	(8.28)	(0.54)	(0.59)
Onshore Infrastructure	(6.87)	(1.53)	(6.17)	(0.03)	(0.61)
Routine Maintenance	(2.64)	(0.00)	(0.00)	(0.00)	(0.00)
On-road Vehicles	(43.33)	(358.46)	(56.50)	(0.00)	(0.39)
Total for -1 CVN	**(53.25)**	**(361.80)**	**(70.96)**	**(0.57)**	**(1.59)**
Addition of 4 AOEs					
Vessels and Auxiliary Equipment	2.57	5.03	52.38	58.13	10.04
Onshore Infrastructure	5.95	2.05	8.23	0.04	0.81
Routine Maintenance	5.28	0.00	0.00	0.00	0.00
On-road Vehicles	31.13	257.43	40.66	0.00	0.28
Total for 4 AOEs	**44.94**	**264.51**	**101.27**	**58.17**	**11.14**
Net Change of -1 CVN + 4 AOEs	**(8.31)**	**(97.29)**	**30.31**	**57.59**	**9.55**
Addition of 1 CVN					
Vessels and Auxiliary Equipment	0.40	1.80	8.28	0.54	0.59
Onshore Infrastructure	6.87	1.53	6.17	0.03	0.61
Routine Maintenance	2.64	0.00	0.00	0.00	0.00
On-road Vehicles	43.33	358.46	56.50	0.00	0.39
Total and Net Change of +1 CVN	**53.25**	**361.80**	**70.96**	**0.57**	**1.59**
Addition of 2 AOEs					
Vessels and Auxiliary Equipment	1.27	1.71	10.69	30.01	6.47
Onshore Infrastructure	2.98	1.02	4.11	0.02	0.41
Routine Maintenance	2.64	0.00	0.00	0.00	0.00
On-road Vehicles	16.87	139.45	22.03	0.00	0.15
Total and Net Change for +2 AOEs	**23.75**	**142.19**	**36.83**	**30.03**	**7.03**

Note: ( ) Represents a net decrease in emissions.

Facility Improvements

Air quality impacts from installation of the dolphin mooring at NAVSTA Everett would mainly occur from combustive emissions due to the operation of diesel-powered tug boats, cranes, and pile drivers. Air quality impacts from this activity would be minor, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Additional facility improvements associated with the action would be of a lesser magnitude and would produce minor amounts of emissions. Air quality impacts from construction of the facilities would be temporary and would cease at the end of construction activities.

Operations

Operational impacts from the action were determined by comparing the net change in emissions that would occur from the removal of one CVN and addition of four AOEs at NAVSTA Everett. The change in emissions associated with the use of the FSC under the action was also included in the analysis.

Table 5.10-1 shows that the removal of one CVN and addition of four AOEs would reduce annual emissions within the NASNI project region by (1) 8.3 tons of VOC and (2) 97.3 tons of CO and increase annual emissions by (1) 30.3 tons of NO_x, (2) 57.6 tons of SO_2, and (3) 9.6 tons of PM_{10}. The main increase in emissions associated with the action would be due to the introduction of the AOE power plants. These emission increases would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Additionally, project emission sources would not be expected to impair visibility within the Olympic National Park Class I area, as any emissions from NAVSTA Everett would be adequately dispersed during the 45-mile transport distance to this area. Since emissions from the action would not exceed 100 tons per year of NO_x, VOC, or CO, the action would not trigger a conformity determination under Section 176(c) of the 1990 CAA. No stationary source associated with the action would exceed 100 tons per year of a regulated pollutant, 10 tons per year of a HAP, or 25 tons per year of combined HAPs. Consequently, operation of the action would produce insignificant air quality impacts within the project region.

5.10.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160 V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Air quality impacts from dredging in proximity to the carrier pier and North Wharf and open-water disposal of dredging materials would mainly occur from combustive emissions due to the operation of diesel-powered tugboats and dredges. It was assumed that the 155,000 yd^3 of material would be removed with a clamshell dredge and disposal technique, similar to the methodology used in section 3.10.2.2. The annual emissions associated with these activities would be (1) 0.4 tons of VOC, (2) 3.7 tons of CO, and (3) 17.1 tons of NO_x. Air quality impacts from dredging activities would be insignificant, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Air quality impacts would be temporary and would cease at the end of dredging activities.

Facility Improvements

Air quality impacts from upgrades to facilities and structures at NAVSTA Everett and the FSC would mainly occur from combustive emissions due to the operation of mobile construction equipment such as earth-movers, cranes, and haul trucks. Minor amounts of fugitive dust emissions (PM_{10}) would also occur during ground-disturbing activities associated with the development of new structures. However, emissions from these activities would not exceed the peak annual emissions estimated above for dredging Pier A and the North Wharf. Air quality impacts from construction activities would be minor, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Since emissions would not exceed 100 tons per year of NOx, VOC, or CO, construction of the facilities at NAVSTA Everett would not trigger a conformity determination under Section 176(c) of the 1990 CAA. Consequently, construction of the action would produce insignificant air quality impacts within the home port region. Air quality impacts would be temporary and would cease at the end of construction activities.

Operations

The worst-case annual emissions associated with one additional CVN at NAVSTA Everett would occur after completion of a PIA maintenance cycle at PSNS Bremerton. During the following 12-month period, a CVN would be at berth for approximately 213 days and deployed at sea for 152 days. Table 5.10-1 shows that the addition of one CVN would increase annual emissions within the NAVSTA Everett project region by (1) 53.3 tons of VOC, (2) 361.8 tons of CO, (3) 71.0 tons of NO_x, (4) 0.6 tons of SO_2, and (5) 1.6 tons of PM_{10}. The majority of these emissions would occur from commuter vehicles and crew dependent vehicles that operate within the greater Everett region. To a lesser extent, emissions from the alternative would also occur from testing onboard diesel-powered emergency generators and steam production from natural gas-fired boilers. Although not included in Table 5.10-1, emissions associated with the bi-annual CVN PIA maintenance would occur at PSNS and would produce 15/3 tons of VOC/PM_{10}. Additionally, this six-month activity would require the daily transport of approximately 1000 crew members by bus between NAVSTA Everett and PSNS. Since the majority of the emissions from the alternative would occur as vehicular emissions that would be spread over a large geographic area, they would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. As a result, air quality impacts from the alternative would be insignificant.

Conformity applicability analyses for federal actions exempt proposed emissions that require air permits. The PSAPCA regulates the NAVSTA Everett natural gas-fired boilers and the oily waste water treatment facility through the NC permit process. Therefore, annual emissions estimated for the action, minus emissions from these sources, were used for comparison to the conformity de minimis thresholds. Emission from non-federal vehicle trips due to shopping, truck deliveries, and dependents, were also excluded from the analysis. The worst-case conformity-related emissions from the action would be (1) 18.3 tons of VOC, (2) 70.6 tons of CO, and (3) 18.0 tons of

NO_x. Since these emissions would not exceed 100 tons per year of NO_x, VOC, or CO, they would not trigger a conformity determination under Section 176(c) of the 1990 CAA and would be considered insignificant.

Project emission sources would not impair visibility within the Olympic National Park Class I area, as any emissions from NAVSTA Everett would be adequately dispersed during the 45-mile transport distance to this area. Additionally, no stationary source associated with the action would exceed 100 tons per year of a regulated pollutant, 10 tons per year of a HAP, or 25 tons per year of combined HAPs. These air quality impacts from the action would therefore be insignificant.

RADIOLOGICAL AIR EMISSIONS INFORMATION

The applicable National Emission Standards for Radionuclide Emissions from project vessels are contained in 40 CFR 61, Subpart I. Similar ships at other Navy bases are exempt from the reporting requirements of 40 CFR 61.104(a), consistent with the criteria outlined in 40 CFR 61.104(b), since their emissions result in exposures to the public that are less than 10 percent of the standards established by the EPA in 40 CFR 61.102 (NNPP 1997). Thus, since radionuclide air emissions are not expected to increase beyond the levels established at other Navy bases, there would be no significant impacts on air quality due to NNPP radioactivity from homeporting an additional NIMITZ-class aircraft carrier at NAVSTA Everett.

5.10.2.5 Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at the North Wharf.

Dredging

Air quality impacts from dredging the North Wharf and open-water disposal of dredging materials would be identical to impacts discussed for this activity in section 5.10.2.3. Emissions from dredging and disposal activities associated with the action would remain well below 100 tons per year of NO_x, VOC, or CO. Consequently, construction of the facilities would not trigger a conformity determination under Section 176(c) of the 1990 CAA and would produce insignificant air quality impacts within the home port region. Air quality impacts would be temporary and would cease at the end of construction activities.

Facility Improvements

Air quality impacts from construction of facility improvements under the action would be nearly identical to impacts discussed for this activity in section 5.10.2.3. Emissions and air quality impacts from these activities would be minor, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Consequently, construction activities from the action would produce insignificant air quality impacts within the home port region. Air quality impacts from construction of the facilities would be temporary and would cease at the end of construction activities.

Operations

Table 5.10-1 shows that the addition of two boiler-powered AOEs would increase annual emissions within the NAVSTA Everett project region by (1) 23.8 tons of VOC, (2) 142.2 tons of CO, (3) 36.8 tons of NO_x, (4) 30.0 tons of SO_2, and (5) 7.0 tons of PM_{10}. The main increase in emissions associated with the action would be commuter vehicles and AOE boilers. These emission increases would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Additionally, no stationary source associated with the action would exceed 100 tons per year of a regulated pollutant, 10 tons per year of a HAP, or 25 tons per year of combined HAPs.

The worst-case conformity-related emissions from the action would be (1) 9.9 tons of VOC, (2) 27.2 tons of CO, and (3) 14.1 tons of NO_x. Since these emissions would not exceed 100 tons per year of NO_x, VOC, or CO, they would not trigger a conformity determination under Section 176(c) of the 1990 CAA and would be considered insignificant. Consequently, operation of the action would produce insignificant air quality impacts within the project region.

Project emission sources would not be expected to impair visibility within the Olympic National Park Class I area, as any emissions from NAVSTA Everett would be adequately dispersed during the 45-mile transport distance to this area. Impacts to visibility from the action would therefore be insignificant.

Radiological air emissions from the action would not be significant, as summarized in section 5.10.2.4.

5.10.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

Since no dredging would occur with the action, there would be no associated air quality impacts.

Facility Improvements

Since no facility improvements would occur from the action, no air quality impacts would be associated with this activity.

Operations

Since no new operations would occur from the no action alternative, emissions and associated air quality impacts would remain essentially unchanged at NAVSTA Everett. Air quality impacts from the alternative would therefore be insignificant.

5.10.2.7 Mitigation Measures

For all project alternatives, air quality impacts from construction and operation would be insignificant and no mitigation measures would be required.

5.11 NOISE

This section describes existing noise conditions and potential effects associated with the proposed actions. Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although exposure to very high noise levels can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual. Volume 2, Appendix C provides additional background information about noise measurement and the noise terminology used in this section.

5.11.1 Affected Environment

NAVSTA Everett is an existing military-industrial environment characterized by noise from truck and automobile traffic, ship-loading cranes, diesel-powered equipment, compressors, and construction activities. The additional CVN homeporting site at NAVSTA Everett is in an area of the station already used by the Navy for CVN homeporting. The on-site noise environment is dominated by noise from ongoing construction and other Navy activities (DON 1995b).

Noise-sensitive receptors are existing land uses associated with indoor and/or outdoor activities that may be subject to significant interference from noise. They would include residential (single- and multi-family dwellings, dormitories, barracks, and other uses), hospitals, convalescent homes, and educational facilities.

The nearest on-base sensitive receptors are the BEQ and the Medical/Dental Facility located in the Station and Personnel Support Zone approximately 3,000 feet northwest of the additional CVN homeporting site.

The nearest off-base sensitive receptors in the City of Everett are multifamily residential areas located approximately 2,700 feet to the southwest and west of the additional CVN homeporting site and a single-family residential neighborhood located approximately 3,000 feet west-northwest of the NAVSTA Everett additional CVN homeporting site. Each of these residential areas lie on the other side of intervening Port of Everett industrial areas and the Burlington Northern Railroad tracks.

5.11.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Military Regulations

The DOD has established acceptable sound level criteria for various land uses. Where these criteria are exceeded, the impact would be significant. The criteria are outlined in the NAVFAC P-970 document, *Planning in the Noise Environment* (DOD 1978), and are presented in Table 5.11-1. In the table, the outdoor noise environment is considered in five noise "zones." For each zone, acceptability is noted by one of the following four entries: (1) a "yes", (2) noise level reduction (NLR), (3) a "no", or (4) one of the above with additional stipulations described in the footnotes.

Table 5.11-1. Acceptable Land Use and Minimum Building Sound Level Requirements for Military Facilities

Land Use	OUTDOOR NOISE ENVIRONMENT (LDN IN DBA)				
	85-89	*80-84*	*75-79*	*70-74*	*65-69*
Family Housing	No	No	No	NLR 30[4]	NLR 25[4]
Bachelor Housing	No	No	NLR 35[4]	NLR 30[4]	NLR 25 [4]
Transient Lodging, Hotels, Motels, *etc.*	No	No	NLR 35[4]	NLR 35[4]	NLR 25 [4]
Classrooms, Libraries, Churches	No	No	No	NLR 30	NLR 25
Offices and Administration Buildings Military)	NLR 40	NLR 35	NLR 30	NLR 25	Yes
Offices — Business and Professional	No	No	NLR 35	NLR 25	Yes
Hospitals and any Medical Facilities with 24-hr occupancy	No	No	No	NLR 30	NLR 25
Dental Clinics, Medical Dispensaries	No	No	NLR 30	NLR 25	Yes
Outdoor Music Shells	No	No	No	No	No
Commercial/Retail Stores, Restaurants/Cafeterias, Banks and Credit Unions, Exchanges, Theaters, EM/Officer Clubs	No	No	NLR 30	NLR 25	Yes
Flight Line Operations, Maintenance, and Training	NLR 35 [5]	NLR 30 [5]	Yes	Yes	Yes
Industrial, Manufacturing, and Laboratories	No	NLR 35 [5]	NLR 30 [5]	NLR 25 [5]	Yes
Outdoor Sports Arenas, Outdoor Spectator Sports	No	No	No	Yes[1]	Yes[1]
Playgrounds, Active Sport Recreational Areas	No	No	No	Yes	Yes
Neighborhood Parks	No	No	No	Yes	Yes
Gymnasiums, Indoor Pools	No	NLR 30	NLR 25	Yes	Yes
Outdoor — Frequent Speech Communication	No[2,3]	No[2,3]	No[2]	No[2]	No[2]
Outdoor — Infrequent Speech Communication	No[2,3]	No[2,3]	Yes	Yes	Yes
Livestock Farming, Animal Breeding	No	No	No	Yes	Yes
Agricultural (except Livestock)	Yes[3]	Yes[3]	Yes	Yes	Yes

Notes: Yes - Land use compatible with noise environment. No special noise control restriction. Normal construction okay.
NLR- Appropriate noise level reduction where indoor activities predominate.
No — Land use not compatible with noise environment, even if special building noise insulation provided.

1. Land use is acceptable provided special sound reinforcement systems are installed.
2. Land use may be acceptable provided special speech communication systems are used.
3. Land use may be acceptable provided hearing protection devices are worn by personnel. Check applicable hearing damage regulations.
4. Although local conditions may require residential uses in these areas, this use is strongly discouraged in Ldn 70-74 and Ldn 75-79 and discouraged in Ldn 65-69. The absence of viable alternative development options should be determined. NLR criteria will not eliminate outdoor environment noise problems and, as a result, site planning and design should include measures to minimize this impact, particularly where the noise is from ground-level sources.
5. The NLR must only be incorporated into the design and construction of portions of these buildings where the public is received, office areas, and noise-sensitive work areas or where the normal noise level is low.

Source: *Planning in the Noise Environment* NAVFAC P-970 (DOD 1978)

Where "yes" is indicated, no special noise control restrictions are necessary, and normal construction appropriate to the activity may be used. For many land uses, higher levels of exterior noise exposure are acceptable if the proper degree of interior noise attenuation is provided. Such tradeoffs are possible for land uses where indoor activities predominate. When such tradeoffs are appropriate, the amount of noise insulation required is enumerated in the table in units of NLR, which is measured in dBA and is the difference between noise measured outside the building and noise measured inside the building. If land use compatibility is contingent on meeting the NLR requirements, then a site-specific interior acoustical analysis must be performed to ensure that the proposed building design will provide the required level of noise reduction. A "no" indication means that the noise environment is not suitable for the designated activity or facility, even if special building noise insulation is provided. The table footnotes indicate exceptions where special conditions apply.

Civilian Regulations

Within the City of Everett, noise is regulated by a noise control ordinance (City of Everett 1994). In residential areas, noise levels up to 60 dBA emanating from noise sources in an industrial area (such as NAVSTA Everett) are acceptable. Operational noise levels that exceed 60 dBA at residential locations would be significant.

Construction noise levels are treated differently. Construction is generally permitted within city limits between the hours of 7:00 A.M. and 10:00 P.M. The only requirement is that the best available noise abatement technology consistent with economic feasibility be used.

5.11.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)*

Alternative Two would not require any new projects.

Dredging

No dredging is required. Therefore, no dredging-related noise impacts would occur.

Facility Improvements

No new facilities would be constructed. Thus, no construction noise impacts would occur.

Operations

Total average daily traffic would not change; therefore, the operational noise impacts would not be significant.

5.11.2.2 *Removal of Existing CVN: Total of No CVNs (Alternative Three)*

Alternative Three would not require any new projects.

Dredging

No dredging would be required. Therefore, no dredging noise impacts would occur.

Facility Improvements

No construction would be required. Therefore, no construction noise impacts would occur.

Operations

Removal of the existing CVN would reduce the number of vehicle trips generated by NAVSTA Everett by 7,900 trips per day (855 trips during the peak hour). This would result in a corresponding decrease in traffic noise along the approach roads. The noise decreases, which would occur along road segments that are mostly industrial or commercial, may not be noticeable, because when noise is generated by many sources of equal noise level, reducing the number of sources has very little effect on the overall level. Thus, minor beneficial traffic noise impacts would result.

5.11.2.3 Facilities for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs (Alternative One)

Alternative One would include a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Dredging at North Wharf would result in temporary noise impacts during 1 to 2 months of dredging activities. Noise levels from a diesel clamshell dredge typically range from 75 dBA to 85 dBA at a distance of 50 feet (DON 1995a).

The nearest on-base sensitive receptors are the BEQ and the Medical/Dental Facility located in the Station and Personnel Support Zone, both approximately 500 feet east of the North Wharf. At this distance, dredging noise levels would be attenuated to a range of approximately 53 dBA to 63 dBA, which is below the 65 dBA limit for outdoor levels at a BEQ (DOD 1978). Therefore, the dredging phase would have a less than significant adverse noise impact on on-base sensitive receptors.

The nearest off-base sensitive receptors in the City of Everett are a multi-family residential area located approximately 2,700 feet west of the North Wharf and a single-family residential neighborhood located approximately 2,800 feet west of the North Wharf. At these distances, dredging noise levels would be attenuated to a range of approximately 40 dBA to 50 dBA. The City of Everett's noise control ordinance (City of Everett 1994, sections 20.08.100 B.3 and 4) permits construction noise within city limits between the hours of 7:00 A.M. and 10:00 P.M. The only requirement is that the best available noise abatement technology consistent with economic feasibility be used, which is already required at military construction sites. Therefore, the dredging phase would have a less than significant adverse noise impact on off-base sensitive receptors.

Facility Improvements

Construction activity at the Carrier Pier would require a pile driver, which would generate noise. The pile driving noise impact would be intermittent and would last for just a few days. Therefore, the temporary construction noise impacts that would occur would be less than significant.

Operations

Removal of the existing CVN at NAVSTA Everett and replacing it with four AOEs would not significantly change the overall scale of existing Naval operations at NAVSTA Everett. The number of homeported ships would increase, but the number of personnel would decrease. The reduction of personnel would reduce the daily commuter traffic by approximately 2,000 trips (see Table 5.9-4) with a corresponding reduction of traffic noise on the approach roads to NAVSTA Everett. This would result in minor reductions of traffic noise, thus creating a beneficial noise impact.

5.11.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Dredging operations at the Carrier Pier and North Wharf would result in temporary noise impacts during 1 to 2 months of dredging activities. Noise levels from a diesel clamshell dredge typically range from 75 dBA to 85 dBA at a distance of 50 feet (DON 1995a).

The noise impacts due to dredging at North Wharf would be the same as described in section 5.11.2.3. Therefore, the noise impacts of dredging at the North Wharf would be less than significant.

For the dredging at the Carrier Pier, the nearest on-base sensitive receptors are the BEQ and the Medical/Dental Facility located in the Station and Personnel Support Zone, both approximately 3,000 feet northwest of the Carrier Pier. At this distance, dredging noise levels would be attenuated to a range of approximately 40 dBA to 50 dBA, well below the 65 dBA limit for outdoor levels at a BEQ (DOD 1978). Therefore, the dredging phase would have a less than significant adverse noise impact on on-base sensitive receptors.

The nearest off-base sensitive receptors in the City of Everett are multi-family residential areas located approximately 2,700 feet to the southwest and west of the additional CVN homeporting site and a single-family residential neighborhood located approximately 3,000 feet west-northwest of the NAVSTA Everett additional CVN homeporting site. Each of these residential areas lie on the other side of intervening Port of Everett industrial areas and the Burlington Northern Railroad line. At these distances, dredging noise levels would be attenuated to a range of approximately 40 dBA to 50 dBA. The City of Everett's noise control ordinance (City of Everett 1994 sections 20.08.100 B.3 and 4) permits construction noise within city limits between the hours of 7:00 A.M. and 10:00 P.M. The only requirement is that the best available noise abatement technology consistent with economic feasibility be used, which is already required at military construction sites. Therefore, the dredging phase would have a less than significant adverse noise impact on off-base sensitive receptors.

Facility Improvements

New construction would include a multi-story parking structure (constructed at the site of an existing parking lot), electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Construction-related noise from projects would result in short-term impacts and would occur only during daylight hours over 1 to 2 months. The Navy's *Environmental and Natural Resources Program Manual* (DON 1995c) requires use of low noise emission construction equipment for all construction projects. Given the industrial nature of the site and the distance to the nearest off-base sensitive receptors (over 0.5 mile), construction noise impacts would be less than significant.

Operations

Homeporting one additional CVN at NAVSTA Everett would expand the shipberthing operations that currently exist within the home port area. Operational noise impacts would result primarily from increased traffic on the local approach roads to NAVSTA Everett.

Average daily traffic for operations would increase by approximately 7,900 trips (see Table 5.9-4). The increased traffic would be primarily due to CVN personnel commuting to and from the base and would be distributed among several roads (see section 5.9.1.2.2). During peak traffic periods, traffic noise along approach roads to NAVSTA Everett would increase. West Marine Drive would experience the greatest noise impact with increased noise levels of 3 to 4 dBA (DON 1995b). Other roads would experience noise increases of less than 3 dBA. These increases, which would occur along road segments that are mostly industrial or commercial, would be barely noticeable. Therefore, the operational noise impacts would be less than significant.

5.11.2.5 Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

Approximately 50,000 cy of dredging at North Wharf would result in temporary noise impacts during the 1 to 2 months of dredging activities. Noise levels from a diesel clamshell dredge typically range from 75 dBA to 85 dBA at a distance of 50 feet (DON 1995a).

The nearest on-base sensitive receptors are the BEQ and the Medical/Dental Facility located in the Station and Personnel Support Zone, both approximately 500 feet east of the North Wharf. At this distance, dredging noise levels would be attenuated to a range of approximately 53 dBA to 63 dBA, which is below the 65 dBA limit for outdoor levels at a BEQ (DOD 1978). Therefore, the dredging phase would have a less than significant adverse noise impact on on-base sensitive receptors.

The nearest off-base sensitive receptors in the City of Everett are a multi-family residential area located approximately 2,700 feet west of the North Wharf and a single-family residential neighborhood located approximately 2,800 feet west of the North Wharf. At these distances, dredging noise levels would be attenuated to a range of approximately 40 dBA to 50 dBA. The City of Everett's noise control ordinance (City of Everett 1994 sections 20.08.100 B.3 and 4) permits construction noise within city limits between the hours of 7:00 A.M. and 10:00 P.M. The only requirement is that the best available noise abatement technology consistent with economic feasibility be used, which is already required at military construction sites. Therefore, the dredging phase would have a less than significant adverse noise impact on off-base sensitive receptors.

Facility Improvements

Development of two AOE home ports at NAVSTA Everett would only require construction of a mooring dolphin. Construction-related noise from the projects would result in short-term impacts and would occur only during daylight hours. The Navy's *Environmental and Natural Resources Program Manual* (DON 1995c) requires use of low noise emission construction equipment for all construction projects. Given the industrial nature of the site and the distance to the nearest off-base sensitive receptors (over 0.5 mile), construction noise impacts would be less than significant.

Operations

Homeporting two AOEs at NAVSTA Everett would expand the shipberthing operations that currently exist. Operational noise impacts would result primarily from increased traffic on the local approach roads to NAVSTA Everett.

Average daily traffic for operations would increase by approximately 2,950 trips (see Table 5.9-4). The increased traffic would be distributed among several roads (see section 5.9.1.2.3). During peak traffic periods, traffic noise along approach roads to NAVSTA Everett would increase. West Marine Drive would experience the greatest noise impact with an increased noise levels of 3 to 4 dBA (DON 1995b). Other roads would experience noise increases of less than 3 dBA. These increases, which would occur along road segments that are mostly industrial or commercial, would be barely noticeable. Therefore, the operational noise impacts would be less than significant.

5.11.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

No dredging would be required. Therefore, no dredging noise impacts would occur.

Facility Improvements

No construction would be required. Therefore, no construction noise impacts would occur.

Operations

No change to any existing operations would occur. Therefore, no adverse operational noise impacts would occur.

5.11.2.7 Mitigation Measures

Because noise impacts would be less than significant, no noise mitigation is provided.

5.12 AESTHETICS

This section addresses the aesthetics, or visual resources, of the proposed NAVSTA Everett home port site. Visual resources consist of topographic features such as landforms and bodies of water, and man-made features such as buildings, bridges, and recreational areas. The aesthetic quality of an area is evaluated by the extent that important visual resources are seen from view corridors (vantage points), or experienced from roadways, parks, or buildings (public and private).

5.12.1 Affected Environment

The home port site is located within the NAVSTA Everett area, which is characterized by marine-industrial uses (DON 1995b). This industrial activity extends southward for several miles from the Port of Everett, across the East Waterway from the station, to the Snohomish River. Other major industry in the area is the Scott Paper Company Mill directly east of the East Waterway, and the Port of Everett directly south of the mill (see Figure 2-9). These land uses contribute to a densely occupied industrial waterfront. The paper mill, for example, has very large buildings made of structural steel and corrugated metal siding (DON 1995b).

Public recreational uses in the site vicinity are limited to the Port of Everett public marina, located north of NAVSTA Everett (see Figure 2-9). The NAVSTA Everett home port site is separated from the marina's 2,200 slips, retail center, and parking lots, such that it is not readily visible (DON 1995b). NASVTA Everett is also shielded from views experienced at the commercial Marina Village and Chamber of Commerce buildings adjacent to the marina (DON 1986).

Private views of the NAVSTA Everett waterfront area are seen from residential neighborhoods on surrounding bluffs above and east of the home port site (DON 1986, 1995b). These vistas extend beyond the station to include the Puget Sound and the Olympic Mountains (DON 1986). Views from Marine View Drive and Norton Avenue east of the home port site are blocked by industrial structures, except for the intersection of Norton Avenue and California Street, from which the existing CVN berth is viewed (DON 1986). The Scott Paper Company Mill also obstructs views.

NAVSTA Everett base guidelines ensure consistency in materials and finishes for building and landscape design (DON 1995b). The Base Exterior Architecture Plan (BEAP) includes objectives including preservation of the Navy tradition related to the primary station function of homeporting ships, while enhancing views of the station from adjacent neighborhoods and downtown Everett (DON 1986, Appendix A). Consequently, the Naval Station is a visually attractive feature of the Everett landscape.

5.12.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The proposed action would result in a significant aesthetic impact if it would result in either of the following:

- Substantially adverse degradation of the quality of an identified visual resource, including but not limited to unique topographic features, undisturbed native vegetation, surface waters and major drainages, and parks or recreational areas; or

- Substantially adverse obstruction of any scenic vista or view visible to the public.

5.12.2.1 *Facility for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)*

Alternative Two would not require any new projects.

Dredging

Because no dredging would take place, no impacts on aesthetics would result.

Facility Improvements

Because no construction would take place, no impacts on aesthetics would result.

Operations

No ships would be added to or removed from NAVSTA Everett. Therefore, no impacts to aesthetics would result.

5.12.2.2 *Removal of Existing CVN: Total of No CVNs (Alternative Three)*

Alternative Three would not require any new projects.

Dredging

Because no dredging would take place, no impacts on aesthetics would result.

Facility Improvements

Because no construction would take place, no impacts on aesthetics would result.

Operations

The removal of the existing CVN would allow for redistribution of the six vessels currently berthed on the west side of the Carrier Pier and the Breakwater Pier. These changes would be visually consistent with the marine-industrial activity of the area. The nature of the seascape consistently changes with vessels calling and leaving the area. In addition, NAVSTA Everett has a low level of visibility from adjacent areas. The removal of the existing CVN would result in a minimal change to this quality. Therefore, operational impacts on aesthetics would be less than significant.

5.12.2.3 *Facility for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Dredges and dredging equipment required for dredging of approximately 50,000 cy of sediment would be compatible with the visual appearance of NAVSTA Everett as a marine-industrial area. In addition, NAVSTA Everett has a low level of visibility from adjacent areas and impacts would be short term. Therefore, impacts on aesthetics would be less than significant.

Facility Improvements

Construction of a mooring dolphin by pile drivers would be short term and imperceptible relative to maritime activity in the port area. The mooring dolphin would be primarily beneath the water, and, therefore, and not much of it would be visible. On-land infrastructure improvements would consist of utility upgrades, and these changes would be visually consistent with the marine-industrial activity of the area. Therefore, impacts on aesthetics would be less than significant.

Operations

The removal of one CVN and addition of four AOEs would be visually consistent with the marine-industrial activity of the area. The nature of the seascape consistently changes with vessels calling and leaving the area. In addition, NAVSTA Everett has a low level of visibility from adjacent areas. The removal of the existing CVN and addition of four AOEs would result in a minimal change to this quality. Therefore, operational impacts on aesthetics would be less than significant.

5.12.2.4 Facility for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Dredges and dredging equipment required for dredging of approximately 155,000 cy of sediment would be compatible with the visual appearance of NAVSTA Everett as a marine-industrial area. In addition, NAVSTA Everett has a low level of visibility from adjacent areas and impacts would be short term. Therefore, impacts on aesthetics would be less than significant.

Facility Improvements

Homeporting facilities and infrastructure needed for one additional CVN would require the construction of a multi-story parking structure where a parking lot now exists. This structure would comply with the BEAP and would be consistent with the visual appearance of NAVSTA Everett as a large marine-industrial area when seen from private views on surrounding bluffs above and east of the home port site. Therefore, impacts on aesthetics would be less than significant.

Operations

The addition of one CVN would be consistent with the marine-industrial activity of the area. The nature of the seascape consistently changes with vessels calling and leaving the area. In addition, NAVSTA Everett has a low level of visibility from adjacent areas. The addition of one CVN would result in a minimal change to this quality. Therefore, operational impacts on aesthetics would be less than significant.

5.12.2.5 Facility for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

Dredges and dredging equipment required for dredging approximately 50,000 cy would be compatible with the visual appearance of NAVSTA Everett as a marine-industrial area. In addition, NAVSTA Everett has a low level of visibility from adjacent areas and impacts would be short term. Therefore, impacts on aesthetics would be less than significant.

Facility Improvements

Homeporting facilities and infrastructure needed for the addition of two AOEs would require minor construction as listed above. Additional support facilities and utility expansions would be visually consistent with the area. Therefore, impacts on aesthetics would be less than significant.

Operations

The addition of two AOEs would be consistent with the marine-industrial activity of the area. The nature of the seascape consistently changes with vessels calling and leaving the area. In addition, NAVSTA Everett has a low level of visibility from adjacent areas. The addition of one CVN would result in a minimal change to this quality. Therefore, operational impacts on aesthetics would be less than significant.

5.12.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

Because no dredging would take place, no impacts on aesthetics would result.

Facility Improvements

Because no construction would take place, no impacts on aesthetics would result.

Operations

No ships would be added to or removed from NAVSTA Everett. Therefore, no impacts to aesthetics would result.

5.12.2.7 Mitigation Measures

Because all impacts on aesthetics would be less than significant, no mitigation measures are provided.

5.13 CULTURAL RESOURCES

Cultural resources within the potential homeporting site at NAVSTA Everett have been evaluated in previous studies. No marine cultural resources of any kind have been recorded within proposed dredging areas, even though this area has been well studied (DON 1985). The following discussion therefore considers only terrestrial cultural resources. All disposal would occur in previously approved disposal sites, eliminating the potential for impacts to upland archaeological sites.

5.13.1 Affected Environment

Overview

The prehistory of the region is similar to that of PSNS (see section 4.13.1). When the first European explorers arrived in the late 1700s, they found the Everett area to be inhabited by the Snohomish Indians (Abbott and Larson 1984). The Snohomish ceded ownership of lands around Everett in the Point Eliot Treaty of 1855.

The first Euroamerican settlers came into the Everett area in the early 1860s, but the most rapid period of expansion came in the 1890s and early 1900s after the development of railroad connections to the east and large lumber mills along the city's waterfront. NAVSTA Everett facilities have been built on reclaimed land along the Puget Sound over a period of about 80 years. Ship building began in Everett in the 1890s (Abbott and Larson 1984), and the Navy constructed ships at this facility during the 1940s and 1950s, turning out 36 vessels during World War II (DON 1986).

Cultural Resources in the Project Area

Because the entire NAVSTA Everett facility is built on reclaimed land, the proposed project site does not contain any intact prehistoric cultural resources. The nearest documented prehistoric sites are two village locations at the mouth of the Snohomish River about 1.5 miles to the north of the facility (Abbott and Larson 1984).

Although NAVSTA Everett was used for the construction of vessels during World War II, none of the structures associated with that activity exist today. Almost all structures at NAVSTA Everett constructed before 1986 were demolished to make way for the construction of the current Naval facility in the late 1980s and early 1990s (DON 1986). The only exceptions are an apple chilling building at the northern edge of the facility and a modular office building for the Resident Officer in Charge of Construction (ROICC), which was moved from its original location to its present location near the apple chilling building. The apple chilling building was built in 1982. It is not considered eligible for listing on the National Register of Historic Places (NRHP) due to its recent age, and it has been converted into a pier-side Navy exchange. The construction date for the modular ROICC office building is not certain, but it probably built in the mid-1970s. Neither of these structures are considered eligible for listing on the NRHP due to their recent age.

5.13.2 Environmental Consequences and Mitigation Measures

Significance Criteria

As outlined in the Federal regulations that implement the NHPA, the significance of project impacts are assessed only for those cultural resources that are considered "historic properties," which have been defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register" (36 C.F.R. 800.2 [e]). Therefore, the evaluation of historical significance is an important part of assessing impact significance. Evaluation of the significance of cultural resources is guided by specific criteria for listing on the NRHP, as defined in 36 C.F.R. 60.4, as augmented by appropriate state guidelines, and in consultation with the State Historic Preservation Officer. The quality of significance is present in districts, sites, buildings, structures, and objects that maintain the following:

- Association with events that have made a significant contribution to the broad patterns of history;
- Association with the lives of persons significant in the past;
- Design or construction techniques that embody the distinctive characteristics of a type, period, or method of construction or represent the work of a master or possess high artistic value or represent a significant and distinguishable entity whose components may lack individual distinction; and
- Cultural materials, including artifacts, features, and other remains, that have yielded, or may be likely to yield, information important in prehistory or history.

The regulations at 36 C.F.R. 800 provide criteria for evaluating effects and determining whether or not the effects should be considered "adverse." For cultural resources, any "adverse effect" on a historic property, as defined by 36 C.F.R. 800.9, would be considered a "significant effect," as defined under NEPA, if it "diminished the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Significant effects (impacts) may include any of the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Alteration of the character of the property's surrounding environment (i.e., setting) that contributes to the property's qualification for the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or
- Neglect of a property resulting in its deterioration or destruction.

Other federal laws, including the American Indian Religious Freedom Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act, deal with cultural resources, but they do not establish criteria for determining significance of impacts. They only pertain after the pertinent cultural resources have been identified, or if their discovery seems likely.

5.13.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)*

Alternative Two would not require any new projects.

Dredging

No dredging would occur under this action. Therefore, no impacts on cultural resources would result. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Facility Improvements

The lack of construction means that this option would not alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. Therefore, this action would have no impact on cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Operations

No change in the operation of NAVSTA Everett to provide the capacity for homeporting for one existing CVN would be required. Therefore, no adverse impacts on cultural resources would result.

5.13.2.2 *Facilities for Removal of Existing CVN: Capacity for Total of No CVNs (Alternative Three)*

Alternative Three would not require any new projects.

Dredging

No dredging would occur under this action. Therefore, no impacts on cultural resources would result. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Facility Improvements

Removal of the existing CVN would not require any construction. Therefore, this action would have no impact on cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Operations

Change in the operation of NAVSTA Everett to accommodate the removal of the existing CVN would not damage any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. Therefore, this change in operations would not have adverse impacts on cultural resources. Notification of the State

Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

5.13.2.3 *Facilities for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Under this action, the only dredging to occur would be in the vicinity of the North Wharf. No historic or prehistoric archaeological resources are present in this area, therefore there are no resources to be impacted by this activity. This dredging would have no adverse impacts on significant cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Facility Improvements

The only construction associated with this action is a mooring dolphin to be built off of the west side of the Carrier Pier. No significant cultural resources are in the area to be affected by this construction, therefore construction of the mooring dolphin would not damage cultural resources; nor would this construction alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. This facility improvement would have no adverse impact on cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Operations

Change in the operations of NAVSTA Everett to resulting in the removal of one CVN and the addition of four AOEs would not damage any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. Therefore, this change in operations would have no adverse impacts on cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

5.13.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Providing capacity to homeport an additional CVN would require dredging within the Carrier Pier and in the vicinity of the North Wharf. No historic archaeological resources are present in these areas. Therefore, this dredging would have no adverse impacts on cultural resources.

Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Facility Improvements

With construction of a parking structure and other utility improvements needed to provide the capacity to homeport an additional CVN, ground disturbing activities would only occur within recent fill soils. Therefore, this action would have no impact on cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Operations

Change in the operations of NAVSTA Everett to needed to provide the capacity to homeport an additional CVN, including a parking structure, would not damage any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. Therefore, this change in operations would have no adverse impacts on cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

5.13.2.5 Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

The only dredging that would be needed to provide the capacity to homeport two additional AOEs would be in the vicinity of the North Wharf. No historic or prehistoric archaeological resources are present in this area, therefore there are no resources to be impacted by this activity. This dredging would have no adverse impacts on significant cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Facility Improvements

Construction of facility improvements to provide the capacity to homeport two additional AOEs would disturb ground only in areas containing fill. Therefore, this action would have no impact on cultural resources. Notification of the State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

Operations

Change in the operations of NAVSTA Everett to provide the capacity to homeport two additional AOEs would not damage any significant cultural resources, alter the setting or feeling of significant cultural resources, or result in the neglect of any historic properties. Therefore, this change in operations would have no adverse impacts on cultural resources. Notification of the

State Historic Preservation Officer regarding the determination of no effect on historical properties resulting from the proposed action is underway.

5.13.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

No dredging would be required, therefore no potential for adverse impacts on cultural resources would occur.

Facility Improvements

No construction would be required for this alternative. Therefore, no impact on cultural resources would occur.

Operations

No change in the operation of NAVSTA Everett would be required for this alternative. Therefore, no impact on cultural resources would occur.

5.13.2.7 Mitigation Measures

No impacts on cultural resources would occur under any of the any of the actions discussed above. Therefore, no mitigation measures are required.

5.14 GENERAL SERVICES/ACCESS

This section discusses general services affecting Naval personnel quality of life, including recreational facilities, community support facilities, medical care, fire protection, and police protection. Schools and housing are addressed in section 5.8 (Socioeconomics). Access in and out of NAVSTA Everett is also addressed in this section, although specifics of vehicle movements of roadways are discussed in section 5.9 (Ground Transportation).

5.14.1 Affected Environment

Recreational Facilities

NAVSTA Everett recreational facilities include four softball fields that can also be used for flag football or soccer, two football/soccer fields, two indoor basketball/volleyball courts (DON 1995b). A recreational center includes service club areas, a sports center, amusement area, gymnasium, racquetball courts, and exercise rooms (DON 1995b). A recently constructed marina containing approximately 70 slips is located at NAVSTA Everett in the East Waterway between Pier D and Spruance Boulevard. In addition, the Navy has constructed a waterfront park that meets the shoreline permit agreement for public access.

Other facilities are available at the Family Support Complex (FSC), 11 miles north of NAVSTA Everett. The facilities, including two softball diamonds that can also be used for flag football or soccer, five tennis/basketball courts, arts and crafts, auto hobby shop, outdoor gear rental, and a small multipurpose gymnasium, are designed for NAVSTA Everett personnel use.

Snohomish County recreational facilities include 2,300 acres of parkland, with 600 acres within the City of Everett. The City's Grand Avenue Park covers 3.5 acres on a bluff overlooking NAVSTA Everett. A variety of waterfront recreational uses exist adjacent to the station including boating, sailing, kayaking, and sport fishing. Boating traffic is heaviest adjacent to the Port of Everett public marina and public boat launch facility, north of the existing CVN berthing site (DON 1995b).

Community Support Facilities

Community support facilities at NAVSTA Everett and the FSC include enlisted barracks and BOQ, a galley, child development center, retail commissary and exchange, clubs, auto hobby shop, and a chapel (DON 1995b). Naval housing is discussed in section 5.8.

Medical Facilities

Although no Naval hospital facility exists at NAVSTA Everett, a modular, temporary medical and dental clinic provides out-patient health care for active duty personnel. The medical clinic provides emergency stabilization care for injuries occurring on base. After initial treatment, injured individuals are transferred by private ambulance to any of the five hospitals in the Everett area (DON 1995b). The closest Naval hospital facilities are at Whidbey Island Naval Air Station and the Bremerton Naval Hospital at PSNS. Both facilities are about 2 hours from NAVSTA Everett by ferry and car.

A new medical/dental clinic is scheduled for 1998 construction. The new facility will treat both active duty and family members. Emergency medical services will continue to be provided by local providers at the five hospitals in Everett.

Other non-military health services in the vicinity are doctor's offices, dental offices, and clinics. NAVSTA Everett has agreements with the non-military hospitals and health care facilities to supplement Naval medical service (DON 1995b).

Fire Protection

The NAVSTA Everett Fire Department is housed at the on-base fire station. Fire protection facilities include sensors, alarms, and fire suppression systems (DON 1995b).

Law Enforcement

The NAVSTA Everett Police Department is housed at the Waterfront police station. The police force provides security patrols and enforcement. NAVSTA Everett access is controlled by personnel at the main gate house and sentry booths, as well as perimeter fencing. A Legal Services Office detachment and courtroom (housed in the Administration Complex) are also provided.

Access

NAVSTA Everett is accessed by two gates. Six lanes of traffic are available at the Main Gate, and four lanes of traffic are at the Service Gate (DON 1995b).

5.14.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The proposed action would result in a significant impact on general services/access if it would result in any one of the following:

- A substantially adverse increase on the remaining service/access capacity;
- Reach or exceed the current capacity of the service/access such that accepted levels of service would not be maintained;
- Cause response times for fire protection or law enforcement to increase beyond their respective department standards; or
- Require development of new services/access beyond those existing or currently planned.

5.14.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)

Alternative Two would not require any new projects.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because no dredging would occur, there would be no impacts on general services/access.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT, AND ACCESS

No construction would be required. Therefore, no impacts on general services and access would result.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

There would be no additional impacts from this alternative.

5.14.2.2 Removal of Existing CVN: Total of No CVNs (Alternative Three)

Alternative Three would not require any new projects.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because no dredging would occur, there would be no impacts on general services/access.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because no construction would occur, there would be no impacts on general services/access.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

The removal of the existing CVN, would decrease the number of military personnel and their dependents by 3,217 persons. General services and access needs at NAVSTA Everett would continue to be met and the decreased demand would cause impacts on general services/access to be beneficial.

5.14.2.3 *Removal of Existing CVN and Addition of Four AOEs: No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Dredging and disposal of approximately 50,000 cy of sediment would be temporary and the labor force would be local. Therefore, no impacts on general services would result.

ACCESS

Because dredging would takes place in the water and not on land, no impacts to land access would result. Dredging operations would be localized in existing Naval navigational channels and would not extend into commercial navigational channels. Therefore, no impacts on land access would result.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Construction would be temporary and the labor force would be local. Therefore, no impacts on general services would result.

ACCESS

Existing access routes would be sufficient to provide for construction required for homeporting facilities and infrastructure needed for the removal of one CVN and addition of four AOEs. Impacts would be short term and less than significant.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

The removal of one CVN and addition of four AOEs would decrease the number of military personnel and their dependents by 817 persons. General services and access needs at NAVSTA Everett would continue to be met and the decreased demand would cause impacts on general services/access to be beneficial.

5.14.2.4 *Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)*

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Dredging and disposal of 155,000 cy of sediment would be temporary and the labor force would be local. Therefore, no impacts on general services would result.

ACCESS

Because dredging would take place in the water and not on land, no impacts to land access would result. Dredging operations would be localized in existing Naval navigational channels and would not extend into commercial navigational channels. Therefore, no impacts on land access would result.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, AND LAW ENFORCEMENT

Construction associated with the homeporting facilities and infrastructure needed for the addition of one CVN would be temporary and the labor force would be local. Therefore, no impacts on general services would result.

ACCESS

Existing access routes would be sufficient to provide for construction of homeporting facilities and infrastructure needed for one additional CVN. Impacts would be short term and less than significant.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

The addition of one CVN would increase military personnel and their dependents by 3,217 persons. General services and access levels of service would not be reduced below historically accepted levels of service associated with periodic fluctuations in the Everett population. Impacts would be adverse but less than significant.

5.14.2.5 *Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)*

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Dredging and disposal of 50,000 cy of sediment would be temporary and the labor force would be local. Impacts would be similar but less than those described in section 5.14.2.4.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Construction associated with the homeporting of two AOEs would be temporary and the labor force would be local. Therefore, no impacts on general services and access would result.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

The addition of two AOEs would increase the number of military personnel by 1,200 persons. This change is less than significant, and existing general services and access would be adequate to allow for this increase. Moreover, the Everett population fluctuates periodically, this change would not reduce levels of service of general services and access below historically accepted levels of service. Therefore, operational impacts on general services/access would be less than significant.

5.14.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because no dredging would occur, there would be no impacts on general services/access.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because no construction would occur, no impacts on general services/access would result.

Operations

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Because there would be no changes in the operations at NAVSTA Everett, no operational impacts on general services/access would result.

5.14.2.7 *Mitigation Measures*

All impacts on general services/access would be less than significant. No mitigation measures are proposed.

5.15 HEALTH AND SAFETY

This section addresses health and safety issues related to the project alternatives at NAVSTA Everett.

5.15.1 Affected Environment

All operations at NAVSTA Everett are governed by the Navy Occupational Health and Safety (NAVOSH) program (DON 1994). Volume 3, section 3.15, provides a detailed summary of the content of this program, which is applied throughout the Navy.

NAVOSH Program

A CVN has been homeported at NAVSTA Everett since January 1997. All station operations supporting the ship come under the purview of the station's NAVOSH program (DON 1996b). Oversight of the program is provided by the OSH Policy Council. This council meets quarterly and consists of the Commanding Officer, Executive Officer, Safety Manager, Department Heads, and invited guests that include the Industrial Hygiene Officer, Occupational Health personnel, and Safety Representatives from tenant commands. The station NAVOSH organization, Code 01S, is staffed with a manager, an explosive safety officer, two OSH specialists, and a secretary. The last Navy inspection of the station's NAVOSH program was conducted in July 1995 and a satisfactory grade was assigned.

Hazardous Waste Program

Facilities used to hold and process hazardous waste on NAVSTA Everett are operated by the Public Works Department. In the past 3 years, using military construction monies, the naval station has constructed an Oily Waste Water Processing Facility for $5.6 million and a Hazardous Waste Facility for $1.6 million. These facilities are designed to handle all of the hazardous wastes generated at the station. Both of the facilities' designs incorporated the newest technology in management of these waste streams.

The hazardous waste facility operates as a 90-day accumulation point. Containerized waste is picked up and transported to the hazardous waste facility where it is consolidated, stored and packaged for disposal. Annual volumes of material for disposal average just under 260,000 lbs per year. The waste is turned over to the Defense Reutilization Marketing Office (DRMO), who uses a regional commercial contract for off-site shipment and disposal. The oily waste water system processes an average of 2.7 million gallons per year. The hazardous and oily waste generated by the homeported CVN, 2 DDs 2 DDGs and 2 FFGs have been managed without major incident.

The addition of a second aircraft carrier at NAVSTA Everett would require expansion of the Hazardous Waste Facility in the form of additional bays. The oily waste water collection and storage system would be upgraded by constructing two additional Load Equalization Tanks.

The Navy has implemented a strict Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program for all of its facilities. The Navy continuously monitors its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes. For example, nonhazardous materials are substituted for hazardous materials wherever practicable, processes are changed to ones that do not employ hazardous materials, and care is taken to avoid contaminating nonhazardous materials with hazardous materials.

Other Federal Health and Safety Requirements

All proposed facilities at NAVSTA Everett are designed, constructed, and operated to meet the requirements of Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, to ensure whenever feasible that pollution would be prevented or reduced at the source, that pollution that cannot be prevented would be recycled in an environmentally safe manner; that pollution that cannot be prevented or recycled would be treated in an environmentally safe manner; and that disposal or other releases to the environment would be employed as a last resort. These requirements are contained in all contractual documents for the design, construction, and operation of the proposed facilities. Operations such as the proposed action are required to comply with regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

Inspection and Abatement Program

The Inspection and Abatement Program is the foundation of the overall NAVOSH program at NAVSTA Everett. It influences most, if not all, of the remaining programs and serves as the primary tool for identifying hazardous acts and conditions. Annual, or more frequent, inspections are performed on all facilities and operations at the station. A customized computer software program is used that is designed to include the NAVOSH Deficiency Notice and all of its elements and cover letters for issuance to supervisors, as well as providing an automatic Hazard Abatement Program summary log. This program is networked to all computer stations in the Safety Office so that each inspector can use the program jointly.

The Safety Office has also implemented a Building History file for each facility on the station. It contains pertinent reports and information relating to which building and what materials are stored inside. These include inspection reports, corrective actions, industrial hygiene survey reports, mishap reports, and pending changes. This file is crucial for background information prior to each scheduled inspection, as well as being a quick reference source of information for each work place.

Safety Training

The Safety Office conducts all safety training required by NAVOSH directives on a regular scheduled basis. NAVSTA Everett produces NAVOSH training materials for local staff orientation. A customized computer tracking database is used for documenting Safety Training. NAVOSH Personnel Profile sheets include all training required, dates accomplished, due dates and even the same information for medical surveillance requirements. Additional training is provided at the OSHA Training Institute (OTI), a regional training center at the University of Washington. NAVSTA Everett coordinates with the OTI and assists them with their training programs by arranging tours and training augmentation.

Hazardous Materials Program

A hazardous materials program has been implemented that provides for storage management, tracking, facility use, and spill containment. The program is defined in Volume 5, section 5.15.

NNPP Radiological Impact

Chapter 7 provides detail on the radiological health and safety aspects of NNPP activities. Also, the Navy's safety and health record is well documented. As is discussed in the Navy's annual report (NNPP 1997a), procedures used by the Navy to control releases of radioactivity from U.S. Naval nuclear-powered ships and their support facilities have been effective in protecting the environment and the health and safety of the general public.

5.15.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Impacts associated with hazardous waste generation are considered significant if the construction, and/or operation of the proposed action create either of the following:

- Substantially increases the risk of a hazardous substance release during construction; or
- Generates or otherwise manages hazardous materials in a manner that substantially increases the risk of hazardous waste upset (e.g., release or spill).

Facilities associated with the proposed action would be designed, constructed, and operated to meet the requirements of Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, to ensure whenever feasible that pollution would be prevented or reduced at the source, that pollution that cannot be prevented would be recycled in an environmentally safe manner; that pollution that cannot be prevented or recycled would be treated in an environmentally safe manner; and that disposal or other releases to the environment would be employed as a last resort. These requirements would be contained in all contractual documents for the design, construction, and operation of the proposed facilities. Operations would comply with regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

5.15.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)

Alternative Two would not require any new projects.

Dredging

There would be no dredging and therefore no impacts would occur.

Facility Improvements

There would be no new construction at NAVSTA Everett. Therefore no impacts would occur.

Operations

There would be no additional operational impacts associated with this alternative.

5.15.2.2 Removal of Existing CVN: Total of No CVNs (Alternative Three)

Alternative Three would not require any new projects.

Dredging

There would be no dredging and therefore no impacts.

Facility Improvements

There would be no facility improvements and therefore no impacts.

Operations

This condition would result in a slight beneficial effect by reducing the activity in the area.

5.15.2.3 Facilities for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs (Alternative One)

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Dredging at the North Wharf would occur. Dredging activity would not be expected to involve handling of hazardous wastes. No potential for hazardous waste releases or upset impacts would occur.

Facility Improvements

Facility improvement construction activity would be moderate term. Any unexpected releases of hazardous substances during construction would be subjected to existing NAVOSH program procedures. These procedures would reduce potential impacts to health and safety to less than significant.

Operations

The removal of one CVN would offset the potential increase in hazardous waste generated by the four AOEs that would be relocated under this action. The net future hazardous waste generation and risk of upset would not be substantially increased as a result of the relocated vessels. The existing NAVOSH program would apply and existing facilities are capable of accommodating any increase in hazardous material disposal. The impacts of this action are therefore less than significant. Operations would comply with the Navy's Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program as well as regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

5.15.2.4 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Dredging activity would not be expected to involve handling of hazardous wastes. No potential for hazardous waste releases or upset impacts would occur.

Facility Improvements

Facility improvement construction activity would be short term. Any unexpected releases of hazardous substances during construction would be subjected to existing NAVOSH program procedures. These procedures would reduce potential impacts to health and safety to less than significant.

Operations

The net future hazardous waste generation and risk of upset would not be substantially increased as a result of homeporting a second CVN under this action. The existing NAVOSH Program would apply and existing facilities are capable of accommodating any increase in hazardous material disposal. The impacts are therefore less than significant. Operations would comply with the Navy's Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program as well as regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

A quantitative analysis of a hypothetical accident involving the release of hazardous substances at NAVSTA Everett has been included in Volume 2 Appendix J. Using conservative assumptions, the analysis concludes that if an accident involving hazardous substances were to occur at NAVSTA Everett without the currently established mitigation measures (such as emergency planning) in place, there could be a potential impact to safety and environmental health. However, as described in Volume 2 Appendix J, the Navy already has mitigation measures in place at NAVSTA Everett which minimize the possibility of such an accident occurring, and minimize the impact if such an accident occurs. These mitigation measures include administrative controls for safe handling of hazardous substances, personnel protective equipment, and emergency response programs involving established resources such as fire departments and emergency command centers.

Nuclear-powered ships homeported at NAVSTA Everett would comply with the NAVOSH program for the radiological aspects of the work. This program meets or exceeds all applicable OSHA regulations and has proven to be effective in ensuring safe and healthful conditions in the workplace. No significant occupational safety and health impacts are expected to occur.

Personnel Radiation Exposure. Trained personnel would encounter radioactivity when performing work shipboard on the reactor plant. Personnel radiation exposure would be controlled using the same controls used in shipyards performing Naval nuclear work. Individual radiation worker exposure is strictly controlled, resulting in exposures well below the federally established limit of 5 roentgen equivalent man (rem) per year. In fact, no shipyard worker has exceeded 2 rem per year since 1980 (NNPP 1997b). These controls are discussed further in Chapter 7.

The effectiveness of these controls is demonstrated by the fact that the average occupational exposure of shipyard personnel is less than three-tenths of a rem per year, which is equivalent to the amount of radiation exposure a typical person in the United States receives each year from natural background radiation. For workers performing the mixed waste activities, their average occupational exposure is about 0.04 rem per year. It should be noted that shipyard workers perform nuclear refuelings and manage spent nuclear fuel; these activities would not be conducted at NAVSTA Everett. With additional NIMITZ-class aircraft carriers at NAVSTA Everett, radiation levels would continue to be well below federal standards for permissible levels of radiation in uncontrolled areas. There would continue to be no distinguishable effect on the normal background radiation levels at the site perimeter (NNPP 1997a).

The risk to radiation workers from occupational radiation exposure related to nuclear propulsion plant maintenance is small compared to the risks accepted in normal industrial activities and compared to the risks regularly accepted in daily life outside work (NNPP 1997b). In 1991, researchers form the Johns Hopkins University in Maryland completed a comprehensive epidemiological study of the health of workers at the six Navy shipyards and two private shipyards that serviced Navy nuclear-powered ships. This independent study evaluated a population of over 70,000 civilian workers over a period from 1957 through 1981 to determine whether there was an excess risk of leukemia or other cancers associated with exposure to low-levels of gamma radiation. This study did not show any cancer risks linked to radiation exposure. Furthermore, the overall death rate among radiation-exposed shipyard workers was less than the death rate for the general U.S. population. In conclusion, the Johns Hopkins study found no evidence to conclude that the health of people involved in work on U.S. nuclear-powered ships has been adversely affected by exposure to low levels of radiation incidental to their work (NNPP 1997b). Thus, homeporting additional NIMITZ-class aircraft carriers and performing small amounts of Naval nuclear propulsion plant maintenance aboard the ship, would pose no significant radiological risk to other Navy personnel or to the general public.

Radioactive Material Control. The principal source of radioactive materials encountered during Naval nuclear propulsion plant maintenance is from trace amounts of corrosion and wear products from reactor plant metal surfaces in contact with reactor coolant water, which is either deposited internally or contained in the coolant water. Radioactive materials would be strictly controlled to protect the environment and human health, utilizing the same proven methods used in shipyards performing Naval nuclear work. Examples of techniques used to control the spread of radioactive contamination include use of multiple boundaries, HEPA filters, and impermeable, easily cleaned surfaces. In addition, frequent monitoring is performed to detect contamination. Only specially trained personnel are permitted to handle radioactive material.

Environmental monitoring at facilities supporting Naval nuclear-powered ships shows these controls have been effective in protecting the environment, and that radioactivity associated with Naval nuclear-powered ships has had no significant or discernible effect on the quality of the environment. The results of this monitoring are reported annually in publicly available reports (NNPP 1997a). Thus, since stringent control of radioactive materials would continue, there would be no significant radiological impact on the environment from homeporting additional NIMITZ-class aircraft carriers at NAVSTA Everett.

Solid Radioactive Waste. The Navy uses stringent controls to minimize the generation of radioactive waste from nuclear propulsion plant operation and maintenance. Radioactive waste is waste that contains man-made radionuclides as described in the Atomic Energy Act of 1954 and its implementing regulations. This waste includes radioactively contaminated rags, plastic bags, paper, filters, ion exchange resin, and scrap materials resulting from operations and minor routine work aboard ship. Radioactive waste is strictly controlled to prevent loss and is packaged it in rigid containers, shielded as necessary, accumulated in a controlled storage area on board the ship, and shipped to licensed burial sites. Radioactive waste generated at NAVSTA Everett is currently sent to the Hanford reservation in central Washington State for disposal. It is expected that for each CVN homeported at NAVSTA Everett, approximately 325 cubic feet of low-level radioactive waste per year would be generated.

Mixed waste generated from NNPP activities is a mixture of low-level radioactive waste and chemically hazardous waste. The Navy has implemented strict controls to prevent, to the maximum extent practicable, mixing radioactive and chemically hazardous waste. However, small amounts of mixed waste (less than 3 cubic meters per year from each CVN) would be generated by the Navy and stored at PSNS. The mixed waste would be primarily solid in form. The radioactivity would be controlled as noted above. The chemically hazardous constituents of the waste would be regulated in accordance with Washington Administrative Code (WAC) 173-303, which implements the federal RCRA. Detailed characterization of NNPP mixed waste has been accomplished using sampling and extensive process knowledge, and has confirmed that the waste is suitable for safe storage until it is shipped off site for treatment and disposal. Mixed waste would be packaged in sealed containers, accumulated in a controlled area on board the ship, and shipped to permitted treatment, storage, and disposal facilities. Mixed waste would be stored in a dedicated, controlled mixed-waste storage facility at PSNS that meets Navy, EPA, and State of Washington requirements for storing mixed waste. The mixed-waste storage facility complies with Washington State regulations (WAC 173-303). It is anticipated that this small amount of mixed waste would be stored pending availability of permitted treatment and disposal facilities.

The same effective methods used to control other radioactive materials and to minimize personnel radiation exposure would be used to control low-level radioactive and mixed wastes. Thus, there would be no significant radiological environmental impacts as a result of storing this waste generated by additional NIMITZ-class aircraft carriers at NAVSTA Everett.

Radioactive Material Transportation. All shipments of radioactive materials in the NNPP are required to be made in accordance with the applicable regulations of the U.S. Department of Transportation, the U.S. Department of Energy, and the U.S. Nuclear Regulatory Commission. In addition, the Navy has issued instructions to further control these shipments. These regulations and instructions ensure that shipments of radioactive materials are adequately controlled to protect the environment and the health and safety of the general public regardless of the transportation route taken, and have proven to be effective.

There have never been any significant accidents involving release of radioactive material during shipment since the NNPP began. Shipments of radioactive materials associated with Naval nuclear propulsion plants have not resulted in any measurable release of radioactivity to the environment. The maximum exposure to any individual member of the public is far less than that received from natural background radioactivity. Carriers of radioactive materials are required to have accident plans that identify the actions to be taken in case of an accident, including notification of the civil authorities and communication with the shipment originator for guidance and assistance. The Navy would communicate with and cooperate fully with state radiological officials in the event of occurrences involving shipments of radioactive materials (NNPP 1997a). Thus, there would be no significant impacts related to shipment of radioactive materials with homeporting additional NIMITZ-class aircraft carriers at NAVSTA Everett.

All depot-level nuclear propulsion plant maintenance would be accomplished at PSNS. The net future hazardous waste generation and risk of upset would not be substantially increased as a result of homeporting a second CVN under this action. The existing NAVOSH program would apply and existing facilities are capable of accommodating any increase in hazardous material disposal. The impacts of this action are therefore less than significant.

5.15.2.5 *Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)*

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

Dredging at the North Wharf would occur. Dredging activity would not be expected to involve handling of hazardous wastes. No potential for hazardous waste releases or upset impacts would occur.

Facility Improvements

Minor facility improvements would occur under this action. No impacts on health and safety would occur.

Operations

All nuclear propulsion plant maintenance would be accomplished at PSNS. The net future hazardous waste generation and risk of upset would not be substantially increased as a result of the relocated AOEs. The existing NAVOSH program would apply to existing facilities with the expansion of the Hazardous Waste facility in the form of additional bays. The oily wastewater collection system would be upgraded by constructing two additional load equalization tanks. Operations would comply with the Navy's Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program, as well as regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act. Impacts would be less than significant.

Radiological effects would be the same as these identified under section 5.15.2.4.

5.15.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

No dredging would occur. No potential for hazardous waste releases or upset impacts would occur.

Facility Improvements

No facility improvements would occur. No impacts on health and safety would occur.

Operations

No change in operations would occur, therefore there would be no additional impacts.

5.15.2.7 Mitigation Measures

None of the facilities and infrastructure required to support an additional CVN at NAVSTA Everett would result in significant impacts to health and safety; therefore, no mitigation measures are proposed.

5.16 UTILITIES

This section addresses utilities including energy (natural gas and electricity), fuel supply, drinking water, wastewater (sanitary, industrial, and oily industrial) disposal, stormwater disposal, solid waste (hazardous and non-hazardous waste) disposal, steam, and compressed air, which is required to serve the proposed home port site.

5.16.1 Affected Environment

The NAVSTA Everett Public Works Department is responsible for all major utilities servicing NAVSTA Everett. Utility corridors are located generally in roadways. Utility piping to the waterfront area, wharf, and ship piers is placed in a partly buried corridor (DON 1995b). Utilities at the wharf and pier that serve ship berths are placed in channels, and removable concrete panels cover what are known as utilidoors. Most NAVSTA Everett utility systems have built-in expansion capability so that additional upgrades can be achieved with a minimum effect on the system (DON 1995b).

5.16.1.1 Energy

Natural Gas

Natural gas at the station is provided by the Defense Fuel Supply by way of an underground supply main to the NAVSTA Everett steam and air plant and waterfront buildings. The system has a capacity of 400,000 cubic feet/hour (cfh) with a steady state load (normal operating pressure) of 85,000 cfh.

Electricity

Electricity is provided to NAVSTA Everett by a 115-kV transmission system operated by Snohomish County Public Utilities District (PUD) No. 1 in the vicinity of the Waterfront (DON 1995b). A 115-kV substation constructed at the NAVSTA Everett waterfront has a capacity of 80,000 kilovolt-amperes (kVA) and a steady-state electrical load of 40,000 kVA. Remaining unused electrical capacity at the NAVSTA Everett waterfront is 45,000 kVA.

5.16.1.2 Fuel Supply

NAVSTA Everett has no on-site fuel storage for the seven berthed ships. All fuel is barged from the Naval Supply Center, Puget Sound, Manchester Fuel Department, at the Bremerton Naval Complex (see section 4.16.1.2 for additional discussion of the facility).

5.16.1.3 Water Supply

The City of Everett, Public Works Department, Water Division provides potable water to NAVSTA Everett through a 16-inch line along Norton Avenue, and a 12-inch radial main to the station waterfront (DON 1995b). The waterfront has an estimated peak flow rate of 4.55 mgd. Potable water is distributed to the pier and wharf with a maximum flow of 3,500 gpm. Total available water capacity is 2.2 mgd, with a steady-state load of 1.2 mgd.

5.16.1.4 Wastewater Disposal

Sanitary Wastewater

The City of Everett Sewer Department provides service to the NAVSTA Everett waterfront through two sewer and pumping systems, ranging from 12 to 36 inches in diameter. The main Navy sewer pump station responsible for conveying NAVSTA Everett wastewater to the city's system is at Broadway Avenue and 22nd Street (DON 1995b). The NAVSTA Everett sewer pumping system includes a main pump and pressure main with a capacity of 1.25 mgd and a steady-state load of 0.6 mgd. The city sewer system operates with adequate capacity.

Industrial Wastewater Disposal

Industrial wastewater results from cleaning equipment activity from onshore maintenance building showers, sinks, laundry, and floor drains; and vessel deck drains, galley drains, bilgewater (water collecting inside the lowest point of the ship's inner hull from seepage or leakage), equipment cooling water, brine solutions, and refrigerant emissions (DON 1995b). All industrial wastewater from these ships is processed through the industrial wastewater pretreatment plant. Onshore showers, sinks, laundry, and floor drains go to the city sewer. The NAVSTA Everett industrial wastewater treatment plant has a capacity of approximately 95,000 gpd. Existing demand is approximately 50,000 gpd. An Industrial Discharge permit is in effect for disposal of these waste stream discharges.

Oily Wastewater

Oily wastewater (including water brake fluid, piston oil, and grease) from ships and barges is collected in an oily water separator system. The collection system provides all piping necessary to transfer the oily waste water from moored ships to the land-based oily water separator system, including quick connect/disconnect piping manifolds and connection hoses for ship connections. The oily water separator system includes two 16,000-bbl concrete load equalization tanks (120' x 40' x 20' ht), two 3,000 gallon oil storage tanks, two induced gravity separators, associated pumps and interconnecting piping. The discharge system includes piping form the oily water separator system to the on-site sewage attenuation tank. Total capacity is 95 KGPD.

The wastewater is transported from vessels at the berths to the oily waste treatment plant (OWTP). The existing surge capacity load is 360,000 gpd, excluding the Load Equalization Tank (LET) #3. After treatment at the OWTP, recovered oil is stored and then removed by a private contractor. Separated non-oily fluids are transported to the industrial wastewater treatment plant (IWTP).

5.16.1.5 Stormwater Disposal

NAVSTA Everett stormwater disposal is provided by a drainage system that carries runoff to the East Waterway (to the east) and Port Gardner Bay (west and south). The stormwater system is capable of accommodating annual runoff of approximately 2.2 million gallons. Discharge of stormwater into the ocean and bay is discussed in section 5.2.

5.16.1.6 Solid Waste Disposal

Non-Hazardous Waste

Solid waste and potentially recycled materials are separated by a private contractor at NAVSTA Everett. Approximately 163 tons/month of non-recyclable material is transported to the Snohomish County landfill transfer station. Approximately 53 tons/month of recyclable material is taken to the station's recycling center.

Hazardous Waste

Hazardous waste generated at NAVSTA Everett is stored in approved containers designed for this purpose up to 90 days, with the average turn-around time closer to 30 days, before being transported by a contracted waste hauler off site. The facility provides temporary storage of hazardous wastes arriving from ships and the shoreside industrial facilities. The facility is 7,555 square feet and includes seven covered and two expansion storage bays, a loading dock, office, and a laboratory. Individual storage sumps for each pad prevent mixing of wastes if a spill or leakage should occur. Based on a 90-day storage cycle, the estimated maximum capacity of the facility is 437 drums (see section 5.15 for additional discussion of hazardous waste storage procedures).

5.16.1.7 Steam

Steam is required at NAVSTA Everett for ships only. All other facilities have been designed with small stand alone package boilers. The distribution piping system delivers steam and condensate piping at 250 pounds per square inch gauge (psig). The total steam plant capacity is 95,000 pounds per hour (pph), and total capacity is 188,340,000 pounds per year (ppy).

5.16.1.8 Compressed Air

Compressed air used for industrial activities is generated at the NAVSTA compressor plant. The low pressure air (LPA) is distributed to the piers and the corrosion control facility through a supply main system, operated at approximately 150 psig. The total compressed air capacity is 4,000 standard cubic feet per minute (scfm), with a maximum peak demand of 4,200 scfm.

5.16.2 Environmental Consequences and Mitigation Measures

The greater Snohomish County utility grid assumes that NAVSTA operations at complete capacity would not impact regional utilities during peak demand. The incremental increased demand, when below maximum capacity, is a utilization of previously available capacity and is not considered an increased demand. Therefore, utilities which are accommodated by current systems would have a less than significant impact on the overall environment (personal communication, J. Martinson 1998).

Significance Criteria

The proposed action would result in a significant impact on utility systems if it would result in any one of the following:

- Use a substantial proportion of remaining system capacity;

- Reach or exceed the current capacity of the system; or
- Require development of new facilities and sources beyond those existing or currently planned.

The facilities associated with the proposed project would be designed, constructed, and operated to meet the requirements of Section 306 of Executive Order 12902 to minimize the life cycle cost of the facilities by utilizing energy efficiency, water conservation, or solar or other renewable energy techniques when they are cost effective. These considerations are contained in all contractual documents for the design, construction, and operation of Naval facilities.

5.16.2.1 *Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)*

Alternative Two would not require any new projects.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no dredging would occur, no impacts on these utilities would result.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because there are no facility improvements, there would be no impacts.

Operations

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

No additional impacts would result from this alternative.

5.16.2.2 *Removal of Existing CVN: Total of No CVNs (Alternative Three)*

Alternative Three would not require any new projects.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no dredging would occur, no impacts on these utilities would result.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no construction would take place, no impacts on these utilities would result.

Operations

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

The removal of the existing CVN would cause an overall decrease in demand on these utilities, resulting in beneficial impacts.

5.16.2.3 *Facility for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

The dredging and disposal of approximately 50,000 cy of sediment would place minimal additional demands on these utilities. Dredging activities would occur for an approximate one to two-month period, resulting in short term and less than significant impacts.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Construction would place minimal additional demands on these utilities. Construction would occur over approximately a one-month period, resulting in short-term and less than significant impacts.

Operations

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

All utilities currently meet the demands at NAVSTA Everett, and they would continue to do so with the operations of homeporting facilities and infrastructure needed for four additional AOEs because additional demands caused by four additional AOEs would be offset by a more than equivalent amount with the removal the existing CVN. Therefore, operational impacts on utilities would be less than significant.

Any additional demands caused by the displacement of two FFGs to the North Wharf would be the same as described in section 5.16.2.4.

5.16.2.4 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Dredging and disposal of approximately 155,000 cy of sediment would place minimal additional demands on these utilities. Dredging activities would occur for an approximate one to two-month period, resulting in short term and less than significant impacts.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Construction activities would place minimal additional demands on these utilities. Construction activity would take place over an approximate one-month period, resulting in short-term and less than significant impacts.

Operations

NATURAL GAS

CVN demands on natural gas would be minimal and accommodated for by the current system (DON 1988). Therefore, operational impacts on natural gas would be less than significant.

The displacement of two FFGs to the North Wharf would result in no additional demands on natural gas (DON 1988). Because no utility infrastructure currently exists at the North Wharf, utility connections to accommodate for natural gas would be required.

ELECTRICITY

A CVN requires maximum electrical capacity of 4,160 volts at 2880 amps, equivalent to 16,000 volts at 450 amps (DON 1994). Electrical upgrades are proposed as part of the project design, and there would be ample electricity for demands associated with homeporting facilities and infrastructure needed for one additional CVN. Therefore, impacts on electricity would be less than significant.

The displacement of two FFGs to the North Wharf would require maximum electrical capacity of 5,600 amps at 450 volts (DON 1988). Because no utility infrastructure currently exists at the North Wharf, utility connections to accommodate for this change would be required.

FUEL SUPPLY

CVN demands on the fuel supply would be minimal and accommodated for by the use of fuel barges at NAVSTA Everett (DON 1988). Therefore, operational impacts on the fuel supply would be less than significant.

The displacement of two FFGs to the North Wharf would result in minimal additional demands on the fuel supply (DON 1988). FFGs would be fueled at either Pier a or B from fuel tanks arriving from Manchester.

WATER SUPPLY

A CVN requires approximately 185,000 gallons of potable water per day at maximum demand (DON 1988). The current distribution system would meet the demands on the water supply. Therefore, impacts on the water supply would be less than significant.

The two FFGs that would be displaced to the North Wharf would require a maximum of 21,600 gallons of potable water per day (DON 1988). Because no utility infrastructure currently exists at the North Wharf, utility connections to accommodate for this change would be required.

SANITARY WASTEWATER

A CVN generates approximately 171,000 gpd of sewer at peak production (DON 1994). The NAVSTA Everett sewer pumping system has sufficient capacities to meet this demand. Therefore, impacts on sanitary wastewater would be less than significant.

The two FFGs that would be displaced to the North Wharf would generate 60,000 gallons of sanitary wastewater per day (DON 1994). Because no utility infrastructure currently exists at the North Wharf, utility connections to accommodate for this change would be required.

INDUSTRIAL WASTEWATER

A CVN does not generate appreciable amounts of industrial wastewater. Therefore, impacts on industrial wastewater disposal would be less than significant.

The two FFGs that would be displaced to the North Wharf would not generate appreciable amounts of industrial wastewater.

OILY WASTEWATER

A CVN generates a maximum of 440,000 gpy of oily wastewater (DON 1994). The existing oily wastewater treatment facilities would be sufficient in handling this demand. Therefore, operational impacts on oily wastewater would be less than significant.

The two FFGs that would be displaced to the North Wharf would generate a maximum of 220,000 gallons of oily wastewater per year (based on a CVN production of 440,000 gpy [DON 1994]).

Because no utility infrastructure currently exists at the North Wharf, utility connections to accommodate for this change would be required.

STORMWATER DISPOSAL

Operations of one additional CVN would not effect stormwater disposal. Therefore, no impacts on stormwater disposal would result.

NON-HAZARDOUS WASTE

Using the average solid waste generation rate of 3.7 pounds per person per day (DON 1994), non-hazardous waste generated by one additional CVN would increase by 11,903 pounds per day (3,217 personnel x 3.7 pounds per person). Existing landfill capacities would be sufficient in meeting this demand such that this increase would be adverse, but less than significant.

The displacement of two FFGs to the North Wharf would not generate any additional non-hazardous waste, and would have no impact on non-hazardous waste.

HAZARDOUS WASTE

Increases in hazardous waste for one additional CVN are not expected to exceed existing storage and treatment capacities at NAVSTA Everett. Therefore, operational impacts on hazardous waste would be less than significant.

The displacement of two FFGs to the North Wharf would not generate any additional hazardous waste, and would have no impact on hazardous waste.

STEAM

Maximum demands for steam would be 15,500 pph, plus during CVN maintenance, 2,200 mega Btu per year (DON 1988). Steam plant capacity would be sufficient meeting the demands of operations of one additional CVN. Therefore, impacts on steam would be less than significant.

The two FFGs that would be displaced to the North Wharf would not require any steam per year. Because no utility infrastructure currently exists at the North Wharf, utility connections to accommodate for this change would be required.

COMPRESSED AIR

One CVN would demand 2,400 scfm of compressed air (DON 1995a). The NAVSTA Everett compressor plant would adequately meet this demand. Therefore, operational impacts on compressed air would be less than significant.

The two FFGs that would be displaced to the North Wharf would require 2,000 scfm of compressed air per year (DON 1988). Because no utility infrastructure currently exists at the North Wharf, utility connections to accommodate for this change would be required.

5.16.2.5 *Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)*

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Dredging and disposal of approximately 50,000 cy of sediment would place minimal additional demands on these utilities. Dredging would occur over an approximate one to two-month period, resulting in short term. and less than significant impacts.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

The construction listed above would place minimal additional short-term demands on these utilities. Construction activities would occur over an approximate 1-month period, resulting in short-term and less than significant impacts.

Operations

Any additional demands on utilities resulting from the two FFGs that would be displaced to the North Wharf are discussed in section 5.16.2.4.

NATURAL GAS

Additional demands for the two AOEs on natural gas would be minimal and accommodated for by the current system (DON 1988, 1992). Therefore, operational impacts on natural gas would be less than significant.

ELECTRICITY

Two AOEs would require maximum electrical capacity of 6,400 amps at 450 volts (DON 1988). There would be ample electricity for demands associated with homeporting facilities and infrastructure needed for two additional AOEs. Therefore, operational impacts on electricity would be less than significant.

FUEL SUPPLY

Any increase in fuel demands would be minimal (DON 1988) and accommodated for by the fuel barges at NAVSTA Everett. Therefore, operational impacts on the fuel supply would be less than significant.

WATER SUPPLY

Two AOEs would require 36,000 gpd of potable water at peak demand (DON 1988). The current distribution system would meet demands on the water supply. Therefore, operational impacts on the water supply would be less than significant.

SANITARY WASTEWATER

Two AOEs would generate approximately 60,000 gpd of sanitary wastewater at peak production (DON 1994). The existing wastewater treatment plant has sufficient capacities to meet this demand. Therefore, impacts on sanitary wastewater would be less than significant.

INDUSTRIAL WASTEWATER

Two additional AOEs would not result in an increased production of industrial wastewater. Therefore, no operational impacts on industrial wastewater disposal would result.

OILY WASTEWATER

Two AOEs would generate an estimated 40 percent of the maximum industrial wastewater production of a CVN, or approximately 330,000 gpy (based on a size comparison of AOE and CVN personnel (DON 1994). The existing oily wastewater treatment facilities would be sufficient in handling the net increased demand of 110,000 gpy. Therefore, operational impacts on oily wastewater would be less than significant.

STORMWATER DISPOSAL

The addition of two AOEs would not generate any additional stormwater at NAVSTA Everett, and, as such, would not require additional stormwater improvements. Therefore, no impacts on stormwater disposal would result.

NON-HAZARDOUS WASTE

Using the average solid waste generation rate of 3.7 pounds per person per day (DON 1994), non-hazardous waste generated by two additional AOEs would increase by 4,400 ppd (an increase of 1,200 personnel x 3.7 pounds per person). Existing landfill capacities would be sufficient in meeting this demand such that this increase would be adverse, but less than significant.

HAZARDOUS WASTE

Two AOEs would generate approximately one-fifth of the amount of hazardous waste estimated for one additional CVN. This demand would not exceed existing storage and treatment capacities at Everett such that there would be ample storage and treatment capacity for hazardous wastes generated by two additional AOEs. Therefore, operational impacts on hazardous waste would be less than significant.

STEAM

Two AOEs would require 5,600 pph of steam (DON 1988). There would be sufficient steam production to meet the demands of operations of two additional AOEs. Therefore, impacts on steam would be less than significant.

COMPRESSED AIR

Two AOEs would require 3,000 scfm of compressed air (DON 1988). The NAVSTA Everett compressor plant would adequately meet this demand. Therefore, operational impacts on compressed air would be less than significant.

5.16.2.6 *No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)*

The No Action Alternative would not require any new projects.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no dredging would occur, no impacts on these utilities would result.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because no construction would take place, no impacts on these utilities would result.

Operations

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM; AND COMPRESSED AIR

Because there would be no change in existing operations, no impacts on utilities would result.

5.16.2.7 *Mitigation Measures*

Impacts on utilities would be less than significant for all alternatives. No mitigation measures are proposed.

5.17 ENVIRONMENTAL JUSTICE

This section addresses the proposed action's potential to generate disproportionately high and adverse human or environmental effects on minority and low-income populations, as required under Executive Order 12898. As part of this directive, the federal agency must promote enforcement of all health and environmental strategies in areas where minority and low-income populations reside. Identifying differential patterns of natural resource consumption and ensuring greater public participation is required. In addition, federal agencies may provide project information to non-English speaking populations whenever practicable and appropriate (DON 1995b). The EPA Office of Solid Waste and Emergency Response (OSWER) *Environmental Justice Task Force Draft Final Report* (EPA 1994) recommends identifying minority or low-income communities in the vicinity of the proposed action to determine whether they may be disproportionately or adversely affected by the proposed action, identifying any proposed action health and safety risks, and proposing ways to distribute project information and effects to affected communities. Guidance provided by the Council on Environmental Quality (CEQ 1997) has been considered in developing the environmental justice analysis presented below.

Also addressed in this section is the proposed action's potential to generate disproportionately high environmental health and safety risks to children, as required under Executive Order 13045. This executive order was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults Under this order, the federal agency must ensure that its policies, programs, activities, and standards address disproportionate environmental health or safety risks to children that result from dredging, described as those risks to health or safety that are attributable to product or substances that the child is likely to come into contact with or ingest. These impacts include increases in noise levels in public school areas, which could disrupt children while they are in a learning environment.

5.17.1 Affected Environment

Minority Populations

No predominantly minority or low-income populations live adjacent to NAVSTA Everett. Land uses in the direct vicinity of the NAVSTA Everett home port site are industrial (DON 1995b). The nearest residential communities are within the Northwest and Bayside neighborhoods. These neighborhoods are over 80 percent white, with few minority groups (DON 1995b).

Information on the presence of minority populations in the vicinity of the home port site is found in the 1990 Census. The census provides demographic information in terms of Snohomish County, Washington State, and the United States. Although the census data are over 7 years old, they are the only current statistical information available for population composition analysis. They are presented in Table 5.17-1.

Snohomish County figures are used to characterize populations in the vicinity of NAVSTA Everett that could be affected by the proposed action. The county is predominantly white, with small percentages of minorities (DON 1995b). Snohomish County's composite of minority populations is less than the State of Washington. These data indicate that residential areas adjacent to the project alternate site at NAVSTA Everett do not contain a disproportionate minority population.

Table 5.17-1. Snohomish County Minority Populations

	SNOHOMISH COUNTY		WASHINGTON STATE	
Ethnicity	*Number*	*Percent*	*Number*	*Percent*
White	434,536	93.3	4,308,937	88.5
Black	4,767	1.0	149,801	3.1
Native American	6,422	1.4	81,483	1.7
Asian/Pacific Islander	16,467	3.5	210,958	4.3
Other	3,450	0.7	115,513	2.4
Total	**465,642**	**100.0**	**4,866,692**	**100.0**

Source: DON 1995b.

The Tulalip Tribe, considered a minority under Section 1-101 of Executive Order 12898, has a reservation approximately 2 miles west of NAVSTA Everett, across Port Gardner. The Everett CVN homeporting berth and the PSDDA Port Gardner Disposal Site is within the Marine Fish Reporting Area 8 defined by the Washington Department of Fisheries (COE 1986). Portions of Area 8 and the Snohomish River basin are part of the Tulalip Tribe's "Usual and Accustomed fishing places" that were established under the Treaty of Point Elliot, and subsequently upheld by federal court actions (COE 1986; BIA 1979). "Usual and accustomed fishing places" were defined based on historical accounts of where Native American tribes customarily fished during and before the time treaties were established (BIA 1978). These areas are shown in figure 5.17-1. The treaty reserved the right of tribal members to take fish from these fishing places, and was upheld in the case *United States v. Washington* No. 9213, January 1, 1977. Tribes have been guaranteed the opportunity to take up to 50 percent of the harvestable anadromous (species that spawn, such as salmon and steelhead trout) fish that are associated with these fishing places, as necessary to provide the population with a moderate standard of living (COE 1986). The Tulalip Tribe also collects fish for ceremonial purposes (COE 1986). Native American tribe fishing activity is an integral component of their holistic world view, as well as providing subsistence.

The Puget Sound Dredge Disposal Analysis (PSDDA) program (see section 4.4 for additional discussion), developed jointly by the U.S. Army Corps of Engineers and Washington state natural resource agencies, resulted in a protocol for land use decision-making related to sediment disposal (COE 1988). Impacts to the social and natural environment resulting from projected sediment disposal were also considered, including those on Native American tribe fishing activity.

During the initial CVN homeporting action at NAVSTA Everett, the Tulalip (and Stillaguamish Tribe fishermen who have been granted "invitational fishing rights" in Area 8) had the following concerns: reduction in usual and accustomed fishing grounds yield during CVN facility construction; increased potential for fishing equipment damage and reduced fishing time due to CVN traffic; and potential degradation of salmon and Dungeness crab habitat and water quality due to CVN homeporting facility construction and operation (COE 1986).

Income

As previously identified, residential populations do not live adjacent to the home port site. The county economy is based primarily on higher paying manufacturing labor, resulting in a relatively high average resident income (DON 1995b). Based on an analysis in 1995, the number of low-income (earning below 50 percent of the median income) households was comparable to neighboring King and Kitsap Counties. As discussed in section 5.17.1, these income data indicate

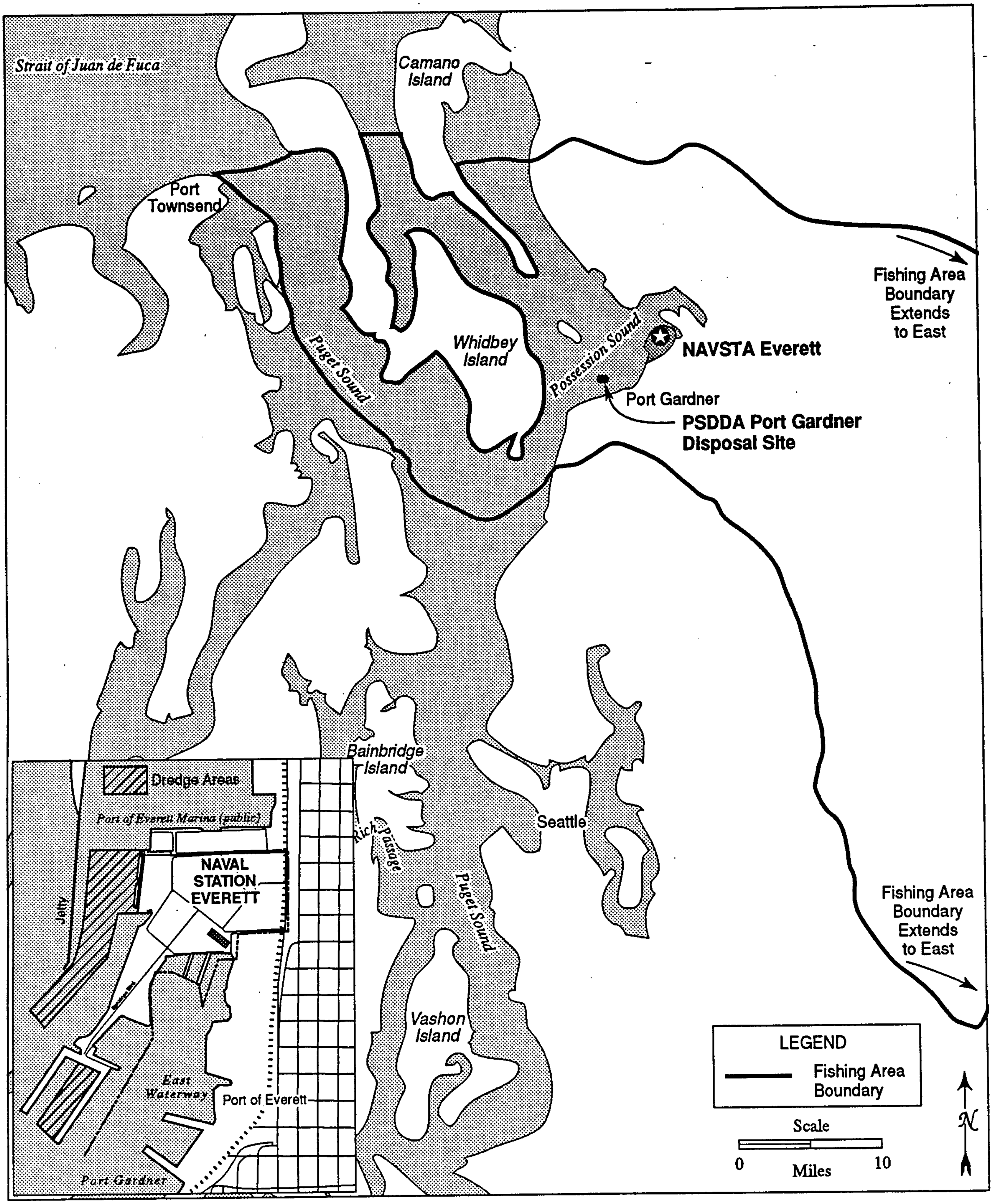

Figure 5.17-1. Tulalip Tribe Usual and Accustomed Fishing Areas

the relative lack of lower income populations in the regional vicinity of the NAVSTA Everett home port site.

Public Participation and Informational Access

The proposed action has been subject to public participation as required under NEPA. The EIS Notice of Intent (NOI) was circulated to neighborhood and community groups who have demonstrated an interest in or are considered likely to show interest in the environmental review process. A scoping meeting was held at the Snohomish County Administration/Courthouse Building in Everett on 4 February 1997 (see section 1.6) to solicit input on the EIS scope of investigation.

Local Public Schools and Day Care Facilities

There are a total of 23 public schools in the Everett School District that could be impacted by increased noise levels, located at varying distances from the project site. In addition, child care facilities are located within .25 miles of NAVSTA Everett.

5.17.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The proposed action would result in a significant impact on environmental justice if it would result in any one of the following:

- Degrading the health and safety of low-income or minority communities or children disproportionately when compared to the regional population;
- Causing a disproportionately high and adverse impact on members of low-income or minority communities adjacent to the proposed action area;
- Failing to provide for or encourage effective participation of members of low-income or minority communities adjacent to the proposed action area in the associated environmental review and decision-making process;
- Relocating public schools within a 65 dBA CNEL contour that was not previously located in such an area; or
- Substantially increasing project air emissions of carbon monoxide (CO), toxic pollutants, or odors to sensitive receptors (such as day care centers and hospitals) in proximity to the project site.

Public participation in this environmental impact analysis is described in section 5.17.1.

5.17.2.1 Facilities for No Additional CVN: No Change — Capacity for Total of One CVN (Alternative Two)

Alternative Two would not require any new projects.

Dredging

Because no dredging would take place, there would be no impacts to environmental justice.

Facility Improvements

Because no new construction would take place, there would be no environmental justice impacts.

Operations

There would be no environmental justice impacts.

5.17.2.2 *Removal of Existing CVN: Total of No CVNs (Alternative Three)*

Alternative Three would not require any new improvements.

Dredging

Because no dredging would take place, there would be no impacts to environmental justice.

Facility Improvements

Because no construction would take place, there would be no impacts to environmental justice.

Operations

The removal of one CVN would lead to a less intensive use of the waters around Everett and within the Tulalip Tribe's "Usual and Accustomed fishing places." Therefore, these operational impacts on environmental justice would be beneficial.

The removal of one CVN would not cause any significant changes in the noise environment (see section 5.11.2.2) or air quality. As such, the noise environment in public schools and air quality at local day care facilities would not be impacted, resulting in no impacts to environmental justice.

5.17.2.3 *Facilities for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs (Alternative One)*

Alternative One consists of a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Disposal of 50,000 cubic yards of dredged sediments would occur at the PSDDA Port Gardner open-water disposal site within the Tulalip Tribe's "Usual and Accustomed fishing places." As shown in Figure 5.17-1, the proposed dredge footprint is a very small proportion of the tribe's total fishing area. This impact would be short term, and, would not cause a disproportionately high and adverse impact on tribal members. Dredged sediment disposal impacts at the PSDDA Port Gardner Disposal Site within the Tulalip Tribe's "Usual and Accustomed fishing places" have been previously addressed during development of the PSDDA program.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 5.11.2.3). In addition, dredging activity would be short term and not located near any schools or day care facilities. Schools and day care facilities would not experience additional hazardous air emissions from dredging equipment. Therefore, impacts on environmental justice would be less than significant.

Facility Improvements

The construction of a mooring dolphin would be extremely short-term and localized to the area adjacent to Pier A. No disruption of Native American fishing ground yields and degradation of salmon and Dungeness crab habitat would occur. All other upland improvement construction would not disrupt fishing grounds yields and degradation of salmon and Dungeness crab.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 5.11.2.3). In addition, construction activity would be short term and not located near any schools or day care facilities. Schools and day care facilities would not experience additional hazardous air emissions from construction activities. Therefore, impacts on environmental justice would be less than significant.

Operations

The removal of one CVN and addition of four AOEs would result in an increase in the use of the waters around NAVSTA Everett and vessel activity within the Tulalip Tribe's "Usual and Accustomed fishing places." This increase in use of the waters would only result during ship transit to and from their berths. This impact would be short term, and, would not cause a disproportionately high and adverse impact on tribal members.

The removal of the existing CVN and addition of four AOEs would increase emissions, mainly due to commuter vehicle traffic and AOE vessel power plants. Emissions from vehicular traffic would be adequately dispersed prior to impacting sensitive receptors in proximity to the facility, such as children in day care facilities, and would not represent an adverse impact. Emissions from AOE boilers, mainly during start-up mode when the units are cold, could at times produce a nuisance to sensitive receptors downwind from these sources. However, it is expected that these events would be of a short enough duration that they would not produce adverse impacts to these locations. Consequently, air quality impacts on day care facilities in proximity to NAVSTA would be less than significant.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 5.11.2.3). Therefore, impacts on environmental justice would be less than significant.

5.17.2.4 Facilities for One Additional CVN: Capacity for Total of Two CVNs (Alternative Four)

Alternative Four consists of constructing a parking structure; electrical conversion to 4,160-V; expansion of a hazardous waste facility; construction of a second transit shed; expansion of a steam plant; addition of two oil waste tanks; dredging at Pier A; and dredging, utilities, and structural repairs at North Wharf.

Dredging

Disposal of dredged sediments would occur at the PSDDA Port Gardner open-water disposal site, within the Tulalip Tribe's "Usual and Accustomed fishing places." As shown in Figure 5.17-1, the proposed dredge footprint is a very small proportion of the tribe's total fishing area. This impact would be short term, and, would not cause a disproportionately high and adverse impact on tribal members. Dredged sediment disposal impacts at the PSDDA Port Gardner Disposal Site within the Tulalip Tribe's "Usual and Accustomed fishing places" have been previously addressed during development of the PSDDA program.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 5.11.2.4). In addition, dredging activity would be short-term and not located near any schools or day care facilities. Schools and day care facilities would not experience additional hazardous air emissions from dredging equipment. Therefore, impacts on environmental justice would be less than significant.

Facility Improvements

Any disruption of fishing ground yields and degradation of salmon and Dungeness crab habitat during construction of homeporting facilities and infrastructure needed for one additional CVN would be minimal and short term.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 5.11.2.4). In addition, construction activity would be short-term and not located near any schools or day care facilities. Schools and day care facilities would not experience additional hazardous air emissions from construction activity. Therefore, impacts on environmental justice would be less than significant.

Operations

The addition of one CVN would result in increased use of the waters around NAVSTA Everett and vessel activity within the Tulalip Tribe's "Usual and Accustomed fishing places." This increase in use of the waters would only result during ship transit to and from their berths. This impact would be short term, and, would not cause a disproportionately high and adverse impact on tribal members.

The addition of one CVN would increase emissions, mainly due to commuter vehicle traffic. Emissions from vehicular traffic would be adequately dispersed prior to impacting sensitive receptors in proximity to the facility, such as day care centers, and would not represent an adverse impact. Consequently, air quality impacts to children, including those in day care facilities in proximity to NAVSTA, would be less than significant.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 5.11.2.4). Therefore, impacts on environmental justice would be less than significant.

5.17.2.5 Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN (Alternative Five)

Alternative Five consists of constructing a mooring dolphin for AOEs; electrical upgrade for AOEs; and dredging, hazardous waste facility expansion, utilities, and structural repairs at North Wharf.

Dredging

Disposal of 50,000 cubic yards of dredged sediments would occur at the PSDDA Port Gardner open-water disposal site, which is within the Tulalip Tribe's "Usual and Accustomed fishing places." As shown in Figure 5.17-1, proposed dredge footprint is a very small proportion of the tribe's total fishing area. This impact would be short term, and, would not cause a disproportionately high and adverse impact on tribal members. Dredged sediment disposal impacts at the PSDDA Port Gardner Disposal Site within the Tulalip Tribe's "Usual and Accustomed fishing places" have been previously addressed during development of the PSDDA program.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 5.11.2.5). In addition, dredging activity would be short term and not located near any schools or day care facilities. Schools and day care facilities would not experience additional hazardous air emissions from dredging equipment. Therefore, impacts on environmental justice would be less than significant.

Facility Improvements

Any disruption of fishing ground yields and degradation of salmon and Dungeness crab habitat during construction of homeporting facilities and infrastructure needed for the addition of two AOEs would be minimal and short term.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 5.11.2.5). In addition, construction activity would be short term and not located near any schools or day care facilities. Schools and day care facilities would not experience additional hazardous air emissions from construction activities. Therefore, impacts on environmental justice would be less than significant.

Operations

The addition of two AOEs would result in increased use of the waters around NAVSTA Everett and vessel activity within the Tulalip Tribe's "Usual and Accustomed fishing places." This impact would be short term, and, would not cause a disproportionately high and adverse impact on tribal members.

The addition of two AOEs would increase emissions, mainly due to commuter vehicle traffic and AOE vessel power plants. Emissions from vehicular traffic would be adequately dispersed prior to impacting sensitive receptors in proximity to the facility, such as day care centers, and would not represent an adverse impact. Emissions from AOE boilers, mainly during start-up mode when the units are cold, could at times produce a nuisance to sensitive receptors downwind from these sources. However, it is expected that these events would be of a short enough duration that they would not produce adverse impacts at these locations. Consequently, air quality impacts to day care facilities in proximity to NAVSTA would be less than significant.

Public schools and day care facilities are all farther from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 5.11.2.5). Therefore, impacts on environmental justice would be less than significant.

5.17.2.6 No Additional CVN: No Change — Total of One CVN (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Dredging

Because no dredging would take place, there would be no impacts to environmental justice.

Facility Improvements

Because no construction would take place, there would be no impacts to environmental justice.

Operations

Because there would be no operational changes, there would be no impacts to environmental justice.

5.17.2.7 Mitigation Measures

All impacts on environmental justice would be less than significant. No mitigation measures are proposed.

5.18 CUMULATIVE IMPACTS

In this section, the proposed action is analyzed in relation to the other projects in the area. Cumulative impacts on environmental resources result from the incremental effects of the project when added to other past, present and reasonably foreseeable future projects in the area. Cumulative impacts can result from minor but collectively significant actions undertaken over a period of time. In accordance with NEPA, a discussion of past projects, those under construction, proposed projects, or projects that are reasonably anticipated to be built in the near future are included. This section addresses the cumulative impacts associated with the action that has the greatest potential for environmental impacts in combination with other military and civilian projects in the area. In order to ensure a comprehensive impact analysis, this section considers the region of influence for each environmental resource area for which cumulative impacts are evaluated, and the timeframe during which all reasonably foreseeable projects would occur. The combined impact of the proposed action and reasonably foreseeable projects is discussed. When the proposed action's incremental contribution to the cumulative impact is significant, mitigation is proposed to reduce this effect. Guidance provided by the Council on Environmental Quality (CEQ 1997) has been taken into account in developing the cumulative analysis presented below.

Reasonably Foreseeable Projects

A total of 10 approved, planned, and reasonably foreseeable projects have been included in this analysis. These projects are identified on Figure 5.18-1, and are summarized as follows:

1. NAVSTA Everett Bachelor Enlisted Quarters

Construction of new Bachelor Enlisted Quarters (BEQ) at NAVSTA Everett is underway and is expected to be complete in early 1999. The new BEQ will help relieve existing housing constraints at NAVSTA Everett.

2. NAVSTA Everett Medical Center

Construction of a Medical Facility at NAVSTA Everett is scheduled to begin in 1999 and will require 18 months to complete. This facility would provide medical treatment for military personnel and their dependents.

3. NAVSTA Everett Family Welcome Center

Construction of the Family Welcome Center at NAVSTA Everett was completed in 1998.

4. NAVSTA Everett Shore Intermediate Maintenance Activity

Construction of the Shore Intermediate Maintenance Activity (SIMA) at NAVSTA Everett is not currently programmed, but it has been projected that construction could begin in 2001 and be completed in 2003. Construction would occur mostly inside an existing facility and would not require any pile driving.

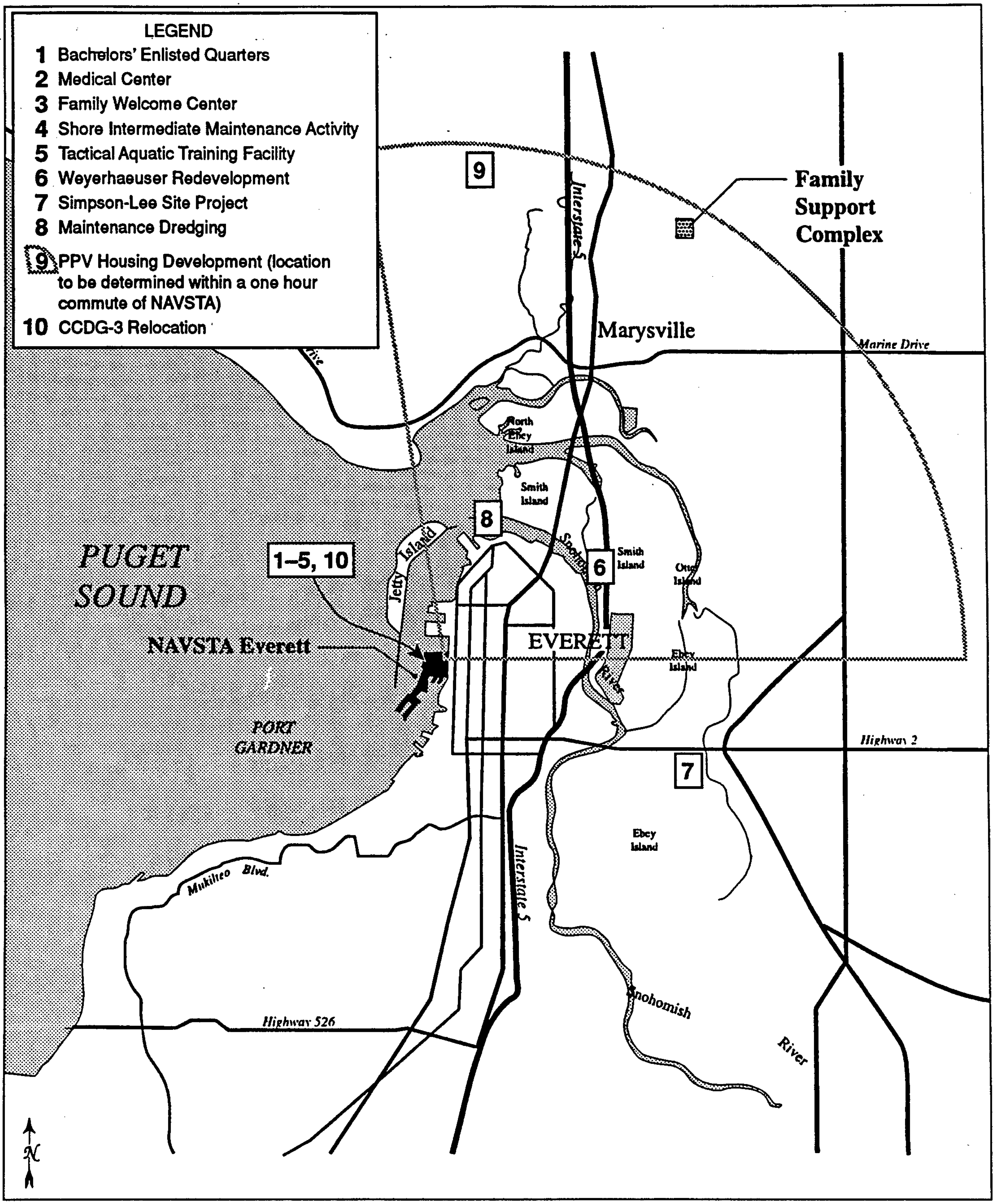

Figure 5.18-1. Cumulative Projects in NAVSTA Everett Area

5. NAVSTA Everett Tactical Aquatic Training Facility

Construction of a Tactical Aquatic Training Facility at NAVSTA Everett has been proposed but is not currently programmed, and no projected construction schedule is available. This facility would provide physical fitness training for military personnel.

6. Weyerhaeuser Redevelopment

The Port of Everett is in the process of purchasing a 120-acre site located on the Snohomish River, approximately 3 miles northeast of NAVSTA Everett. The site would be developed for warehouses and waterfront uses. Site cleanup has already begun, and redevelopment plans are currently under review by the City of Everett.

7. Simpson-Lee Site Project

A 1.5-mile stretch of riverfront is planned for redevelopment at a historic mill site that was acquired by the city in 1993. A feasibility study has been prepared, although no formal plans outlining the specific land uses have been approved. No timeframe for the project construction is established.

8. Maintenance Dredging in Snohomish River

Maintenance dredging of approximately 400,000 cy per year takes place annually in one of two settling basins located at the mouth of the Snohomish River. Disposal and reuse of the dredged material occurs in a variety of locations. The most recent dredged material was used for salt marsh establishment on Jetty Island and at a Superfund remediation site. It has not been determined where future dredged material will be disposed.

9. Public Private Venture (PPV) Housing Development (Everett II)

The Navy proposes to contribute funding toward developing approximately 350 residential rental units. The Family Housing Improvement Fund will execute this public-private venture development, called the Everett II project, within a one-hour commute of NAVSTA Everett. A private developer will use these funds to purchase, develop, and maintain the residential project. Units will be rented to military families at below market cost. The Everett II project private partner has not been selected; therefore, a site location and construction date has not yet been established

10. Relocation of Cruiser Destroyer Group 3 (CCDG-3)

The Navy plans to relocate the CCDG-3 Group to NAVSTA Everett sometime between November 1999 and February 2000. This group consists of 66 Navy personnel, including 24 officers and 33 enlisted, their 39 spouses, and 74 children. Personnel and their families are expected to reside as far north as Edmonds and as far south as Marysville.

CUMULATIVE IMPACTS ON ENVIRONMENTAL RESOURCES

5.18.1 Topography, Geology, and Soils

The region of influence for topography, geology, and soils includes the greater Port of Everett and Snohomish river mouth region, due to the interrelated nature of the geology and soils of this region. The timeframe for projects considered in this analysis includes past, present, and reasonably foreseeable projects. Past projects are included in the cumulative impact analysis since existing structures would be exposed to the same earthquake-related hazards as those affecting reasonably foreseeable project construction. Significance criteria described in section 5.1.2 are applicable to the cumulative analysis.

Analysis of the distribution of past, present, and reasonably foreseeable projects suggests that many of the projects are clustered at NAVSTA Everett (Nos. 1-5 and 10), with other projects to the north along the Snohomish River (Nos. 6 and 8) and north of Marysville (No. 9). A significant seismic event, however, would have the potential to affect all of the project sites concurrently.

The proposed action that would result in the addition of one CVN (Alternative Four) would result in a small incremental increase of people and property exposed to earthquake-related hazards. Reasonably foreseeable projects in the region of influence involving new structural development (e.g., BEQ Construction, Medical Center Construction, Family Welcome Center, Tactical Aquatic Training Facility, Weyerhaeuser Redevelopment, Simpson-Lee Project, and Residential Development), would also be exposed to earthquake-related hazards such as ground acceleration, ground shaking, liquefaction, and settlement. Most of these reasonably foreseeable projects are also located adjacent to Puget Sound where hydraulic fill soils with a high potential for liquefaction are prevalent.

Regardless of the geographical separation and spatial distribution, potential seismic impacts associated with the proposed action, in combination with potential seismic impacts associated with past and reasonably foreseeable projects, may result in increased cumulative impacts with respect to overall loss of use of reasonably foreseeable project facilities in the Port of Everett and Snohomish rivermouth area. However, potentially significant cumulative impacts would be reduced to a level of insignificance by components of the project design, including incorporation of building code regulations and flood control measures.

The addition of one CVN would also result in a small incremental increase of people and property exposed to flooding hazards in the event of 100-year storms. Those projects adjacent to the shoreline could also be subject to tsunamis and seiches, although these hazards are very rare and would likely not occur during the projects' operational lifespan. If not constructed properly, structures associated with the reasonably foreseeable projects could cause a substantial loss of use or expose the public to substantial risk of injury. Reasonably foreseeable projects potentially affected by coastal flooding include Nos. 1 through 6 and No. 10, in the vicinity of NAVSTA Everett and the Snohomish River. Potential flooding impacts associated with the proposed action, in combination with potential flooding impacts associated with past and reasonably foreseeable projects, may result in increased cumulative impacts with respect to overall loss of use of facilities along the waterfront and river areas. However, potentially significant cumulative impacts would be reduced to a level of insignificance by components of the project design, including incorporation of building code regulations and flood control measures.

Reasonably foreseeable project construction would be completed primarily within previously developed areas where the topography is generally flat. However, construction could result in excessive soil erosion and resultant water quality impacts if not completed properly. Because many of these construction projects are clustered and could potentially occur simultaneously, potential erosional impacts associated with the proposed action, in combination with potential erosional impacts associated with past and reasonably foreseeable projects, may result in increased cumulative impacts with respect to water quality impacts (surface water and marine waters) in the NAVSTA Everett and Snohomish River area. However, potentially significant cumulative impacts would be reduced to a level of insignificance by components of the project design, including soil compaction and incorporation of standard erosion control measures.

The only reasonably foreseeable projects that involve dredging would be maintenance dredging in Snohomish River. This project would create an incremental increase in bathymetry changes in the Port of Everett and the Snohomish rivermouth area. Dredging would temporarily disrupt submarine depositional processes, however, depositional equilibrium would be reestablished within a short period of time and no regional, long-term depositional disruptions would occur. Dredging would occur within previously dredged areas and associated impacts would generally be confined to the immediate vicinity of the dredged area. Impacts would be less than significant. Because this project is geographically separated from the proposed action and potential impacts are confined to the immediate vicinity of the dredged area, impacts associated with dredging at the proposed action, in combination with potential dredging impacts associated with past and reasonably foreseeable projects, would not result in increased cumulative impacts. No mitigation measures are required.

5.18.2 Terrestrial Hydrology and Water Quality

The region of influence for terrestrial hydrology and water quality includes the Port of Everett and Snohomish rivermouth area, which defines the area in which local water sources are related. Projects occurring in this area that locally impact water quality also have the potential to impact water quality of the region as a whole. Projects considered in this analysis are those occurring from 1998 to 2005, as well as past projects which have influenced the water quality of the region. Due to the historic industrial activity in the region since 1900, waters have historically been subject to contaminants from runoff and leaching into groundwater. Significance criteria described in section 5.2.2 is applicable to this cumulative analysis.

Analysis of the distribution of past, present, and reasonably foreseeable projects suggests that many of the projects are clustered at NAVSTA Everett (Nos. 1, 2, 3, 4, 5 and 10). With the exception of the relocation of CDDG-3 Group (No. 10), which is expected to occur in 1999 to 2000, and the proposed action, which is expected to occur after 2004, these naval projects have either been completed or have no timeframe for construction. Due to the proximity of these projects, in combination with the uncertainty for future construction, these projects would potentially result in an increase in cumulative impacts. The remaining civilian reasonably foreseeable projects include construction that may occur simultaneously, however, these projects are geographically distant, thus reducing the likelihood for an increase in cumulative impacts.

The proposed action that would result in the addition of one CVN (Alternative Four) would not significantly impact surface water or groundwater. Standard erosion control measures and pollution control measures would be incorporated to reduce construction impacts on water quality to below a level of significance, as outlined in section 5.2.2. Construction and operations of several projects located within the region of influence (e.g., BEQ Construction, Medical Center Construction, Family Welcome Center, Tactical Aquatic Training Facility, Weyerhaeuser Redevelopment, Simpson-Lee Project, and Residential Development) could produce discharges which would flow into surface or groundwater sources. If not designed properly, these projects could result in stormwater quality degradation, contaminating discharges, release of toxic substances, and release of hydrocarbons or related contaminants.

Because most of the naval projects are clustered geographically, potential water quality impacts associated with the proposed action, in combination with potential water quality impacts associated with past and reasonably foreseeable projects, may result in increased cumulative water quality impacts in the NAVSTA Everett area. However, potentially significant cumulative impacts would be reduced to a level of insignificance by components of the project design. All of these reasonably foreseeable projects would be required to comply with applicable federal, state, and local regulations such as a National Pollutant Discharge Elimination System (NPDES) permit, mandating management plans to regulate soil and groundwater contamination, and hazardous materials releases. Soil and groundwater remediation related to the homeporting of one CVN, in conjunction with any similar remediation occurring during other related project development in the vicinity, would be a beneficial cumulative impact.

5.18.3 Marine Water Quality

The region of influence for potential cumulative impacts to marine water quality includes the waters at NAVSTA Everett affected by the project and other proposed development projects in the area; the NAVSTA shoreline in general; and adjacent waters of Port Gardner and the Snohomish River mouth. The time period considered includes historical and present-day conditions, as well as future projects. The significance criteria for cumulative impacts to water quality are the same as those described in section 5.3.2.

The principal impacts to water quality from the addition of one CVN (Alternative Four) would be increased suspended solids concentrations, which leads to other water quality changes such as reduced light transmittance; increased oxygen demand leading to reduced DO; increased nutrients levels; and increased levels of toxic chemicals associated with suspended particulates. Project actions would be implemented in conformance with permit conditions intended to protect water quality, and impacts would be less than significant.

Reasonably foreseeable projects that could have water quality impacts may occur concurrently with the proposed homeporting project include the Shore Intermediate Maintenance Facility, the Simpson-Lee Site Project, maintenance dredging at the mouth of the Snohomish River. The Shore Intermediate Maintenance Facility and Simpson-Lee Site Project involve development adjacent to the water, and could produce discharges that would impact marine water quality. Water quality impacts from ship relocation would be similar to the operational impacts of the proposed action. In addition, maintenance dredging near the mouth of the Snohomish River would have a temporary impact on marine water quality similar to the dredging impacts of the proposed action. If dredged material from NAVSTA dredging and Snohomish River maintenance dredging were disposed of at the same time and same site (Port Gardner PSDDA site or a wetlands enhancement site in the Snohomish estuary), there could be temporary cumulative impacts to water quality at the disposal site.

Reasonably foreseeable projects that involve land-based demolition or construction adjacent to the bay, including the Weyerhaeuser Redevelopment and Simpson-Lee Site Project, would result in disturbances that could result in increased transport of contaminants by stormwater runoff that, if not regulated, could significantly impact marine water quality. The proposed action's wastewater runoff would be regulated under a NPDES permit. Compliance with permit conditions, as well as proposed mitigation measures, would reduce the incremental impact on marine water quality such that there would not be a cumulatively significant impact.

Water quality in the vicinity of NAVSTA Everett is also influenced by the Snohomish River west of the site, and by properties of the East Waterway. Historically, there were a number of industrial discharges into the East Waterway. However, these have been reduced or eliminated under the NPDES program. The discharges that remain, with the exception of the combined sewer outflows (CSO), receive treatment prior to release.

Although the impacts associated with individual projects are expected to be less than significant, cumulative changes to marine water quality from historical inputs combined with other past, present, and future projects may constitute impaired water quality. Cumulative changes could be considered significant if they cause incremental increases in certain contaminants or in areas that are already affected by historical waste discharges. As mentioned, the proposed action is expected to result in impacts to marine water quality that are less than significant. However, project-specific activities, in conjunction with those of other reasonably foreseeable projects, would contribute to the total watershed-based inputs of contaminants into Puget Sound. Although unlikely, it is not possible to determine quantitatively whether these projects will result in cumulative, bay-wide or site-specific exceedances of water quality objectives. The relative contribution of the project-specific activities and the other reasonably foreseeable projects to marine water quality impacts are expected to be small, localized, and temporary. No mitigation measures are required.

5.18.4 Sediment Quality

The region of influence of potential cumulative impacts to sediment quality includes marine sediment at NAVSTA Everett affected by the proposed action and other proposed development projects in the area are those of the proposed dredging, disposal, and construction sites; the NAVSTA shoreline in general; and adjacent areas of Port Gardner and the Snohomish River mouth. The time period considered includes historical and present-day conditions, representing improvements in water quality in recent years, as well as future projects occurring between 1998 and 2005. Water and sediment quality in the vicinity of NAVSTA Everett have been influenced by historical industrial discharges into the East Waterway. However, these have been reduced or eliminated under the NPDES program. With the exception of the CSOs, remaining discharges receive treatment prior to release. The significance criteria used to evaluate cumulative impacts to sediment quality are the same as those used to evaluate project-specific impacts (section 5.4.2).

Potential impacts to sediment quality associated with the addition of one CVN (Alternative Four) include minor changes in physical and conventional characteristics of surface sediments of the dredging sites, temporary reductions in dissolved oxygen in surface sediments, and degraded sediment quality should fuel or other hazardous substances discharged from ships at NAVSTA Everett. However, as described in section 5.4.2.4, these impacts are likely to be significant. In addition, dredging and construction activities could result in slightly lower concentrations of toxic chemicals in the surface sediments.

Reasonably foreseeable projects that could have water quality impacts include the Shore Intermediate Maintenance Activity (SIMA), the Simpson-Lee Site Project, and maintenance dredging at the mouth of the Snohomish River. The SIMA and Simpson-Lee Site Project involve development adjacent to the water, and could produce discharges that would impact marine sediment quality. In addition, maintenance dredging near the mouth of the Snohomish River would have a temporary impact on sediment quality similar to the dredging impacts of the proposed action. The impacts of disposal of dredged material from multiple projects at the Port Gardner PSDDA site would be regulated by site management practices, and have been addressed in the EIS for PSDDA site designation (COE 1988). If dredged material from NAVSTA Everett and Snohomish River maintenance dredging were re-used beneficially at adjacent sites, such as wetland enhancement sites in the Snohomish estuary, there could be cumulative impacts to sediment quality. These impacts would be limited by the fact that only dredged material of suitable quality would be used in this manner.

Cumulative development projects all adjacent to Puget Sound, including all of the on-base Naval projects, the Weyerhaeuser Redevelopment, and Simpson-Lee Site Project may involve land-based demolition or construction could result in increased contaminants of stormwater runoff, that, if not regulated, could significantly impact sediment quality. All of these reasonably foreseeable projects, however, would be required to comply with the applicable federal, state, and local regulations such as a NPDES permit, mandating management plans to regulate soil and groundwater contamination, and hazardous materials releases. Compliance with permit conditions, as well as proposed mitigation measures, would reduce the incremental impact on marine water quality such that there would not be a cumulatively significant impact.

Similar to those discussed for marine water quality (section 5.18.3), cumulative impacts to sediment quality from the combination of the proposed action with other planned projects are expected to be less than significant. Although the impacts associated with individual projects would be less than significant, cumulative changes to sediment quality from historical inputs combined with other past, present, and future projects may constitute a significant impact to beneficial uses in specific water segments of the bay. Because sediments are the sink for many contaminants in aquatic systems, sediment quality impacts tend to be less temporary than water quality impacts. Therefore, it is not necessary for two or more projects to coincide in order to have cumulative impacts on sediment quality. Still, the homeporting project would not have significant cumulative sediment impacts with other projects. The sediment impacts of each of the projects considered would be so small that, even when taken together, the cumulative impacts would not result in substantive degradation of sediments or adverse effects on biota. The proposed action would have a less than significant impact on sediment quality, and therefore a less than significant incremental contribution to cumulative impacts. No mitigation is required.

5.18.5 Marine Biology

The marine biological region of influence includes the proposed dredging, disposal, and construction sites; the NAVSTA shoreline in general; and adjacent areas of Port Gardner and the Snohomish River mouth. These areas include plankton, algae, benthic and epibenthic invertebrates, fish, bird, and marine mammal communities. The project site is also part of the geographical range of migratory fish, and foraging range of marine birds and mammals that move through the area. Historical, present, and future impacts represented by the foreseeable projects are used to address potential cumulative impacts. Water quality in the vicinity of NAVSTA Everett have been influenced by historical industrial discharges into the East Waterway, and although these have been reduced or eliminated under the NPDES program, they have historically produced an adverse effect on the marine biological resources in the area. The significance criteria for cumulative impacts to the biological communities are the same as those described in section 5.5.2.

Potential impacts of the proposed action requiring dredging would be greatest under the addition of one CVN (Alternative Four). They include increased suspended solids resulting in clogged gills of fish and zooplankton; reduced productivity in algae, eelgrass, and phytoplankton; and reduced visibility for foraging. In areas that are dredged, the benthic community will be lost, although recolonization by benthic invertebrates tends to be relatively rapid. There is also a potential for exposure to contaminated particulates suspended in the water column during dredging or construction activities. As discussed in section 5.5.2, with the exception of impacts to salmon and Dungeness crabs, the biological impacts of any of the proposed changes in ship homeporting would be localized and temporary. Scheduling dredging and construction during non-peak outmigration months would avoid impacts to salmon and other fish. Dungeness crabs are more susceptible to dredging effects during the stage in which they molt into juveniles. This occurs in the late spring, which coincides with the salmon outmigration period. With implementation of mitigation measures, the proposed action would result in less than significant impacts.

Other dredging or construction projects at NAVSTA Everett or in nearby waters that could impact the marine biological communities include the Shore Intermediate Maintenance Facility, Weyerhauser Redevelopment, Simpson-Lee Site project, and maintenance dredging in the Snohomish river as a result of in-water work. The types of biological impacts resulting from construction and dredging activities associated with the reasonably foreseeable projects would be similar to those described in section 5.5.2. The impacts for the majority of the biological communities would be temporary and localized. The Shore Intermediate Maintenance Facility and Snohomish River maintenance dredging could coincide with construction/dredging at NAVSTA Everett. It is unlikely that the in-water construction for the other projects would coincide with that for the homeporting project. There could be cumulative impacts on fish should dredging and construction occur during the outmigration period. Impacts would be less than significant, provided that these development projects include specific mitigation required by federal law to protect any special status species occurring in the area. In addition, all of the reasonably foreseeable projects that involve land-based demolition or construction, and they would result in disturbances that could indirectly impact the biological communities through stormwater runoff impacts to sediment and water quality. However, direct discharges of reasonably foreseeable project wastewaters would be regulated under a NPDES permit, and non-point-source runoff would be regulated under a general stormwater permit. The reasonably foreseeable development project impacts, when mitigated, would not incrementally reduce habitat areas, potentially affect survival, or affect reproductive success. As a result of compliance with project specific mitigation measures, the cumulative impacts on marine biological resources would be less than significant. In addition, the proposed action's incremental contribution to these impacts would be less than significant. No mitigation is required.

5.18.6 Terrestrial Biology

The region of influence for terrestrial biological resources generally includes NAVSTA proper, plus the range of mobile species, primarily birds, that include NAVSTA in their range. The time period considered for project and cumulative impacts includes the past several decades when much of the habitat loss occurred, as well as present and future projects described at the beginning of this section. The proposed action would have little effect on the biological resources that do occur at NAVSTA. Due to the extensive development of the site, NAVSTA has little terrestrial biological habitat and supports little wildlife. The project would cause negligible to no disturbance of feeding or nesting by the bald eagle and marbled murrelet (threatened species). Therefore, the terrestrial biological impacts of the proposed action would be insignificant.

Most of the reasonably foreseeable projects would have similarly small impacts on terrestrial biological resources; they would result in no loss or significant degradation of terrestrial habitat. All of the Navy projects would occur on-base, in areas that have been previously developed, resulting in no new loss of habitat. The Weyerhaeuser Redevelopment and Simpson-Lee Site Project also involve development of previously disturbed areas, resulting in no new loss of habitat. Maintenance dredging of the Snohomish River channel would have a minor potential to disturb feeding by bald eagles or marbled murrelets; resulting impacts on these species would be not significant. Finally, the 400-unit public-private residential development would result in the loss of biological habitat, possibly with significant impacts on biological resources. However, because no other reasonably foreseeable projects would have potentially significant impacts on terrestrial biology, cumulative impacts resulting from these actions would remain less than significant. In addition, the proposed action's incremental contribution to cumulative impacts on terrestrial biology would be insignificant. No mitigation is required.

5.18.7 Land Use

The region of influence for land use impacts includes the surrounding land areas in the immediate vicinities of the proposed NAVSTA Everett CVN and AOE homeporting sites and other on-base improvements. The timeframe of the impacts would be the post-construction period through the lifetime of the constructed facilities after the new land uses have been established. The cumulative impact significance thresholds are the same as those presented in section 5.7.2. None of the proposed actions at NAVSTA Everett would create any significant adverse land use impacts or incompatibilities with existing uses or inconsistencies with the NAVSTA Everett Master Plan or local jurisdiction land use plans.

The nearest reasonably foreseeable projects to the proposed CVN home port site are the seven on-base projects and the off-base Weyerhaeuser redevelopment project. All of these projects would be compatible with existing uses and consistent with the NAVSTA Everett Master Plan and with local jurisdiction land use plans. Thus, the reasonably foreseeable projects and the proposed CVN homeporting project would be compatible with each other and would not result in any adverse cumulative land use impact. Because cumulative land use impacts would be less than significant, no mitigation is provided.

5.18.8 Socioeconomics

The region of influence throughout which these impacts could extend comprises King, Kitsap, and Pierce Counties. Although the socioeconomics of this area is a function of growth throughout the

20th century, the historic timeframe for the cumulative analysis is reasonably defined in the last 5 years, as economic trends have substantially changed since then.

The most adverse socioeconomic impacts among the proposed action alternatives are associated with Alternative Four (the addition of one CVN). The region of influence throughout which the impacts could extend comprises Snohomish County and the timeframe considered includes present condition and extends into the future beyond 2005, when, under the proposed action, a CVN would be homeported in Everett. Significance criteria used to evaluate potential cumulative impacts are the same as those used to address project-specific impacts (section 5.7.2).

Specific impacts associated with the addition of one CVN (Alternative Four) could result in a future increased demand for 3,217 jobs and 1,415 housing units that would occur mostly within the region of influence. However, Snohomish County typically experiences sizeable fluctuations in employment and, as such, this increase would not be significant. Two of the reasonably foreseeable projects that could affect employment include the Weyerhauser Redevelopment and Simpson-Lee Site Project. However, it is not known at this time what the employment associated with construction or long-term operations at these reasonably foreseeable projects would be, although it is unlikely that the known reasonably foreseeable projects would cause a significant increase in employment.

The relocation of the CCDG-3 group (No. 10) to Everett would result in an incremental increase in population. However, the construction of the BEQ and Everett Housing II would serve to offset increased demands on housing. Also associated with the relocation would be approximately 56 school age children. Increases in enrollment would presumably be dispersed over the six nearby school districts. While this increase in enrollment would exacerbate the impacts on schools from the proposed action, the size of this change would be small enough that impacts would still remain less than significant. Therefore, cumulative impacts on socioeconomics from the addition of one CVN under the proposed action, combined with those from related projects in the vicinity, would be less than significant. No mitigation is required.

5.18.9 Transportation

Ground Transportation

The geographical area of influence relative to traffic impacts for NAVSTA Everett consists of the local street network within Everett and the regional highways that provide access to Everett (i.e., Interstate 5 and State Route 529). These facilities are described in section 5.9.1.1. The cumulative traffic analysis of these facilities uses 2005 as the target year, and the significance criteria for the traffic analysis are the same as those used to address project-specific impacts (section 5.9.1.2). The addition of one CVN (Alternative Four) would result in an increase of 4,190 trips and 855 peak hour trips per day, resulting in a significant traffic impact.

The approach for the traffic analysis was to forecast the future baseline traffic volumes by using traffic model projections from the study prepared for the Puget Sound Aircraft Carrier Homeporting Environmental Assessment (DON 1995b), then adding the project traffic to the future baseline scenario. The traffic forecasts accounted for regional growth, the cumulative increase in traffic volumes that would occur as a result of other development projects planned in the Everett area, and other reasonably foreseeable projects at NAVSTA Everett. The volume of site-generated traffic used in the analysis represents the cumulative total of all the activities at the base. Some temporary fluctuations in traffic may occur associated with specific construction projects; however, these activities are not permanent and are not included in the quantification of cumulative traffic conditions. Because the traffic analysis for the proposed action is based on traffic projections, which include potential impacts from reasonably foreseeable projects as well as the NAVSTA Everett activities, a separate cumulative traffic analysis is unnecessary. The analysis indicates that the proposed action's contribution to the cumulative traffic impacts in the study area would be significant. The traffic-related mitigation measures listed in section 5.9.1.2.7 would be required.

Vessel Transportation

The region of influence for vessel transportation would include the Puget Sound and the waterways leading to the CVN pier and North Wharf. By definition, this resource area includes only water-based activities. The time period involved is the present condition through 2005, and continues into the future. The significance criteria to evaluate cumulative impacts are the same as those used to address project-specific impacts (section 5.9.2.2). Under the addition of one CVN (Alternative Four), a net future increase in vessel traffic would occur, although impacts on vessel transportation would be less than significant. None of the other cumulative projects would involve increases in vessel traffic other than maintenance dredging at the mouth of the Snohomish River. Dredging activities have occurred in this area on an annual basis for a number of years, and would thus represent no new vessel activity. There are no reasonably foreseeable projects that would cause the addition of large vessels in the affected waterways; therefore, the cumulative impacts on vessel transportation from the addition of one CVN under the proposed action combined with those from reasonably foreseeable projects in the vicinity have an insignificant cumulative impact on vessel transportation. No mitigation measures are required.

5.18.10 Air Quality

The region of influence for air quality impacts includes Everett and Eastern Puget Sound. The time period involved is the present condition through 2005, and continues into the future. Significance thresholds are based on past and existing cumulative emission levels, as well as regional plans that take into account projected regional growth and land uses. The significance criteria to evaluate cumulative impacts are the same as those used to address project-specific impacts (section 5.10.2). During construction, reasonably foreseeable projects would increase pollutant emissions within the project region. However, these emission increases would be small enough so that they would produce insignificant air quality impacts. In addition, they would be temporary impacts that would cease upon completion of construction. Emissions from the operation of the (1) removal of one CVN and addition of four AOEs and (2) addition of 2 AOEs project alternatives at NAVSTA Everett would exceed the 100 tons per year CO significance criterion. Since the majority of CO emissions from each alternative would occur as vehicular emissions that would be spread over a large geographic area, they would not be large enough in a localized area to cause an exceedance of any ambient air quality standard within the NAVSTA Everett home port region. The proposed alternatives would therefore result in an insignificant incremental contribution to cumulative impacts in the region. No mitigation is required.

5.18.11 Noise

The region of influence for noise impacts is a roughly circular area around the noise source. The radius of the circle is equal to the distance that the noise source can be heard. Any reasonably foreseeable project that has a region of influence that overlaps with the region of influence of any of the proposed actions may have a cumulative impact if a sensitive receptor is located within the overlap area. The timeframe of the impacts would include the construction period through the lifetime of the constructed facilities. The cumulative impact significance thresholds are the same as those presented in section 5.11.2. None of the proposed CVN homeporting actions at NAVSTA Everett would create any significant adverse noise impacts.

The only reasonably foreseeable projects that would be located within the region of influence for noise impacts are the six on-base projects. The nearest off-base reasonably foreseeable projects, the Snohomish maintenance dredging and the Weyerhaeuser Redevelopment project, are almost 3 miles away on the other side of the city (see Figure 5.18-1); they would be too distant to have any cumulative noise impact with proposed CVN homeporting actions at NAVSTA Everett.

Cumulative construction noise impacts could occur if any of the other reasonably foreseeable on-base projects were under construction at the same time as the proposed CVN homeporting actions. However, the Family Welcome Center construction was completed in 1998, the BEQ construction will be complete in early 1999, and the Medical Center construction will begin in 1999 with its completion before mid-2001. These construction projects will be complete before any proposed CVN homeporting actions would begin construction in 2003. Construction of the SIMA and the Tactical Aquatic Training Facility are not yet programmed, but it has been projected that SIMA construction could begin in 2001 and not be completed until 2003. If so, its construction could overlap with construction of the proposed CVN homeporting actions. SIMA construction, however, would occur mostly inside an existing facility and would not require any pile driving. Hence, noise impacts would be minimal and short term. Furthermore, since no-sensitive receptors are located between the SIMA site and the proposed CVN homeporting actions, no significant cumulative construction noise impact is anticipated, and no mitigation is required.

None of the reasonably foreseeable on-base projects are likely to create any significant operational noise impacts. Consequently, the cumulative operational noise impact of these projects along with the homeporting of one additional CVN would not result in any significant adverse cumulative noise impacts. The proposed action would have a less than significant incremental contribution to cumulative impacts on noise. No mitigation is provided.

5.18.12 Aesthetics

The region of influence for aesthetics is the NAVSTA Everett waterfront, the adjacent shoreline and marine area, and Jetty Island, located offshore. These areas compromise the view corridors experienced from prominent public vantage points in the area. Historical development has contributed to the cumulative impact on shoreline view corridors. The time period for assessment of cumulative impacts includes the CVN buildout of the year 2005. The cumulative impact significance thresholds are the same as those presented in section 5.12.2. The addition of one CVN (Alternative Four) would result in less than significant impacts on regional aesthetics. Other reasonably foreseeable on-base projects would be visually consistent with the marine industrial character of the area. Simultaneous construction activities occurring on base may have a temporary significant impact on the visual quality of the area. Some of the reasonably foreseeable Naval construction activities may occur concurrently with one another, including Bachelor Enlisted Quarters and Medical Center construction that would both occur in 1999. The Shore Intermediate Maintenance Facility construction is scheduled to begin in 2001, and depending upon the duration of this construction, it may overlap with the proposed action's construction scheduled to begin after July 1 of that year. Impacts from concurrent construction would be short term and end upon completion of construction. Maintenance dredging by the Port of Everett is visually consistent with the area, as this is an ongoing activity that is part of the existing visual setting. In addition, the Weyerhaeuser Redevelopment and the Simpson-Lee Site project would involve redevelopment activities in previously developed areas that would likely enhance the visual quality of Everett. Because these projects would occur in previously developed areas, they would not impact view corridors in Everett. The Everett II Housing Development would be constructed within a 1-hour commute from NAVSTA Everett, so it would likely be a sufficient distance from the proposed action such that it would not contribute incrementally to cumulative aesthetic impacts. The geographical and temporal separation of many of the reasonably foreseeable projects, in combination with the proposed action, would result in less than significant long-term cumulative impacts on aesthetics. No mitigation is required.

5.18.13 Cultural Resources

The region of influence for cultural resources (i.e., historic properties) focuses on NAVSTA Everett and other properties in the general vicinity of Port Gardner Bay. The time period covers previous development in the area as well as the period between the present and 2005. Both prehistoric and early historic-period sites in the Port Gardner Bay area are generally located along shorelines and major freshwater drainages, and recent construction and urbanization has affected the integrity of many of the known historic properties. At the same time, substantial portions of the area remain unsurveyed, so that new historic properties are likely to be found, and historic properties that retain their integrity can be found in even the most developed areas. Criteria for accessing the cumulative impacts do not differ from the significance criteria presented in 5.13.2. Construction and other activities related to the addition of one CVN (Alternative Four) would not cause any significant impacts to cultural resources in the project area, such that this project would not contribute to cumulative effects in the vicinity.

The potential for the other reasonably foreseeable projects to significantly impact other cultural resources depends largely on their location. The six reasonably foreseeable military projects would all occur on NAVSTA Everett property and in the same general area that is analyzed in section 5.13. This area consists entirely of imported fill, so the potential for impacts to intact prehistoric archaeological sites is nonexistent. No significant historic-period buildings are present within NAVSTA Everett, such that none of these projects would produce significant effects, nor would they contribute to any cumulative effects. In addition, maintenance dredging of the Snohomish River also has no potential to impact significant cultural resources, as no intact prehistoric resources occur between the river banks. Therefore, the reasonably foreseeable project would not contribute incrementally to cumulative effects on cultural resources.

Most of the off-base reasonably foreseeable projects all have the potential to significantly impact historic-period cultural resources. The Simpson-Lee Site Project and the Weyerhaeuser Redevelopment project entail redevelopment of facilities related to the timber industry, a major part of the historical development of the greater Everett area. The Weyerhaeuser facility, in particular, is associated with Frederick Weyerhaeuser, one of the leading figures in the development of the modern timber industry. Weyerhaeuser's choice to locate a mill in Everett in the early 1900s facilitated much of the economic growth that made Everett one of the largest cities on Puget Sound (Clark 1970). Demolition or other substantial alterations to standing structures in these areas may constitute adverse impacts to significant cultural resources in the absence of proper mitigation measures. A site has not yet been determined for the 350-unit Everett II residential development. Consequently, its impact to cultural resources cannot be determined at this time. Taken together, these reasonably foreseeable projects could constitute a significant cumulative effect on cultural resources within the region of influence.

Therefore, although the cumulative impact on cultural resources resulting from reasonably foreseeable projects and the proposed action could be significant, the proposed action's incremental contribution would be insignificant. No mitigation measures are required.

5.18.14 General Services/Access

The region of influence for general services is the NAVSTA Everett base and the surrounding Everett area where general service facilities are located. Previous NAVSTA Everett development has contributed to cumulative impacts on general services and access that are reflected in current conditions. Reasonably foreseeable projects considered are those that would occur from 1998 through 2005. Significance criteria for cumulative impacts is are identical to those used to address project-specific impacts (section 5.14.2). The addition of one CVN (Alternative Four) would increase military personnel and their dependents by 3,217 persons. Though this would be an increase to general services, it would be similar to historic periodic fluctuations in the Everett population. Therefore, impacts on general services would not be reduced below historically accepted levels of service, and this impact would be adverse but less than significant. The relocation of the CCDG-3 Group to Everett would also incrementally increase population. The construction of military housing would provide additional accommodations for personnel to live on base. This could increase the NAVSTA Everett population and cause additional demands on regional general services. However, the construction of the medical facility and FSC would provide services in response to this demand. The Weyerhaeuser Redevelopment, Simpson-Lee Site Project, and residential development would result in increased residential and commercial areas in Everett, thereby increasing demands on general services. Considered collectively, cumulative demands on general services from the proposed action (Alternative Four), relocation of the CCDG-3 Group, BEQ, and civilian development projects would be potentially significant in the short term. The large increase in population due to the proposed action under Alternative Four would be a significant incremental contribution to the cumulative impacts on general services. Nevertheless, as previously stated, the cyclical increases and decreases of the Everett population would allow general services to remain within historically accepted levels of service. Therefore, the residual cumulative impact of the proposed action and reasonably foreseeable projects on general services would be less than significant.

The region of influence for access to NAVSTA Everett includes the perimeter of the naval station and its six access gates, as well as the main roadways leading to NAVSTA Everett, such as Interstate 5, Hewitt Avenue, West Marine View Drive, and east marine View Drive. The region of influence also includes the waters of Port Gardner Bay immediately surrounding the CVN home port site. The proposed addition of one CVN (Alternative Four) would not result in a significant impact on access. The increase in population and associated traffic increases (see section 5.9.2) would cause access constraints. However, due to the historic population fluctuations in Everett, access would not drop below accepted levels of service.

There are several reasonably foreseeable construction projects that may occur concurrently on the NAVSTA Everett base, including construction associated with the proposed action and the Shore Intermediate Maintenance Facility in 2001 and construction of BEQ and the Medical Center in 1999. Impacts to access during reasonably foreseeable project construction would be addressed by individual construction management plans. However, roadways surrounding the access gates may be constrained due to overlapping construction schedules, although access would not be prevented. These impacts would be short term and would cease upon completion of construction. The Weyerhaeuser Redevelopment, Simpson-Lee Site Project, and residential development are all located at least several miles from the Naval base and each other, such that these reasonably foreseeable projects would not contribute to cumulative effects on access. Introduction of increased commuter traffic to the naval station from residential development in combination with the increased Navy personnel from the proposed action would worsen traffic conditions at NAVSTA entry gates and certain intersections during peak travel periods. The flow of traffic would be slowed, although access to NAVSTA Everett entry gates would not be precluded. Because access to NAVSTA Everett would not drop below historically accepted levels of service, cumulative impacts would be less than significant. No mitigation is required.

The only reasonably foreseeable projects that could have an impact on water access is maintenance dredging in the Snohomish River. Dredging activity occurs on an annual basis and occurs over 2 miles away from NAVSTA Everett. Therefore, it would not affect access to the Naval base. Cumulative impacts resulting from the collective activities of the proposed action and reasonably foreseeable projects on water-based access would be less than significant. No mitigation is required.

5.18.15 Health and Safety

The region of influence is defined as the area around the carrier piers and NAVSTA Everett. This is the area in which use of hazardous materials from the proposed action are located. The time considered for assessment of cumulative impacts includes the construction activities associated with the first additional CVN in late 2002 and for continuing operations into the future. The significance criteria are the same as stated for project-specific impacts (section 5.15.2). The addition of one CVN (Alternative Four) would result in a less than significant risk of a hazardous substance release during construction and operation. Other proposed reasonably foreseeable Naval projects would be subject to similar hazardous waste management programs and procedures, resulting in less than significant cumulative impacts. All other reasonably foreseeable civilian projects are outside the region of influence. Since no reasonably foreseeable projects fall within the region of influence and any health and safety impact related to the proposed action would be minimized by regulation programs and procedures, the cumulative impacts from the proposed action (Alternative Four) in association with other reasonably foreseeable projects would be less than significant. No mitigation is required. Volume 2, Appendix F, section 3.3, presents a discussion of cumulative radiological impact. No significant impacts are identified.

As described in the annual report referenced in the EIS, 26 previous versions of that report, and the 1998 update of the report, the total long-lived gamma radioactivity in liquids released annually to all ports and harbors from all Naval nuclear-powered ships and supporting tenders, Naval bases and shipyards is less than 0.002 curies. This annual total includes any accidental releases of radioactivity that occurred during the year. For perspective, the total annual amount is less than the amount of naturally occurring radioactivity present in the seawater displaced by a single submarine, and is environmentally inconsequential. Since the total amount released was inconsequential, any individual release was also inconsequential, and was not subject to reporting, immediate or otherwise, by any regulatory requirements. Thus, there would be no cumulative impacts from releases to any one water body from various NNPP activities in close proximity to that water body.

5.18.16 Utilities

The region of influence for utilities includes the greater Snohomish County area serviced by Snohomish County Public Works department. Previous regional development and particularly that at NAVSTA Everett has contributed to cumulative impacts on general services and access that are reflected in current conditions. Projects considered in the cumulative analysis are those that would occur between 1998 and 2005. The significance criteria for cumulative impacts are the same as stated for project-specific impacts (section 5.16.2). The addition of one CVN (Alternative Four) would result in less than significant impacts on utilities. Utilities would operate below complete capacity. Utility increases that remain below existing NAVSTA Everett capacity would have a less than significant impact to the environment because the planned regional metropolitan utility capacity is determined on the conservative assumption that NAVSTA Everett operations could occur at full capacity.

Other reasonably foreseeable projects with the highest potential for cumulative impacts are new construction projects, rather than reuse of existing urban infrastructure. These projects would create additional, previously unaccounted for demands on utilities. All of the reasonably foreseeable naval projects involve new building construction that would require new utility infrastructure. If these projects were to operate within the NAVSTA Everett utility capacity, similar to the proposed action, they would not represent a new, unaccounted for demand on utilities. Redevelopment projects (Weyerhauser Redevelopment and the Simpson-Lee Site Project) and the PPV Residential Development would also generate new demands on utilities. Individual project permit conditions of approval would require that each project provide fees to compensate for the increased demand on utilities, including needed infrastructure improvements. The multiple number of reasonably foreseeable construction projects has the potential to result in an incremental contribution to cumulative impacts on utilities. However, these projects represent a very small portion of the total demand on utilities within the region of influence, such that the increased demand on utilities would be less than significant. Since reasonably foreseeable Naval projects and the proposed action would not represent new and unplanned increases in utility consumption, and reasonably foreseeable construction projects would represent a relatively small increase when compared with total regional demands, the cumulative impact on utilities resulting from the proposed action and reasonably foreseeable projects would be less than significant. No mitigation is required.

5.18.17 Environmental Justice

The region of influence for cumulative impacts on environmental justice includes Snohomish County. This discreet location provides regional census data that characterize minority and low income communities. Reasonably foreseeable projects considered include historic environmental justice conditions of the area as well as projects occurring between 1998 and 2005. Snohomish County is a predominantly white and middle income community. In addition, residential areas adjacent to the proposed action area do not contain a disproportionately high minority or low income population. The Tulalip Tribe reservation is west of NAVSTA Everett. Overall, the population in the vicinity of the proposed action has historically experienced relatively few environmental justice impacts. The significance criteria for cumulative impacts are the same as stated for project-specific impacts (section 5.17.2).

The removal of one CVN and addition of four AOEs (Alternative One) would result in an increase in the use of the waters around NAVSTA Everett and vessel activity within the Tulalip Tribe's "Usual and Accustomed fishing places." This increase in use of the waters would only result during ship transit to and from their berths and is consistent with the existing mission and activity at NAVSTA Everett. The operation of Navy vessels in this area is consistent with ongoing vessel use in these channels. The proposed action of one CVN and addition of four AOEs (Alternative One) would have a less than significant impact on environmental justice issues related to Native American fishing activity. Other reasonably foreseeable projects that could result in cumulative impacts to environmental justice are those projects that would also use waters within the Tulalip Tribe's "Usual and Accustomed fishing places." Maintenance dredging of the Snohomish River would be the only other reasonably foreseeable project that would result in in-water disturbances. Dredging, if occurring concurrently with use of the waters by ships from the proposed action, would also contribute to short-term but less than significant impacts on the Tulalip Tribe's "Usual and Accustomed fishing places." Cumulative impacts on this environmental justice issue would be less than significant.

Impacts from the proposed action on noise and air quality at child care centers and local public schools would be less than significant. Construction activities at Everett could overlap and cause a cumulative increase on the noise environment. However, these projects are located a sufficient distance within Everett boundaries, and would have a less than significant impact on the noise environment at any nearby local public schools in Everett. Air quality could also be impacted by concurrent construction activities, with the potential to impact nearby day care facilities. These impacts would be localized and end upon completion of construction. Therefore, cumulative impacts on environmental justice resulting from the proposed action and reasonably foreseeable projects in relationship to noise and air quality impacts would be less than significant. No mitigation is required.

6.0 PEARL HARBOR NAVAL SHIPYARD

6.1 TOPOGRAPHY, GEOLOGY, AND SOILS

6.1.1 Affected Environment

Topography

Pearl Harbor is located on the southern side of Oahu's large coastal plain. Pearl Harbor Naval Shipyard (PHNSY) is located on a short peninsula extending in a northerly direction into Pearl Harbor. It is bounded on the northern and western coastlines by South Channel and the Main (Inner) Channel, and by Southeast Loch to the southeast (Figure 6.1-1). The area is relatively flat, with ground elevations sloping from a high of approximately 20 feet above mean sea level (AMSL) in the southeast to 11 feet AMSL along the water.

Geology and Soils

The island of Oahu consists mainly of volcanic rock (basalt) with a fringing layer of "caprock" consisting of interbedded coral and alluvial sediment. Some coastal areas, including the site, also have late-stage volcanic cinder cones breaking through both basalt and caprock. At PHNSY the caprock is approximately 600 feet thick. It is overlain by two consolidated tuff units separated by a thick layer of lagoonal sediments (Pacific Geotechnical Engineers 1993).

Soils on the majority of the peninsula are mapped as coral outcrop with a thin layer of friable red soil; the northwestern portion is mapped as mixed filled land (USDA 1972). Soil borings confirm that fill consists primarily of silty sandy coralline gravel (dredge material), with patches of clays, silts, gravelly silts, sands, and gravels.

Faulting and Seismicity

Except for the island of Hawaii, the Hawaiian Islands are not highly seismic. Oahu is in Seismic Zone 2 (on a rising scale of 0 to 4, as defined by the Uniform Building Code). Most local earthquakes are of volcanic origin and occur too far away to cause damage on Oahu. Other earthquakes have been caused by the load of the Hawaiian Islands on the earth's crust; these earthquakes are deep and therefore are felt further away. The most damaging of these deep earthquakes was an 1871 earthquake with an approximate magnitude of 6.8 and an epicenter about 65 miles away from Oahu; it resulted in damage in Honolulu. The most recent earthquake of any size was a magnitude 6.2 event on the island of Hawaii, 200 miles from Honolulu (UH 1995).

Geohazards

The island of Oahu is not volcanically active. The closest active volcano is on the island of Hawaii, 200 miles away.

Tsunamis (seismically induced sea waves) are very long, shallow, high-velocity ocean waves that are generated by earthquakes. Tsunami hazard zones on Oahu have been mapped by Oahu Civil Defense. Pearl Harbor is protected from tsunamis and other ocean waves and swells by its 2.8-mile-long entrance channel, which attenuates wave propagation (see Figure 6.1-1). No

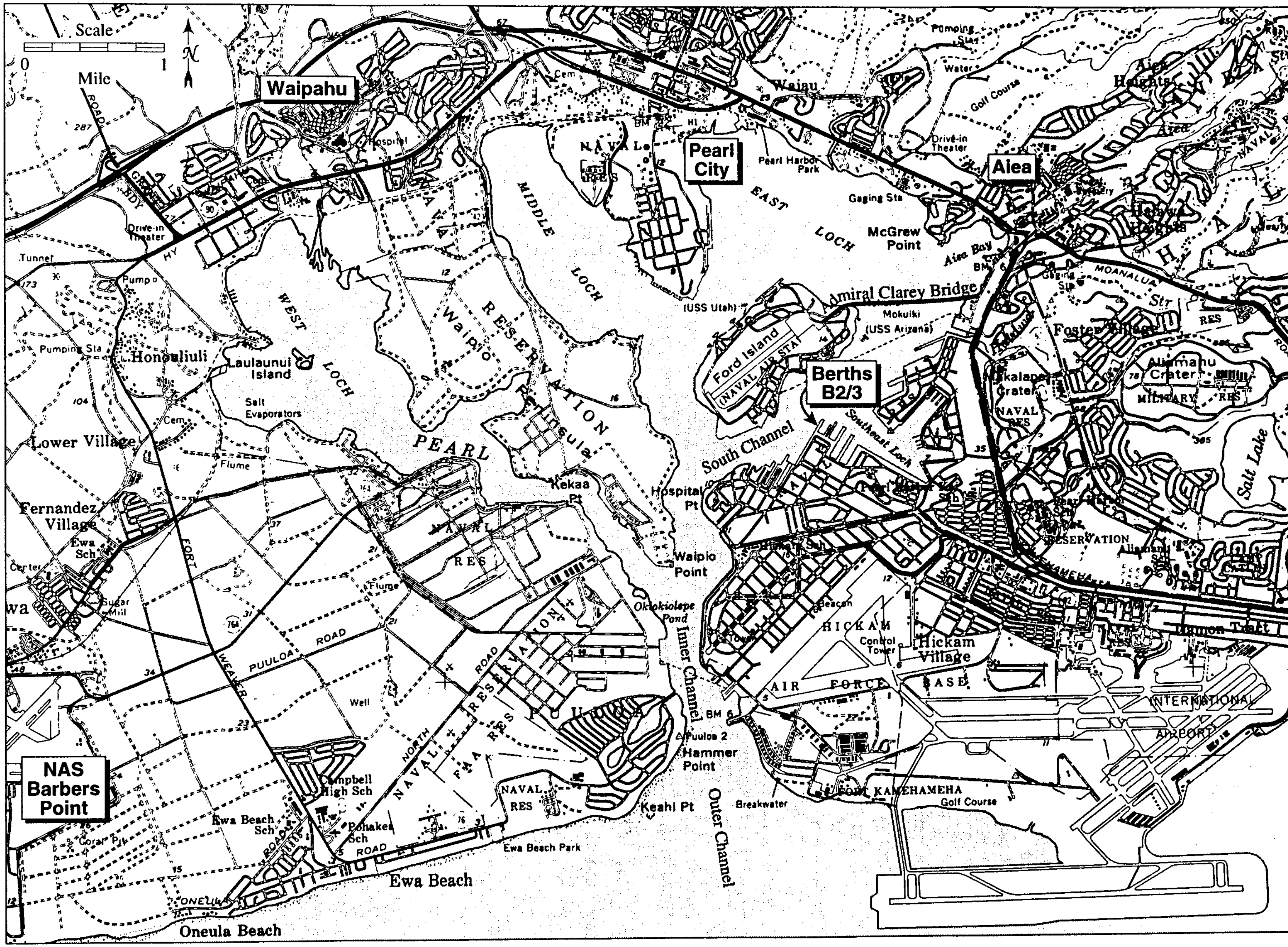

Figure 6.1-1. Pearl Harbor Naval Complex Vicinity Map

shoreline areas within Pearl Harbor are included in Oahu Civil Defense tsunami evacuation zones; a maximum high water rise of 4 feet would be expected inside the harbor (Oahu Civil Defense, 1997). A tsunami would likely be manifested in Pearl Harbor as a gradual upswelling of water, with associated currents which could damage structures in the water or along the shoreline in low-lying areas.

A seiche is a standing wave in an enclosed or partly enclosed body of water, which is analogous to the sloshing of water that occurs when an adult suddenly sits down in a bathtub. Seiches are caused by wind-driven currents or tides. Locally generated wind waves within the harbor are constrained by a maximum fetch of 10,000 feet. Storm waves reach maximum heights of 5 feet for wind speeds of up to 70 knots.

Hurricanes passing Oahu (see section 6.10) may reduce atmospheric pressure, causing high water level and elevated waves. The predicted total water level rise for a 100-year event is 3.5 feet above MLLW (Sea Engineering, Inc. 1989).

6.1.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Impacts of the proposed project on the geologic environment would be considered significant if the following occurred:

- Unique geologic features of unusual scientific value, for study or interpretation, would be adversely affected.
- Geologic processes such as major landsliding or erosion would be triggered or accelerated.
- Substantially adverse alteration of topography beyond that resulting from natural erosional and depositional processes.
- Substantially adverse disruption, displacement, compaction, or overcovering of the soil. Substantial irreversible disturbance of the soil materials at the site could cause their use for normal purposes in the area to be compromised.

Impacts of the following geohazards on the proposed project would be considered significant if the following occurred:

- Ground rupture occurs due to an earthquake on an active fault, causing damage to structures and limiting their use due to safety considerations or physical conditions.
- Earthquake-induced ground shaking occurs causing liquefaction, settlement, or surface cracks at the site and attendant damage to proposed structures, causing a substantial loss of use or exposing the public to substantial risk of injury.
- Historic soil failure (primarily fill) occurs due to liquefaction.
- Slope failure occurs on hillsides or dikes (ship berths area).

- Flooding caused by 100-year storm events or when combined with an extreme high tide or seismic sea wave occur that are capable of causing substantial damage to structures or exposing the public to substantial risk of injury.

- Seiches or tsunamis caused by nearby or distant earthquakes occur that are capable of causing substantial damage to structures or exposing the public to substantial risk of injury.

6.1.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Geologic Environment

DREDGING

Bathymetry would be modified by dredging up to three million cubic yards of material from the Main Entrance Channel of Pearl Harbor, the turning basin, and the berth at B2/3. All areas have been dredged at various times over the past 80 years. Dredging for homeporting a CVN would temporarily disrupt submarine depositional processes, similar to prior dredging episodes in this area. However, depositional equilibrium would be reestablished within a short period. No regional, long-term depositional disruptions would occur as a result of dredging in this area. Therefore, impacts on geological resources due to dredging are less than significant.

Sediments dredged from the harbor would be disposed at the South Oahu Ocean Disposal Site, provided required testing showed the sediment to be suitable for ocean disposal. Any material found not suitable for ocean disposal would be disposed in a CDF or upland disposal area. Although such a disposal facility does not currently exist, the Navy anticipates that such a facility will be required to dispose of maintenance dredging materials in the year 2000 (see section 6.4.2.1). (The Navy will prepare appropriate NEPA documentation prior to construction of a CDF or upland disposal facility.)

FACILITY IMPROVEMENTS

Proposed facility improvements at PHNSY include inland construction of several large buildings and upgrade of various utilities. Topography would be slightly modified during construction. However, PHNSY is predominantly flat and all of it has previously been graded for construction. Therefore, these impacts to topography would be less than significant.

Construction of the proposed facilities would result in temporary soil disturbance and some temporary soil erosion on land. Because of the relatively flat terrain, short-term erosion resulting from construction would be limited. Standard erosion control measures and pollutant control measures are specified in the Storm Water Pollution Control Plan (SWPCP) currently in place. The SWPCP would be amended to incorporate the proposed project, thus further minimizing impacts to less than significant.

OPERATIONS

No impacts on the geologic environment would result from berthing and maintaining a CVN at B2/3.

Geohazards

DREDGING

Geohazard (tsunami and seiche) impacts during dredging are unlikely and, therefore, insignificant.

FACILITY IMPROVEMENTS

Impacts of geohazards (seismicity and tsunamis) on facilities and personnel are extremely rare, are unlikely to occur during the lifetime of the project, and are considered an unavoidable, acceptable risk. Therefore, potential impacts associated with the occurrence of a tsunami or seiche would be less than significant. Tsunamis or seiches might cause a maximum water rise of 4 feet (Oahu Civil Defense 1997) and would not affect construction sites, which would be at an elevation of 11 or more feet AMSL.

OPERATIONS

Tsunamis or seiches might cause a maximum water rise of 4 feet (Oahu Civil Defense 1997) and would not affect project facilities, which would be at an elevation of 11 or more feet AMSL.

Earthquake-related hazards are unlikely on Oahu and are extremely unlikely to result in the rupture of chemical storage containers and release of chemicals to the environment. However, as described in section 6.2.2.1, these operation-related impacts would be reduced to levels that are less than significant by the implementation of the existing SWPPP, the existing safety and health programs described in section 4.15, and compliance with federal, state, and local statutes and regulations pertaining to storm water retention and treatment and soil and groundwater contamination.

6.1.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Geologic Environment

DREDGING

Dredging would not be required; therefore, no impacts are anticipated on the geologic environment at the project site.

FACILITY IMPROVEMENTS

Construction would not be required; therefore, no impacts are anticipated on the geologic environment.

OPERATIONS

Because there would be no change in operations, no impacts are anticipated on the geologic environment.

Geohazards

DREDGING

No dredging is proposed; therefore, there would be no impacts from geologic hazards on dredging.

FACILITY IMPROVEMENTS

Because no demolition or construction is proposed, impacts associated with geologic hazards at the project site would remain unchanged and, therefore, result in no impact.

OPERATIONS

Because there would be no change in existing operations, impacts associated with geologic hazards at the project site would remain unchanged and, therefore, result in no impact.

6.1.2.3 Mitigation Measures

Because impacts on the geologic environment and geohazard impacts would be less than significant, no mitigation measures would be required.

6.2 TERRESTRIAL HYDROLOGY AND WATER QUALITY

6.2.1 Affected Environment

Surface Water

Eight streams carry 123 million gallons of water annually into Pearl Harbor. The closest stream to PHNSY (Halawa Stream) is roughly one mile away. There are no other surface water bodies in the vicinity of the site, with the exception of Pearl Harbor (discussed in section 6.3). The streams drain large areas of agricultural and urban lands and carry substantial sediment with associated agricultural chemicals (such as pesticides) and pollution from urban runoff.

Existing drainage infrastructure at PHNSY consists of catchment basins, swales, and underground conduits discharging into Pearl Harbor (section 6.16). Storm water runoff during construction and operational phases of the project would be regulated under an NPDES permit and the SWPCP currently in place. The SWPCP is designed to protect water quality and would be amended, if necessary, to incorporate the proposed project. Guidance provided by the Council on Environmental Quality (CEQ 1993) has also been considered concerning pollution prevention.

Groundwater

Two primary aquifers — basalt and caprock — underlie Pearl Harbor. Inland portions of the basalt aquifer provide drinking water to a large part of Oahu. The overlying caprock aquifer is brackish (250-1,000 parts per million [ppm] chloride [Cl^-]) and therefore is not used; it effectively protects the basalt aquifer from surface-originating contamination (Mink and Lau 1990). The two aquifers are separated by a relatively impermeable clay-rich layer; the only vertical migration is believed to be upward from the potable basalt into the nonpotable caprock aquifer. The lagoonal sediments form a third, highly brackish aquifer that is contained by the surrounding tuff units. All aquifers in Hawaii flow toward the ocean.

Below PHNSY, saltwater intrusion makes the basalt aquifer nonpotable (250-1,000 ppm Cl^-). It is pumped for drinking water only at wells farther inland and above the Underground Injection Control line, roughly 1.5 miles inland of PHNSY. Few, if any, of the nine industrial water supply wells within 0.5 mile of PHNSY are still in use.

Soil and Groundwater Contamination

Pearl Harbor Naval Complex is included on the CERCLA National Priorities List; all site investigation and remediation is subject to a Federal Facilities Agreement between the Navy, EPA, and DOH. All contaminated sites at Pearl Harbor are now managed by the PHNC Site Management Plan under the IR program.

Installation Restoration (IR) Sites

There are a variety of IR sites at PHNSY; this section focuses on IR sites that may be affected by facilities construction for the proposed action.

The shipyard has not been extensively investigated for oil releases by the IR program, to date. Known IR sites at areas of the shipyard affected by the project include (1) a plume of free petroleum product floating on groundwater under Building 8 (site of the proposed CIF), (2) PCB contamination in catch basins around Building 68 (site of the proposed parking garage), and (3) a plume of free petroleum product at O2 pier, adjacent to Drydock #4. In addition, storm drains passing under the proposed CIF and proposed parking garage sites are under investigation for possible heavy metals and mercury releases. Lead bonding and mercury were disposed in the storm drain system, which empties into Pearl Harbor. There may be some soil contamination in areas where line condition is poor (Earth Tech 1997).

Remediation of the Building 8 petroleum plume (bunker C fuel, a very viscous fuel oil) was completed in 1997. A 100-foot extraction trench was installed between Buildings 5 and 8 to remove free product from the groundwater surface. Remediation of PCBs in catch basin is still in progress. Remediation of the plume at O2 pier began in 1997; an interceptor/collection trench was installed and skimming began in March 1998.

Upland Sediment Disposal Site

Upland treatment or disposal sites are currently under consideration as part of the Long-Term Management Strategy (LTMS) for sediment unsuitable for ocean disposal. The LTMS plan for dredged material disposal for Pearl Harbor is currently being developed for dredged material deemed unsuitable for ocean disposal. Various alternatives, which include nearshore and upland confined disposal facilities (CDFs), contained aquatic disposal, and beneficial uses, are being looked at to determine viable alternatives taking into consideration cost, existing technology, logistics, environmental concerns, and regulations. The LTMS plan is scheduled for completion in 1999 to meet Pearl Harbor's maintenance dredging schedule in fiscal year 2000. Likely disposal sites are situated in or on caprock, as described above. Groundwater at such a site would be near the surface and nonpotable due to high salinity (250–5,000 ppm Cl-).

6.2.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Significant impacts on surface water or groundwater in the project area would occur if the project results in the following:

- Degradation of water quality affecting existing and future beneficial uses of receiving waters.
- Discharge that creates pollution, contamination, or nuisance in violation of applicable federal or state standards.
- Release of substances that would result in substantial toxic effects to humans, animals, or plant life.

6.2.2.1 *Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)*

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging

Dredging would not potentially intercept and thereby adversely impact beneficial groundwater beneath the site, because there is no potable groundwater aquifer beneath PHNSY or the harbor. The confined basalt aquifer is several hundred feet below the floor of the harbor, and would not be disturbed by sediment dredging.

Sediment sampling results indicate no sediment would likely need to be disposed in a CDF or upland site. However, if sediment from the home port project were determined to be unsuitable for ocean disposal and were disposed at an upland landfill, no significant impacts on underlying soil or groundwater quality would result from transportation or disposal of such sediment or from treatment of the sediment at a preexisting upland processing center. Sediment would be transported by barge, not overland by truck. Disposal facilities would already contain maintenance dredging sediment from Pearl Harbor and would be permitted and operated in compliance with federal, state, and Navy solid waste regulations. (If such a facility were programmed, appropriate NEPA documentation would be developed.) Significant impacts to stormwater around such a site would be prevented by the facility design, which would be in compliance with federal and state regulations to control stormwater runoff and leachate. Sediment would be pretreated to reduce toxicity, prior to disposal in such a facility. Any pretreatment facility or upland disposal site would be engineered to prevent runoff of toxic substances to nearby surface waters or leaching of toxic substances to underlying groundwater.

Similarly, no significant impacts to streams, stormwater runoff, or groundwater would occur at a marine CDF. Because water flows from groundwater to the harbor (i.e., not from the harbor into the groundwater), any contaminants introduced to waters within the CDF would not migrate into adjacent groundwater.

Facility Improvements

Additional construction would include demolition of existing buildings, various utility upgrades, and construction of a CIF and a parking garage. Surface and groundwater quality could potentially be impacted by fuel spills or erosion and surface water runoff associated with demolition and construction-related (excavation and grading) activities. However, these potential impacts would be reduced to less than significant levels by the implementation of the existing SWPCP. The SWPCP is designed to minimize water quality degradation through establishment of project-specific BMPs, implementation of standard erosion control measures, and implementation of spill prevention and containment measures. In accordance with Navy Specifications 01575, Temporary Environmental Controls, the Stormwater Pollution Prevention Plan will be completed in accordance with 40 CFR 122.26, EPA 832-R-92-005. These specifications require that the following be implemented in association construction and operation of the proposed project:

- Identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharge from the site.
- Describe and ensure implementation of practices that will be used to reduce the pollutants in storm water discharge associated with industrial activity at the construction site.
- Ensure compliance with terms of EPA general permit for storm water discharge.

- Select applicable management practices from EPA 832-R-92-005.

Provide completed copy of Notice of Intent and Notice of Termination, except for effective date. Submit to the Contracting Officer a minimum of 14 days prior to start of construction the original Notice of Intent, completed and ready for signature, including the SWPPP, a Monitoring Program Plan, and other documents as required by Order No. 92-08-DWQ.

The proposed CIF location partially coincides with the plume of bunker C fuel oil underlying existing Building 8. Although the plume is currently being pumped, it is possible that residual contamination would remain in the subsurface at the time of CIF construction. Unknown or undocumented subsurface contamination may be encountered at other construction areas.

If contaminated soil or groundwater is encountered or disturbed during demolition- or construction-related activities, potentially significant impacts on surface water or groundwater could occur as a result of a discharge or accidental release. These potential impacts would be reduced to less than significant levels by implementation of the following procedures:

Prior to any demolition, excavation, or construction activities, all known utilities (including fuel, sewer, steam, and electrical) and any asbestos-containing material and lead-based paint would be identified by the demolition and construction contractor. Remedial actions for contaminants encountered (or expected to be encountered) would be conducted prior to or in conjunction with construction activities, unless substantial area-wide contamination was known still to exist. In that case, remediation might be postponed until such time as the entire area could be remediated. All remedial actions and excavations would be conducted in compliance with all federal and state statutes and regulations pertaining to soil and groundwater contamination.

This alternative would occur on a site listed on the EPA's National Priority List (NPL) and is subject to the requirements of CERCLA. The Navy would coordinate with CERCLA program managers before executing the proposed action to ensure conformance with CERCLA requirements for this location. In addition, construction in contaminated areas would be conducted in accordance with RCRA (42 U.S.C. 6901), NCP (40 C.F.R. 300, CERCLA Section 105), the UST Program, and the following regulations and guidance manuals:

- 29 C.F.R. 1910.120. Addresses hazardous waste releases and health and safety of workers.

- *Navy and Marine Corps Installation Restoration Manual* (February 1997). Protocol to evaluate, characterize, and control the potential migration of possible contaminants resulting from past operations and disposal practices at DOD facilities.

- *EM 385-1-1 U.S. Army Corps of Engineers Safety and Health Requirement Manual* (September 1996). Addresses health and safety issues for workers handling potentially hazardous materials or waste.

- *Chief of Naval Operations Instruction (OPNAVINST) 5090.1B, Environmental and Natural Resources Program Manual* (1994).

These statutes and regulations are aimed at protecting human health and the environment. They address worker safety, regulatory notification, clean-up requirements, and handling, storage, treatment, and disposal requirements for hazardous materials and waste. Compliance with all applicable federal, state, and local regulations would reduce the potential for significant adverse impacts from contaminants, if encountered, to less than significant levels.

Soil and/or groundwater remediation completed in association with proposed construction in areas of contamination would reduce further impacts associated with exposure of contaminants to on-site workers and the general public. This is considered a beneficial impact.

Operations

Proposed construction and demolition would not appreciably increase the impervious surfaces and associated stormwater runoff at PHNSY, as proposed buildings would replace existing buildings or paved areas. Operations associated with the CVN would result in an increase in the quantity of chemicals handled stored, and disposed at the shipyard, with an attendant increase in the potential for chemical releases to soil or groundwater. However, potential impacts would be reduced to levels that are less than significant by ongoing implementation of the existing SWPCP, the existing health and safety programs described in section 6.15, and compliance with federal, state, and local statutes and regulations regarding storm water retention and treatment and soil and groundwater contamination (see above). The SWPCP is designed to minimize water quality degradation through establishment of project-specific BMPs, implementation of standard erosion control measures, and implementation of spill prevention and containment measures. Implementation of the SWPCP, existing health and safety programs, and continued compliance with environmental regulations would reduce the potential for significant adverse impacts to less than significant levels.

6.2.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Because this alternative would result in no change in existing conditions, no impacts on hydrology would occur.

6.2.2.3 Mitigation Measures

No mitigation measures are required.

6.3 MARINE WATER QUALITY

6.3.1 Affected Environment

This section addresses Pearl Harbor as a whole, but also contains September 1997 sampling results from areas that would be transited by and dredged for a CVN (see Volume 6, section 6.3). A variety of project-specific studies and permitted dischargers have obtained water quality data for one or more areas of the harbor over the past decade, but there has been no systematic study of overall water quality.

Pearl Harbor is an inland estuary formed from a set of drowned river valleys. The narrow entrance channel cuts through the barrier reef, which is relatively impervious to erosion. The harbor is protected from ocean waves and swells because wave propagation through the 2.8-mile-long entrance channel is fully attenuated. The harbor receives 180,000 cubic yards (cy) of sediment per year and is a natural sediment trap. Without regular intervention (i.e., dredging), it would slowly fill with sediment and evolve into wetlands.

The Pearl Harbor estuary is subject to numerous nonpoint sources of contamination. It has been designated a "water quality limited segment" by the state, in recognition that it is an area not expected to attain or maintain state water quality standards without additional action to control nonpoint source pollution. Site-specific water quality standards have been established by the state, and no new wastewater discharges are permitted into the estuary.

The State of Hawaii has designated Pearl Harbor estuary waters as Class 2, which must not receive any discharges that have not undergone the best degree of treatment or control compatible with Class 2 criteria (see Volume 6, section 6.3). Whereas Class 1 waters are intended to remain in their natural state, Class 2 waters are to be protected for recreational purposes; propagation of fish, shellfish, and aquatic life; agricultural and industrial water supplies; shipping; and navigation.

Samples obtained in September 1997 confirm previous indications (e.g., DON 1990) that Pearl Harbor is vertically stratified, with an upper freshwater layer derived from streamwater, rainfall, and groundwater discharge. Turbidity and concentrations of nutrients are far below Class 2 criteria (see Volume 6, section 6.3).

Circulation

Tides in Hawaiian waters are semi-diurnal, with differences ranging from 2.5 feet at extreme spring tides to 0.2 foot at mean low water; the common range is 2 feet. The harbor is fully protected from ocean waves and swells. Locally generated wind waves within the harbor are constrained by a maximum fetch of approximately 10,000 feet, and wave heights over 3.2 feet are not expected (Sea Engineering, Inc. 1989).

The waters of Pearl Harbor are influenced by a two-layer circulation system. Tides, winds, freshwater inflow, and ship-induced turbulence all affect water circulation. Layering occurs primarily as a result of the large influx of fresh water (flow up to 1 foot per second) into the harbor. The boundary between the two layers occurs at a depth of about 4.9 feet in the entrance channel but varies considerably depending on the season. Currents in the bottom layer generally move seaward due to trade winds and the inflow of fresh water; the bottom seawater layer reverses with the tide, the reversal occurring approximately at the peak tidal amplitude (DON 1975). The mean tidal current velocity is 0.3 knots, with a maximum ebb flow of 0.6 knots in the entrance channel (U.S. Department of Commerce 1989).

Temperature/Salinity

Harbor salinity ranges from 10 to 37.5 parts per thousand (ppt), with a yearly average of 32.8 ppt. Water temperatures annually range from 73.2°F to 84.9°F (Grovhoug 1992). Various studies have shown that harbor waters are vertically stratified, with a low density (low salinity) surface layer formed from freshwater input overlying a bottom layer of denser, more saline water (DON 1990).

In September 1997, a warm surface layer of relatively fresh water was detectable at all sampling stations. Salinity increased with depth, with a distinct surface layer of lower salinity water overlying more saline water. Salinity ranged from 32.8 ppt to 34.0 ppt, with a difference between top and bottom layers of 0.3 to 1.5 ppt. Temperature decreased with depth, from about 83.3°F to 81.7°F (see Volume 6, section 6.3).

Dissolved Oxygen

Dissolved oxygen (DO) values in the harbor range from 2.8 to 11.0 milligrams per liter (mg/L) (Grovhoug 1992). In September 1997, DO concentrations at sampling stations ranged from 7.2 to 8.3 mg/L (close to 100 percent saturation). No pattern of vertical stratification was detected.

Water Clarity/Turbidity

Turbidity in Pearl Harbor is naturally high, from the daily sediment load introduced by streams as well as from resuspension of unconsolidated bottom sediments by passing ships. Water transparency ranges from 1.6 to 11.5 feet, with a mean of about 8.2 feet (Grovhoug 1992). During the 1997 survey, turbidity was relatively constant in the upper water column ($\leq$2 nephelometric turbidity units [ntu]) at all stations down to a depth of 25 feet. Near the sediment surface, turbidity increased to about 5 ntu and in the turning basin, up to 25 ntu.

Bacterial and Chemical Contaminants

Severe coliform bacterial contamination in surface waters and oyster tissues was reported during the 1960s and 1970s in certain harbor regions, primarily at stream mouths and in the two lochs farthest from the project site (Grovhoug 1992).

Analysis of turning basin water samples for nutrients, pH, DO, salinity, and metals in 1990 indicated that no sample exceeded state standards (DON 1990). Dissolved nutrients were somewhat different from typical Hawaiian waters, in that mean total phosphorus exceeded total nitrogen. All nutrient concentrations, with the exception of ammonia, were greater in the surface layer, indicating a probable source in freshwater runoff. The samples were not analyzed for organic contaminants.

Aquatic Confined Disposal Site

The proposed action does not include siting and construction of an aquatic confined disposal facility (CDF), which might be required for disposing sediment dredged in the year 2000 maintenance dredging project. Such sites are being considered as part of the Long-Term Management Strategy for maintenance dredging sediment unsuitable for ocean disposal (see section 6.2). Impacts and mitigation associated with siting and construction would be analyzed in the NEPA documentation connected with that project. The CDF would consist of a small natural embayment somewhere within Pearl Harbor. The embayment would be walled in (probably with concrete) and the resulting CDF would receive sediment found not suitable for ocean disposal. Water quality at the site would be characteristic of Pearl Harbor waters as described above, somewhat modified by exposure to sediment unsuitable for ocean disposal.

Results of Marine Water Sampling for Radioactivity

To provide additional assurance that procedures used by the Navy to control radioactivity are adequate to protect the environment, the Navy conducts environmental monitoring in harbors frequented by its nuclear-powered ships. The current Navy environmental monitoring program in the PHNSY area includes analyzing samples of marine water (see below), sediment (see section 6.4.1), and marine life (see section 6.5.1).

Sampling of marine water in the PHNSY area in 1996 showed no detectable radioactivity associated with Naval nuclear propulsion plant operation or servicing (NNPP 1997). In addition to Navy sampling, the Environmental Protection Agency (EPA) has conducted detailed environmental surveys of selected U.S. harbors. A previous EPA survey of the PHNSY area in 1985 detected only naturally occurring radioactivity in marine water samples (EPA 1987), and trace amount of NNPP radioactivity in a few sediment samples at levels below comparable naturally occurring radionuclides.

For further discussion on the Navy's radiological environmental monitoring program, see section 7.4.4.

Installation Restoration (IR) Sites

Pearl Harbor sediments are a named IR site. See section 6.4.1.

6.3.2 Environmental Consequences and Mitigation Measures

Significance Criteria

An impact would be significant if one of the following occurred:

- Alteration of water circulation in the project site to the extent that substantial adverse effects on water quality or biological resources result.

- Discharge that creates pollution, contamination, or nuisance in violation of applicable federal or state standards. This would include state water quality standards or objectives, or the EPA National Ambient Water Quality Criteria, outside a permit-specified discharge mixing zone or immediate construction area.

- Creation of turbidity (suspended solids), dissolved oxygen, contaminant, or other conditions that would result in substantial mortality of aquatic organisms.

6.3.2.1 *Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)*

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging and Disposal

Up to 3,000,000 cy of sediment would be dredged if a CVN were homeported in Pearl Harbor. The navigation channels, and the turning basin are dredged periodically by a ship-mounted hopper dredge (operated by the U.S. Army Corps of Engineers). Areas near piers are typically dredged with a clamshell bucket operated from a barge.

No significant impacts would occur at the dredging sites. Dredging — either by hopper or clamshell — would disturb bottom sediments, and dredged materials would occasionally leak or spill from the dredge equipment, barge, and any associated pipelines. This action would not alter water circulation to the extent that substantial adverse effects on water quality conditions would occur. Turbidity impacts might exceed state water quality standards (geometric mean turbidity of 15.0 ntu no more than 2 percent of sample times [see Volume 6, section 6.3]) temporarily during dredging, but not outside the immediate dredging area. Turbidity is a common occurrence in Pearl Harbor waters and would not result in substantial mortality of aquatic organisms (see section 6.5).

Clamshell dredge turbidity would be controlled as needed by use of an appropriately designed clamshell, which minimizes loss of sediment into the water column. All dredging activities would be conducted in accordance with the Department of the Army permit currently held by the Navy.

NNPP RADIOLOGICAL IMPACT. Dredged material may contain trace amounts of radioactivity as a result of past Navy operations. These trace amounts, however, are far below the levels of comparable naturally occurring radionuclides, and would have no significant effect on the environment during or after the dredging operation or in the disposal of sediment, regardless of the location selected for disposal of the sediment. There is also scientific evidence that cobalt-60 from Naval nuclear propulsion plants does not buildup in marine life (NNPP 1997). Thus, there would be no short-term dredging-related impacts on water quality due to NNPP radioactivity from homeporting one NIMITZ-class aircraft carrier at PHNSY.

Disposal at an Aquatic Site

No significant impacts would occur at a CDF. Sediment destined for disposal at an in-harbor CDF would be pumped through a pipe directly into the CDF from a barge. Disposing sediment in such a facility would not alter harbor water conditions outside the confining barrier.

Disposal at an Ocean Site

No significant impacts would result from disposal of suitable sediment at the ocean disposal site. An EIS was prepared for the site and has already addressed impacts of temporary increases in water turbidity during disposal of suitable sediment at the site. Existing regulations define tests required to determine suitability of sediment for disposal at the site. Dredged sediment would be transported to the ocean disposal site in a hopper dredge and emptied at the site from the base of

6.4 SEDIMENT QUALITY

This section describes existing marine sediments in Pearl Harbor that would be affected by dredging for the proposed project.

Regulatory Setting

There are no state or local plans specific to sediment disposal in Hawaii. The relevant federal, state, and local statutes governing sediment quality are identified in section 1.5. In particular, issues associated with sediment dredging and disposal activities are governed by Sections 401 and 404 of the Clean Water Act and by the Marine Protection, Research and Sanctuaries Act.

6.4.1 Affected Environment

Pearl Harbor receives an estimated 180,000 cy per year of sediment from natural sources (see section 6.2). Up to 800 feet of sediment has been deposited in the harbor in recent geologic time.

Hazardous Harbor Sediment

The sediment of Pearl Harbor was identified as an IR site in 1983 (DON 1983). Field work has been completed for a study of contaminants in harbor sediment and biota, but the results of sediment analysis are not yet available. The study is being prepared by the Navy, in coordination with U.S. EPA, Hawaii Department of Health, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, State Department of Land and Natural Resources, and members of the public. Sediment sampling and analysis in October 1997 for this EIS identified the presence of heavy metals, PCBs, pesticides, and various semi-volatile organic compounds.

Sediment samples were collected in October 1997 (see Volume 6, section 6.4) to assess sediment quality in areas that would be dredged as part of the proposed action. The objective was to obtain screening level chemical and bioassay results for bulk sediment, to allow estimates to be made of the volume of material suitable for ocean disposal. The remaining volume to be dredged would require alternative disposal sites. Ten cores were obtained from the berth, turning basin, and entrance channel (see Figure 2-9 in Chapter 2 and Figure 1 in Volume 6, section 6.4). Two cores from the berth area (stations 1 and 2) were split between top and bottom and composited horizontally (samples 1-2T and 1-2B, respectively); the entire length of each of the other eight cores was composited.

Grain Size

Sediment samples were only loosely consolidated and contained 25-55 percent water. Pierside and western turning basin samples were mostly fine-grained (>90 percent silt and clay), while channel and eastern turning basin samples included up to 45 percent sand (see Volume 6, section 6.4).

Organic Carbon

1997 sediment samples contained total organic carbon (TOC) concentrations of 0.40-2.83 percent.

Bulk Chemistry

The 1997 samples were analyzed for parameters recommended by the Draft *Regional Implementation Manual: Requirements and Procedures for Evaluation of Dredged Material Proposed for Ocean Disposal in the State of Hawaii* (COE/EPA 1997) (see Tables 4-3 and 4-4 in Volume 6, section 6.4). Samples were also analyzed by toxicity characteristic leaching procedure (TCLP) to determine whether they would require regulation as hazardous waste, in the event that some sediment required upland disposal.

Metals results indicate the presence of relatively elevated concentrations of chromium, copper, lead, mercury, nickel, and zinc in all samples; concentrations in the upper pierside composite sample (1-2T) were an order of magnitude greater than metals concentrations in other sites. No metals were detected in TCLP leachate; therefore, no samples represent sediment that would require management as hazardous waste. Organic tin was present in most samples; it was detected at highest concentrations in the two shipyard samples (1-2T and 3).

Pesticide results indicate the presence of very low concentrations (<15 ppb) of several insecticides in several pierside and turning basin samples. PCBs were present in seven of 10 samples; the highest concentration (238 parts per billion [ppb]) was in the upper pierside composite sample (1-2T).

Semivolatile organic compounds (SVOCs) were detected in all 10 samples, but the greatest number of compounds and highest concentrations (by several orders of magnitude) were consistently detected in the upper pierside composite sample (1-2T). The compounds with highest concentrations (1-5 ppm) are components of petroleum products.

No sulfides were detected above the method reporting limits. Concentrations of total recoverable petroleum hydrocarbons (21-1,330 ppm) were not unusual for an industrial harbor site.

Toxicity/Contaminant Bioaccumulation

Sediment samples were used to perform bioassays to estimate suitability of the sediment for ocean disposal. Clean lab animals were exposed to harbor sediments to determine whether contaminants would harm or be bioaccumulated by the animals. No 1997 samples were found unsuitable for ocean disposal. The 1997 samples all passed the solid phase (SP) amphipod test for suitability for ocean disposal (see tables 4-5 and 4-6 in Volume 6, section 6.4), indicating that sediment dredged for CVN homeporting could probably be disposed at the South Oahu Ocean Disposal Site (EPA and COE 1991). Suspended particulate phase (SPP) analysis indicated that sediment will most likely pass modeled SPP suitability criteria for ocean disposal.

Several previous bioassay and bioaccumulation investigations were performed from 1980 through 1990. These studies repeatedly indicated minimal sediment toxicity from most Pearl Harbor sediments. The most recent harbor-wide sampling occurred in 1989-1990 in association with planned maintenance dredging. Results indicated no significant bioaccumulation except for total butyltins in clams, and no significant differences between control and test biota in survival (Grovhoug 1992). No significant toxicity and no bioaccumulation of organics (phenols, PCBs, polycyclic aromatic hydrocarbons [PAHs], pesticides) were found in samples from the shipyard and channels or other areas of the harbor. Statistically significant bioaccumulation potential of silver and lead was detected in the general shipyard area (Southeast Loch) and of nickel and cadmium in the harbor's inner channel. Various studies in the 1970s detected 100–1,000 ppm of trace metals in harbor sediments (DON 1990). Detected concentrations of copper, lead, and mercury apparently decreased between 1970 and 1990, but detected concentrations of zinc have apparently increased in the same period (Grovhoug 1992).

Results of Sediment Sampling for Radioactivity

Sampling of sediments in the Pearl Harbor area in 1996 showed no detectable radioactivity associated with Naval nuclear propulsion plant operation or servicing (NNPP 1997). The detectable level of cobalt-60 for Navy radiological surveys is approximately 0.1 pCi/gram (wet). The actual value varies depending on the amount of naturally occurring radioactivity in the survey sample. A previous EPA radiological survey of Pearl Harbor in 1985 (EPA 1987) also showed detectable cobalt-60 in Pearl Harbor. The highest level detected in surface sediment was 0.88 pCi/gram (dry) near PHNSY. This radioactivity is a result of releases of low-level radioactivity from nuclear-powered ships in the 1960s. These levels are well below the naturally occurring radioactivity levels in the harbor, and have no radiological impact on the area. Since the early 1970s, the Navy has prohibited intentional discharges of radioactivity to the harbor, and the level of radioactivity in the sediments has significantly decreased due to radioactive decay. Cobalt-60 decays with a half-life of 5.2 years. Therefore, in 50 years the amount originally present is reduced by a factor of approximately 1,000 and in 100 years by a factor of approximately 1,000,000. Otherwise, only naturally occurring radioactivity and traces of cesium-137 from nuclear weapons testing fallout were observed in the sediment samples.

6.4.2 Environmental Consequences and Mitigation Measures

Elements of the proposed project that could affect sediment quality include (1) dredging in the Main Entrance Channel, turning basin, and at B2/3, (2) dredged material disposal, and (3) operational and/or accidental discharges or releases from naval vessels.

Potential impacts to sediment quality from the proposed project include the following: (1) dredging-related impacts associated with resuspension and possible redistribution of sediments (2) inputs of contaminants such as metals from anti-fouling paints, corrosion, and sacrificial anodes, (3) low probability, accidental spills of contaminants into the harbor, and (4) cumulative effects and long-term accumulation of contaminants in harbor sediments.

Significance Criteria

An impact would be significant if the following occurred:

- A discharge of dredged material occurs at the surface of a disposal site or exposure of sediments at a dredging site, which would cause substantial toxicity or bioaccumulation of contaminants in aquatic biota.

6.4.2.1 *Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)*

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging

No significant impacts would occur as a result of exposing deeper sediment at the dredge sites. Sediment samples from the proposed dredge areas represent the entire depth to be dredged (50 feet) plus an overdredge of 2 feet. Because most samples were vertically composited, the physical and chemical characteristics described above are representative of the new sediment layer (which would be exposed after dredging) as they are of the existing surface layer. Past studies have indicated that deeper sediments may contain higher concentrations of some contaminants but lower concentrations of others, so no overall increase or decrease in local toxicity would occur as a result of dredging. Only minor changes in physical and conventional characteristics of surface sediments result from dredging.

No significant impacts on ocean disposal site substrate would result from disposal of sediments determined to be suitable for ocean disposal. Suitability is determined on the basis of physical, chemical, and biological tests, including tests for bioaccumulation. Analysis of the 1997 sediment samples indicated that all of the sediment dredged for the project would be suitable for ocean disposal. The ocean disposal site has received similar sediment from Pearl Harbor at least twice in the past 30 years.

Sediment sampling results indicate no sediment would likely need to be disposed in a CDF. However, if required, home port dredged sediment would be disposed on top of any maintenance dredging sediments previously deposited in such a CDF, provided capacity were available.

Facility Improvements

No facility improvements are planned for aquatic sites, so no direct contact with sediment would occur. Section 6.3.2.1 identifies prevention measures that would mitigate potential impacts from construction on sediment quality (that is, construction site releases of petroleum or hazardous substances to the harbor water and thereby to underlying sediment) to less than significant.

Operations

No significant impacts to sediment quality would result from routine ship and shipyard operations. Disturbance and resuspension of sediments from propeller wash would not be different from present harbor activities, so no significant operational effects would occur. Prevention measures that would mitigate potential impacts to nonsignificance are listed in section 6.3.2.1. Disturbance and resuspension of sediment from propeller wash would not be different from the turbidity plumes routinely created by ships passing through the harbor.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 6.3.2 would continue, there would be no significant impacts on sediment quality from homeporting a NIMITZ-class aircraft carrier at PHNSY.

6.4.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Because this alternative component would result in no change in existing conditions, no impacts from sediment quality would occur.

6.4.2.3 Mitigation Measures

No significant impacts on sediment quality would result from homeporting a CVN in Pearl Harbor. No mitigation is proposed.

6.5 MARINE BIOLOGY

6.5.1 Affected Environment

This section describes the biological community in Pearl Harbor that would be affected by dredging and construction activities for the proposed project. Biological communities addressed in this section include plankton, algae, invertebrates, fishes, marine mammals, threatened and endangered species, and the results of marine life sampling for radioactivity.

The waters of Pearl Harbor are considered an inland estuary and classified as Class 2 waters by the Hawaii Department of Health (1992), as discussed in section 6.3.1. Pearl Harbor is not considered a natural or pristine environment because of impacts over time from surrounding urbanization, industrial use and pollutants, sedimentation, and maintenance dredging activities. Sedimentation is a predominant factor influencing the harbor's marine community. Large volumes of freshwater runoff from streams discharge sediment into the harbor, creating relatively high turbidity.

Marine communities in Pearl Harbor are relatively homogeneous with regard to habitat type and are represented by four general zones: sand-rubble, algal mud, channel wall, and channel floor mud-silt. Marine organisms commonly found in the areas not impacted by shipping include sea cucumbers, algae, sponges, worms and tubeworms, benthic shrimps and crabs, and a few species of fish, such as *Arothron hispidus* and *Parupeneus porphyreus* (DON 1995c). Limited commercial fishing of nehu (*Stolephorus purpureus*) (a baitfish) occurs with permission from the Naval Base. No threatened or endangered marine life have been reported from the project area, although it is possible that green sea turtles (*Chelonia mydas*) may enter Pearl Harbor infrequently. Two major groups of organisms common in other Hawaiian waters — stony corals and sea urchins (echinoids) — are not found inside Pearl Harbor (Grovhoug 1992).

The State Department of Health (DOH) issued an advisory to the public in August 1998 that marine life (i.e., crabs, clams, fish and bait fish) taken from Pearl Harbor should not be consumed by humans. Based on recommendation from DOH, Naval Base Pearl Harbor posted signs around the harbor's shoreline advising the public of the state's fish consumption advisory. Preliminary findings from an ongoing study of Pearl Harbor sediments indicate low, but unacceptable levels of herbicides, pesticides, polychlorinated biphenyl (PCBs) in the sediment and tissue of fish and shellfish that feed off the bottom of the harbor. Harbor fish are exposed to daily influxes of pesticides and other contaminants carried in sediment entering the harbor from seven streams draining agricultural and urban lands. Preliminary data collected for the study has not yet demonstrated a relationship between contaminated sediment and the levels of contaminants in fish and shellfish. (See sections 6.2 and 6.5.) The study is being prepared by the Navy, in coordination with U.S. EPA, Hawaii State Department of Health, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration (NOAA), State Department of Land and Natural Resources (DLNR) and members of the public. The study commenced in 1996; results will be published in the spring of 1999 (DON, NBPH Naval Environmental Affairs Officer 1998).

A marine survey was conducted in September 1997 for this EIS, the results of which are included in Volume 6, section 6.3. The marine biota characteristics of the proposed action site (B2/3, the turning basin, and the Pearl Harbor entrance channel) are briefly described as follows (see Figure 1 in Volume 6, section 6.3).

Plankton

Plankton are free-floating or weakly swimming plants and animals that form the base of the marine food chain. No information is available on plankton assemblages within Pearl Harbor. Given the degree of naturally occurring sedimentation and the reduced clarity of the waters of the harbor, caused in part by free-floating phytoplankton, plant and animal plankton within the harbor would be adapted to the existing water quality regime.

Eelgrass/Algae

Eelgrass does not occur in Pearl Harbor. Similarly, no macroalgal species were observed in the project area during the September 1997 survey. The algal mud habitat zone harbors microalgae.

Invertebrates

Composition and consistency of sediment habitats varied from fine terrigenous mud to mud with mixed carbonate and broken shell pieces (e.g., from oysters and barnacles). Dark-colored, fine sediment or mud was present in all samples collected except those from Station 8 (see Volume 6, section 6.4, Figure 1), which were comprised of very fine pale-colored mud (probably carbonate of reef origin).

Throughout the study area burrowing macrofauna appear abundant, based on the numerous burrows observed in the soft mud bottom. However, none of these organisms were collected in the sediment cover, likely because of their motility and potentially deep burrowing ability. All of the benthic organisms are likely found throughout the soft-bottom environments of Pearl Harbor.

Results of the benthic infaunal analysis indicate the abundance of live-collected macrofauna was very low; no live-collected macrofauna were recorded in eight of the 30 samples. The infauna were dominated by six species of polychaete typical of stressed marine environments. Only one species of non-polychaete, an anemone, was collected (at Station 8). Similarly, the abundance of individuals was low. The range of mean individuals per station was 0.7 to 2.7. The polychaete *Capitella* sp. was the most common polychaete collected, followed by *Sternapsis* sp., *Podarke* sp., and *Prionospio cirrifera,* of which three and two individuals respectively were collected. There were four species of which only one individual was collected (see Volume 6, section 6.5, Table 6.5-1).

The relatively low abundance and diversity of organisms is probably related to the sample locations in the middle of active ship channels. As large ships and tug boats move through the harbor they create propeller wash that stirs up the sediment. Consequently, most organisms are unable to establish and maintain themselves in these areas. Analysis of samples taken from stations outside shipping channels revealed substantially greater numbers of species and individuals. For example, work completed in April 1997 (Environmental Assessment Co. 1997) on the soft-bottom benthos near the submarine docking facilities at Pearl Harbor, away from propeller wash areas, noted a mean of 22 species and 174 individuals per sample. Also, a study of marine communities in Pearl Harbor (Bishop Museum 1997) noted 60 taxa in their soft-bottom samples. The diversity and abundance of soft-bottom benthos declined in samples collected from areas with high sediment input (heads of lochs and close to stream mouths) as well as from areas where sediments are in fine-grained silt to clay (Bishop Museum 1997).

Fishes

Few to no fish occur in the areas to be dredged, due to a lack of food and cover. Fish would probably avoid the dredging area in favor of adjacent habitat. As a result, no impacts on fish are expected from temporary resuspension of sediment due to dredging. Any impacts would be temporary and localized and would be less than significant.

Birds

Sea birds frequenting the project area are discussed in section 6.6.1.

Marine Mammals

There are no marine mammals frequenting or inhabiting the project areas.

Threatened and Endangered Species

There are no threatened or endangered species of marine organisms found within Pearl Harbor. Threatened and endangered water birds inhabiting or frequenting Pearl Harbor are discussed in section 6.6.1.2.

Results of Marine Life Sampling for Radioactivity

Sampling in the Pearl Harbor area in 1996 of mollusks, crustaceans, and marine plants showed no detectable radioactivity associated with naval nuclear propulsion plant operation or servicing (NNPP 1997). These results demonstrate that no bioaccumulation of NNPP radioactivity has occurred. A previous EPA radiological survey of the Pearl Harbor area in 1985 (EPA 1987) detected only naturally occurring radioactivity and radioactivity attributed to fallout from past nuclear weapons tests.

6.5.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Significant impacts would occur if the project results in the following:

- There would be a substantial adverse effect on a threatened, endangered, or sensitive species, including state and federally listed or proposed species. A substantial adverse effect would include destruction or adverse modification of critical habitat or reductions in the abundance or long-term viability of the species. Such an effect may result from direct harm to individuals, or through effects on the competitors, predators, prey, or habitat of the species that could result in increased mortality or reduced reproductive success. Consideration would also be given to "species of concern" that could meet criteria for listing.

- The impact would violate applicable federal or state laws with respect to the protection of biological resources. Consideration would be given to impacts involving the loss or long-term degradation of sensitive habitat, defined as habitat that (1) provides essential resources that are otherwise limited on a regional scale; (2) serves as a concentrated breeding, nursery, or foraging area; or (3) supports substantial concentrations of one or more sensitive species.

- Consideration would also be given to effects resulting from interference with the movement of resident or migratory fish and wildlife, to the extent that substantial adverse impacts threatened the survival or reproductive success of a population.

6.5.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Drydock #4 upgrade; and personnel support facilities.

Dredging

PLANKTON

Dredging activities would temporarily increase suspended solids within the water column, potentially interfering with phytoplankton productivity. However, the increased turbidity conditions would be localized and temporary and similar to existing naturally turbid conditions. The overall effect on phytoplankton would be insignificant. Similarly, impacts to zooplankton are expected to be insignificant due, in part, to the low number of species occurring in the vicinity of the project site, and because the existing species should be adapted to the naturally turbid conditions.

EELGRASS/ALGAE

There are no eelgrass beds within Pearl Harbor. Therefore, the proposed dredging activities would not impact eelgrass. Similarly, no macroalgal species were observed in the proposed action area during the marine biological survey performed for the proposed action. Therefore, the proposed dredging activities would not significantly impact algae communities.

INVERTEBRATES

Impacts would occur to many benthic invertebrates that would be removed from the dredging area. However, the community is already very depauperate in the project region, and recolonization would occur from the adjacent areas of the harbor. Dredging would increase turbidity in the dredge areas, but existing communities should be adapted to high suspended sediment levels. No impacts are expected from temporary resuspension of sediment, because the biota are already exposed to any contaminants present in the sediment. The ongoing j study has not demonstrated a relationship between sediment contamination and elevated levels of contaminants found in fish and shellfish. Some epifauna are motile and would be able to move to other channel areas outside the dredging site.

FISHES

Most fish would probably avoid the dredging area, and be temporarily displaced to adjacent habitat. However, since these effects would be localized and limited to dredging periods, the impacts would be less than significant. Dredging is not expected to affect or increase levels of contamination bioaccumulated in fish.

BIRDS

Potential impacts to seabirds frequenting the project area are described in section 6.6.2.

THREATENED AND ENDANGERED SPECIES

No threatened or endangered species occur in the project or general harbor area so no impacts to these types of organisms would result from dredging activities.

Facility Improvements

Changes in water quality resulting from construction activities would be temporary and localized (section 6.2.2), and therefore would not be of a magnitude to affect biological communities in the vicinity of the proposed home port area.

Operations

Present ship operations in the harbor and proposed home port area typically cause propeller wash that disturbs the sediment and biological communities in and around the area. Because of this, the addition of one CVN to the harbor, which would operate similarly to existing ships, would not result in any significant impacts to marine biota.

NNPP RADIOLOGICAL IMPACT. Because the controls discussed in section 6.3.2 would continue, there would be no significant impacts on marine biology due to NNPP radioactivity from homeporting a NIMITZ-class aircraft carrier at PHNSY.

6.5.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Because this alternative component would result in no change in existing conditions, no impacts to marine biota would result.

6.5.2.3 Mitigation Measures

Significant impacts to marine biological resources would not occur; thus, no mitigation measures are proposed.

6.6 TERRESTRIAL BIOLOGY

This section addresses terrestrial biology of the Pearl Harbor Naval Complex.

6.6.1 Affected Environment

Plants

The Pearl Harbor Naval Complex was established in 1908. Consequently, almost all of the installation has been urbanized and/or industrialized for a variety of military uses. As indicated in section 6.7, all of the installation is considered developed.

Several botanical assessments and inventory surveys of Pearl Harbor Naval Complex have been conducted over the past 15 years (Char 1989a, 1989b; Hall 1984). The botanical studies indicate that vegetation consists almost exclusively of introduced species. All of the areas that could be directly affected by the proposed action are designated for shipyard support facilities and are already urbanized/industrialized. Flora, where it exists, is composed largely of landscape plantings or weedy species.

Animals

Ornithological and mammal surveys of the Pearl Harbor Naval Complex have been conducted over the past 15 years (Bruner 1988, 1989). During a 1989 survey conducted for the Ford Island Bridge project (Bruner 1989), a total of 15 bird species were observed in or near the project area, about 2,000 feet north of B2/3. With the exception of the migratory Pacific golden plover (*Pluvialis fulva*), all species were exotic or introduced species. The rocky shorelines within Pearl Harbor are suitable to support wandering tattler (*Heteroselus incanus*) and ruddy turnstone (*Arenaria interpres*), two common indigenous migratory seabirds, although none were observed during the surveys. Additional birds that may potentially inhabit or frequent the project sites include the common barn owl (*Tyto alba*), northern mockingbird (*Mimus polyglottus*), common waxbill (*Estrilda astrild*), chestnut mannikin (*Lonchura malacca*), rock dove (*Columba livia*), common Java sparrow (*Padda oryzivora*), and common house sparrow (*Passer domesticus*).

Mammals likely inhabiting the proposed home port sites include the common Indian mongoose (*Herpestes auropunctatus*), rat (*Rattus* sp.), and the common house mouse (*Mus musculus*). Feral dogs and cats may also occur, but none have been observed.

Threatened and Endangered Species

Previous studies have not identified any sensitive plant communities in the proposed action areas, nor are there any known listed or candidate endangered or threatened species of plants found within the proposed action areas.

The Pearl Harbor National Wildlife Refuge is divided into two units. The Waiawa Unit at Middle Loch is located approximately 4 miles northwest of the project site. The Honouliuli Unit on West Loch is located approximately 4.5 miles west of the project site. They provide habitat for the endangered Hawaiian coot (*Fulica alai*) and Hawaiian stilt (*Himantopus mexicanus knudensi*). No listed or candidate threatened or endangered species of birds or mammals are known to inhabit or frequent the project sites and none have been sighted during the various surveys of the B2/3 area.

6.6.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Significant impacts would occur if the project results in the following:

- There would be a substantial adverse effect on a threatened or endangered species, including state and federally listed or proposed species. A substantial adverse effect would include destruction or adverse modification of critical habitat or reductions in the abundance or long-term viability of the species. Such an effect may result from direct harm to individuals, or through effects on the competitors, predators, prey, or habitat of the species that could result in increased mortality or reduced reproductive success. Consideration would also be given to "species of concern" that could meet criteria for listing.
- The impact would violate applicable federal or state laws with respect to the protection of biological resources.
- Consideration would be given to impacts involving the loss or long-term degradation of sensitive habitat, defined as habitat that (1) provides essential resources that are otherwise limited on a regional scale; (2) serves as a concentrated breeding, nursery, or foraging area; or (3) supports substantial concentrations of one or more sensitive species.
- Consideration would also be given to effects resulting from interference with the movement of resident or migratory fish and wildlife, to the extent that substantial adverse impacts threatened the survival or reproductive success of a population.

6.6.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging

Terrestrial biology would not be affected by the proposed dredging activities.

Facility Improvements

No significant impacts on terrestrial biota would result from facility improvements associated with this alternative component. The Pearl Harbor Naval Complex area has been extensively altered over the past 90 years, and the installation is highly urbanized and industrialized. The flora and fauna of the project sites are all introduced or migratory indigenous species. There are no rare, threatened, or endangered species or sensitive habitat to be impacted. No federal or state protection laws would be violated by the proposed action.

Operations

No significant impacts on terrestrial biota would result from operations of this alternative component. The Pearl Harbor Naval Complex area has been extensively altered over the past 90 years, and the installation is highly urbanized and industrialized. The flora and fauna of the project sites are all introduced or migratory indigenous species. There are no rare, threatened, or endangered species or sensitive habitat to be impacted. No federal or state protection laws would be violated by the proposed action.

6.6.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Because this alternative component would result in no change in existing conditions, no impacts on terrestrial biota would.

6.6.2.3 Mitigation Measures

Because impacts on terrestrial biology would be less than significant, no mitigation measures are proposed.

6.7 LAND USE

6.7.1 Affected Environment

This section describes existing land uses and land use plans for the Pearl Harbor Naval Complex and for the general region surrounding it.

6.7.1.1 Pearl Harbor Naval Complex

The Pearl Harbor Naval Complex includes Ford Island, the Pearl City Peninsula, and the land area east of Pearl Harbor (Figure 6.1-1). The Waipio Peninsula and areas south of West Loch are part of the U.S. Naval Magazine Lualualei (NAVMAG Lualualei) except for two small areas belonging to NAVSTA Pearl Harbor. The area immediately west and south of Pearl Harbor Naval Complex includes Hickam Air Force Base and Honolulu International Airport.

There are several different commands and land use activities within the core area of Pearl Harbor Naval Complex, including NAVSTA Pearl Harbor and Intermediate Maintenance Facility; Fleet and Industrial Supply Center, Pearl Harbor (FISC Pearl Harbor); and Pearl Harbor Naval Shipyard. In essence, all of the core area is fully developed (see Figure 6.7-1).

The areas immediately adjacent to the operational ship berthing areas within Pearl Harbor Naval Complex are primarily industrial activities. Berthing and support facilities are concentrated within the NAVSTA Pearl Harbor areas.

The developed Pearl Harbor Naval Complex areas east of Kamehameha Highway include the headquarters complex in the Makalapa area and the family-oriented support complex in the Moanalua area. The main PWC Pearl Harbor complex also is located in this area, close to both the industrial operations and the family housing areas.

Pearl City Peninsula has a mix of family housing and industrial development, such as fuel tanks, petroleum-oil-lubricant (POL) operations, and warehousing. The Waipio Peninsula traditionally has been primarily used for agriculture due to the explosive safety quantity distances (ESQD) required from the West Loch berths. Agricultural activities have lessened due to high land values and the cessation of sugar operations by the Oahu Sugar Company.

Land use on Ford Island has been dominated by the Auxiliary Landing Field (ALF) and the clear zones associated with the runway. Operational and administrative areas are on both sides of the runway along with storage functions in the former aircraft hangars. Family housing areas are on the northern and eastern portions of the island and new housing units are planned (see section 6.8.1).

Land use at the proposed home port site within PHNSY (B2/3) is presently dedicated to ship berthing and support activities. A 60-long-ton lift capacity rail crane, potable and salt water, sewer, electrical, and steam utility connections are available (see section 6.16), and the piers are sufficiently long to handle the CVN (see section 6.9.2). Lands immediately adjacent to and in the vicinity of the piers are also dedicated to ship maintenance and operation activities. Included are electrical, carpentry, rigging, and mechanical shops necessary to support normal ship operation and maintenance activities, as well as laydown areas for equipment and supplies. The Navy is in the process of consolidating shop activities to obtain more efficient and cost-effective operations.

The shipyard adjoins Hickam Air Force Base. Other areas of Pearl Harbor adjoin state highways, light industrial areas, and suburban neighborhoods.

ESQC Arcs

ESQD hazard zones have been established by the DOD for various quantities and types of explosives. Minimum distances, or ESQD arcs, are prescribed to separate explosives from inhabited structures, public roads, and other explosives. Ammunition handling transactions are not permitted at berths B2/3. The major ESQD zones at Pearl Harbor emanate from ammunition piers at West Loch. The zones were established to accommodate ships with up to 3.25 million pounds Net Explosive Weight of Class I, Division I ordnance. The West Loch ESQD arc extends across the entire Entrance Channel. Ships and craft must offload their ordnance at the West Loch piers or to offshore transfer ships prior to entering the shipyard. The only other ESQD arcs in the shipyard berths are 1,600 feet away, emanating from berths B22 to B26.

Aircraft Installation Compatible Use Zones

Pearl Harbor Naval Complex does not operate any active military airfields. A runway on Ford Island is used by civilian light aircraft and occasionally by military helicopters. Hickam AFB runways and the Honolulu International Airport lie within 1 mile and 3 miles, respectively, of PHNSY. Aircraft Installation Compatible Use Zones (AICUZ) delineate areas where aircraft accidents would be most likely to occur. The shipyard lies outside of the two airfields flight paths and their AICUZ zones.

6.7.1.2 City and County of Honolulu

Pearl Harbor Naval Complex is located within the City and County of Honolulu. Major land uses in the vicinity include the communities of Pearl Ridge, Aiea, Waimalu, and Waipahu. These areas are bedroom communities with shopping, recreational, and light-industrial support functions. The region is one of the fastest growing areas on Oahu, with both state and City and County of Honolulu land use plan policies directing growth toward west Oahu. The new communities of Kapolei and West Loch, along with established communities of Ewa Beach, Waipahu, and Makakilo, are experiencing rapid growth of civilian homes and support facilities.

Land uses outside the Pearl Harbor Naval Complex are governed by the State Plan and State Functional Plans for Transportation, Agriculture, Employment, Tourism, and Land Use. The City and County of Honolulu General Plan and Central Oahu Development Plan and Facilities Plan control land uses at the local level. The proposed action would be in conformance with these land use and facilities plans.

The civilian land uses do not encroach on Navy operations and facilities at Pearl Harbor Naval Complex, but traffic congestion, the need to comply with state and local noise and air quality codes and standards, and increased civilian population levels could restrain future activities within the Pearl Harbor Naval Complex. At this time, none of the existing or planned civilian regional characteristics would affect the proposed action. However, civilian housing, socioeconomic, and traffic factors would be affected by the proposed action (see section 6.7.2).

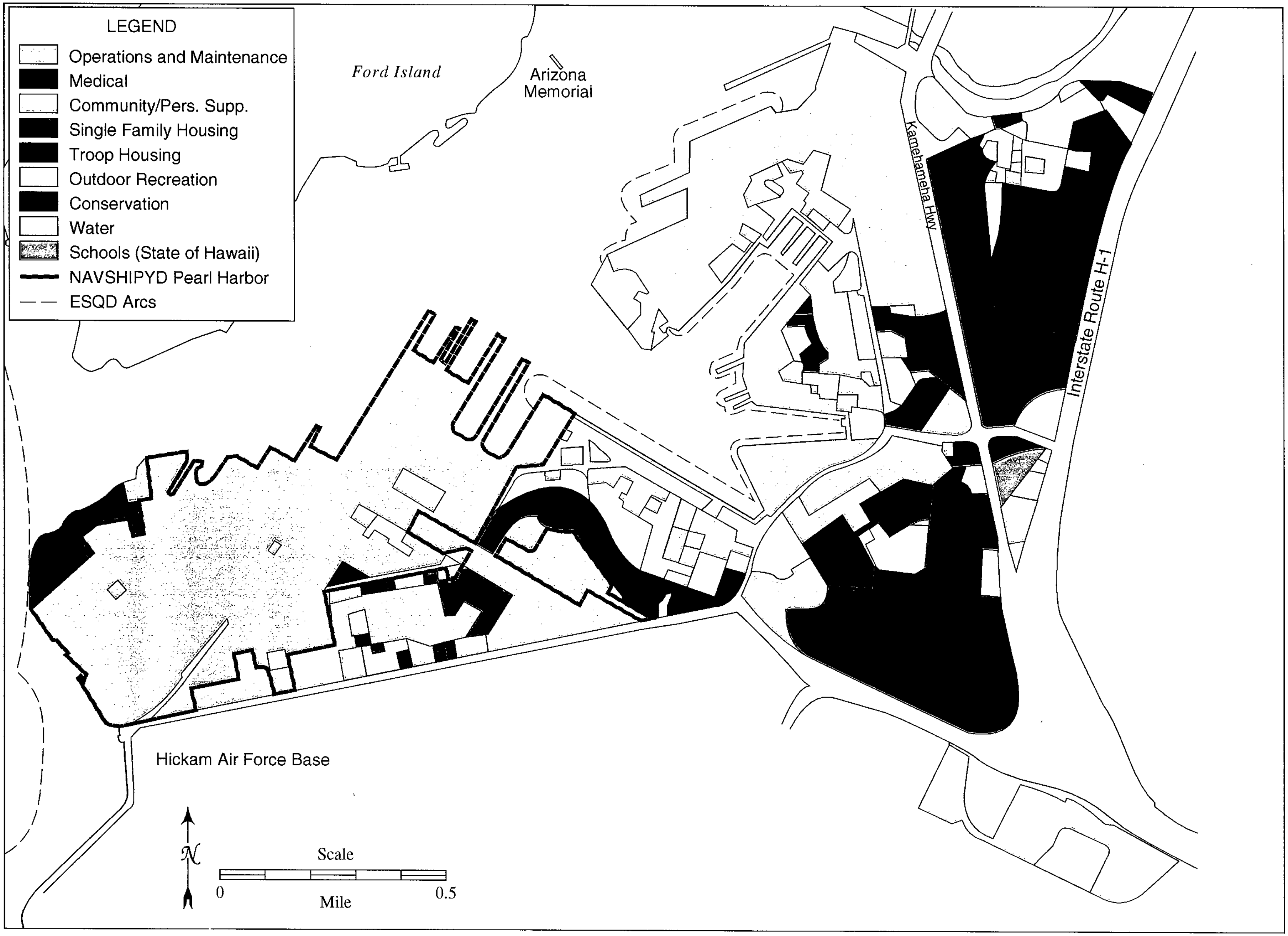

Figure 6.7-1. Land Use in the PHNSY Vicinity

The federal Coastal Zone Management Act (CZMA) of 1972 requires federal agency projects in coastal zones to be consistent with enforceable local coastal management programs. In Hawaii, all lands are considered to be within the coastal zone, except federal lands.

6.7.2 Environmental Consequences and Mitigation Measures

Significance Criteria

A land use impact is significant if one or more of the following result:

- Inconsistency and/or conflict with the environmental goals, objectives, or guidelines of *Pearl Harbor Naval Complex Master Plan* or AICUZ;
- Incompatibility with existing land uses on site; or
- Incompatibility with surrounding uses.

6.7.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging

No land use impacts would result. The addition of one CVN will require dredging up to 3,000,000 cy from the area immediately around B2/3, the Pearl Harbor entrance channel, and the turning basin. This is not a land use change, because the harbor has been dredged several times over the past 80 years.

Any Navy sediment disposal facility would be located on existing Navy land in a previously developed industrial area. Therefore, no land use inconsistency or incompatibility would result.

Facility Improvements

No significant impacts would result. Homeporting would involve demolition of several industrial buildings and replacement with newer industrial buildings. The proposed demolition and construction sites are all consistent with the industrial nature of PHNSY and with the *Pearl Harbor Master Plan*. Such activities have occurred repeatedly since the area was first developed in 1918.

Operations

Use of the B2/3 area for berthing a CVN would not result in any major land use changes. The area is presently designated for ship berthing, maintenance, and operation activities and these activities would continue. Therefore, no inconsistency or incompatibility would occur.

6.7.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Because no change in existing land uses would occur, no land use impacts would occur.

6.7.2.3 Mitigation Measures

No mitigation measures are required because there are no potentially significant impacts.

6.8 SOCIOECONOMICS

6.8.1 Affected Environment

The potential socioeconomic impacts of homeporting a CVN in Pearl Harbor would be felt over a large area. Pearl Harbor is surrounded by an urban zone, from suburbs along the West Loch side of the harbor, to the towns of Waipahu, Pearl City, and Aiea, to metropolitan Honolulu (Figure 6.1-1). In general, Navy personnel and operations are found throughout the urban areas of Oahu. Navy housing is located near Pearl Harbor, to the west at Naval Air Station (NAS) Barbers Point and Iroquois Point, and in smaller concentrations in central Oahu. Navy personnel are also being relocated to Marine Corps Base Hawaii, Kaneohe Bay, on a peninsula between the towns of Kailua and Kaneohe. Housing costs have been a long-standing problem on Oahu, and there is a need for additional housing for military families.

About three-quarters of Hawaii's people live on the island of Oahu. In the next 20 years or so, the island population is expected to grow by about 0.7 percent annually, and incomes are expected to grow by about 1.8 percent annually. The military share of the state economy is estimated to be about 12 to 14 percent. Military land on Oahu amounts to 21 percent of the island's surface area. The military role in Hawaii is expected to change little in the foreseeable future.

Local Economy

Major employment sectors on Oahu are the military (particularly at Pearl Harbor) and tourism, followed by state and county governments and agriculture. None of these sectors is currently growing in Hawaii.

Economic activity on Oahu is concentrated in the Primary Urban Center (PUC) of Honolulu. However, it is home to only half of the island population. It is anticipated that, along with the development of the secondary urban center in the Ewa region (west of Pearl Harbor), most expansions in retail, industrial, and government activity will occur there and in the Waipahu/Mililani area. The City of Kapolei and the adjacent Ko Olina resort complex are likely to obtain an increasingly greater share of office and resort activity. Table 6.8-1 identifies employment forecasts for Oahu Development Plan Areas (DPAs).

As indicated in Table 6.8-1, over three-quarters of the jobs on the island of Oahu are located in the PUC. While the total number of jobs is projected to increase for the PUC, its share of all jobs on Oahu is projected to decrease over time, from 77 percent in 1990 to approximately 69 percent in 2020. The number of jobs in the Ewa DPA is projected to increase at an approximate average annual rate of over 4 percent, a rate nearly nine times that for the PUC. Likewise, Ewa's share of the total number of jobs on Oahu is projected to increase from 3 percent in 1990 to approximately 10 percent in 2020. The speed of job-creation at Ko Olina and at NAS Barbers Point (after the base closes in 1999) is at this time uncertain. Kapolei, projected to become the major employment center of the region, is dependent on continued business development in the City of Kapolei. Campbell Industrial Park and Barbers Point Deep Draft Harbor will function as industrial and maritime employment centers.

Table 6.8-1. Employment Forecast for Oahu DPAs 1990-2020

DPA	*1990*	*Share (%)*	*2000*	*Share (%)*	*2010*	*Share (%)*	*2020*	*Share (%)*	*Average Annual Growth Rate*
PUC	390,576	77	412,300	75	435,233	73	459,441	69	0.5 percent
Ewa	17,434	3	26,903	5	44,514	7	64,061	10	4.4 percent
Central Oahu	40,153	8	48,666	9	58,984	10	71,490	11	1.9 percent
East Honolulu	7,058	1	7,625	1	8,237	1	8,898	1	0.8 percent
Koolaupoko	34,800	7	34,713	6	34,627	6	34,541	5	0.0 percent
Koolauloa	4,861	1	5,951	1	7,286	1	8,921	1	2.0 percent
North Shore	3,583	1	3,987	1	4,435	1	4,935	1	1.1 percent
Waianae	5,611	1	6,858	1	8,383	1	10,246	2	2.0 percent
Oahu	504,706	100	547,003	100	598,700	100	662,533	100	1.4 percent

Source: City & County of Honolulu Planning Department forecasts through 2020.

Housing

Housing conditions on Oahu during the 1990s have been shaped by the expansion of housing stock (both military housing and private-sector development), the economic downturn of the 1990s, and consolidation of military personnel and operations. The result has been decreases in the number of occupied rental units and a decline in rental rates. As of the end of 1995, the rental vacancy rate had increased to 5.4 percent of the total rental housing stock. The U.S. Census Bureau Annual Rental Vacancy Survey shows a 6.4 percent Honolulu vacancy rate for 1997.

The island housing inventory includes both on-base and off-base units. The total resident inventory (not including group quarters [excludes barracks and other institutional shelter]) grew by more than 34,400 units between 1984 and 1994 (DBEDT 1996).

On base, the supply of military family housing (for all of the armed forces) totals about 20,050 units and is expected to grow to 20,600 units by 2001 (The Prudential Locations, Inc. 1997). The bachelor housing supply amounts to about 11,100 units. This number is expected to grow to 11,750 units by 2001. With recent changes in rules defining the space requirements for such units, renovation of existing units is likely to yield no growth in inventory.

Off base, the total rental inventory is currently estimated at 128,000 units (SMS Research and The Prudential Locations, Inc. 1997).

U.S. military personnel have been estimated as needing some 28,000 family housing units and 19,850 bachelor units by 2001. The increase by 2001, included in these numbers, comes to 2,450 family housing units and 750 bachelor units. (The number of housing units involved is smaller than these numbers suggest, since unaccompanied military personnel can share units off base.) Total needs for rental housing units, from both military and civilian households, are expected to grow as follows:

- 1997 - 2001: 6,680 units;
- 2002 - 2005: 6,140 units;
- 2006 - 2010: 7,240 units; and

- 2011 - 2015: 6,650 units.

For forecasting purposes, all housing priced at levels affordable for households making 80 percent of the median household income (as estimated by the U.S. Department of Housing and Urban Development [HUD]) is treated as in the rental pool. New demand is expected to be distributed as follows: 26.2 percent Very Low Income (less than 30 percent of HUD median); 34.5 percent Low Income (30 percent to 50 percent of HUD median); and 39.2 percent Moderate Income (50 percent to 80 percent of HUD median).

In recent years, some military families have been able to buy housing, despite high Hawaii prices. About 25 percent of officers and 5 percent of enlisted families living off base have purchased homes (The Prudential Locations, Inc. 1997).

In 1998, the military rental market changed; single military personnel are able to combine housing allowances when sharing a unit. This change, to be gradually implemented over approximately 3 years, will lower the number of units demanded by single personnel and make a wider range of units available to them. In terms of the income categories used above, the change will mean that single E-5 personnel (pay grade 5 enlisted personnel), whose housing allowance is just below the bottom of the rental range for Moderate Income renters, will have more than the maximum of that range, if willing to share a unit. Off-base bachelor and family housing rental markets will effectively overlap.

Schools

The U.S. Department of Education provides federal impact aid in the form of basic support payments for school districts where there are at least 400 federally connected students or where 3 percent of the average daily attendance is federally connected. Basic support payments are made for dependents living either with military or civilian employees who are working for or assigned to federal military installations. The minimum eligibility requirement for funding off-base civilian students is 1,000 students and at least 10 percent of average daily attendance.

The potentially affected area includes all of Oahu, which is not divided into community school districts. Hawaii has a single statewide public education system funded by the state, not independent districts. As of the 1995-96 school year, the State maintained 242 schools. Private schools enroll about 16.2 percent of total primary and secondary school students (about 30,000 students, on Oahu). Private schools account for nearly one quarter of all high school graduates on the island (as of 1994, according to DBEDT 1996).

Public school enrollments have been increasing on Oahu and statewide, as shown in Table 6.8-2. However, the number of federally-connected pupils, military dependents and children of civilian federal employees of the armed services, has changed little in recent years. Federal Impact Aid has averaged about $580 per pupil. However, the annual cost of schooling per public school student has been nearly $5,800; therefore, Impact Aid accounts for only 10 percent of the cost of schooling.

Table 6.8-2. Fall Enrollments and Federal Impact Aid			
	1993-94	1994-95	1995-96
Total Enrollment State of Hawaii DOE	181,212	182,691	184,408
Federally-connected pupils as share of enrollment	35,306 19.5%	33,650 18.4%	33,343 18.1%
Military Dependents	18,725	18,513	N/A
Impact Aid	$24,000,000	$18,600,000	$22,600,000

Note: Impact aid is received months or years after the school attendance to which it is correlated. Hawaii State Department of Education staff estimate impact aid received in 1996-1997 as $19 million. Here this is correlated to the 1994-1995 school year, as much of the recently received impact aid would be based on that year's attendance.

Source: Hawaii State Department of Education records.

With urban growth directed to Central Oahu and Ewa, the Leeward and Central district schools on Oahu are largely at or beyond listed capacity, while schools in Honolulu and Windward Oahu may be operating below capacity. Typically, schools over capacity depend on portable structures for classrooms and may combine uses of spaces that were planned for specialized purposes. The State Department of Education and Department of Accounting and General Services have been sharply criticized for failure to build and maintain facilities in a timely manner. In response, the State Legislature has earmarked funds for school facilities, and school construction procedures have been reviewed and streamlined. The Department of Education has opened new schools in suburban areas, and has worked out turnkey agreements with developers. The Department of Education routinely demands that suburban residential developers are committed to fair share participation in school construction costs. As a result of these actions, the current problem of school facilities could well diminish by 2005 or sooner.

6.8.2 Environmental Consequences and Mitigation Measures

Potential consequences in the areas of employment, population, housing, and public schools are addressed below.

Significance Criteria

Socioeconomic impacts would be significant if one or more of the following occur as a result of project implementation:

- Direct and indirect civilian jobs created by the action cannot be filled by the current population and cause a major in-migration of new residents.
- Changes in demand in the housing market are substantial enough to cause dislocation in the market, reflected by accelerated price increase or decrease and vacancy rates below or above historic levels.

- Educational resources are burdened to the point that the overall quality of these services declines.

6.8.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging Site

EMPLOYMENT, POPULATION, HOUSING, AND SCHOOLS

Because local labor would be employed for the dredging activity, no impacts to employment, population, schools, or housing would occur.

Facility Improvements

EMPLOYMENT

Construction would include demolition of warehouses, construction of a CIF and parking garage, and various utility upgrades. More than 500 person-years of work would be involved. The construction activity would in turn support some 1,300 additional person-years in various jobs in Hawaii's economy.

POPULATION, HOUSING, AND SCHOOLS

Facility improvements would be accomplished by the existing Honolulu labor pool. Therefore, no effects on population, housing, or schools would occur.

Operations

EMPLOYMENT

Homeporting a CVN would bring both a large ship's crew to live in Hawaii and would provide maintenance employment. A ship's crew of 3,217 officers and enlisted personnel and their families would be in Hawaii much of the time. Maintenance personnel would include a small staff responsible full-time for off-ship maintenance facilities, and skilled crews present for several months, every other year. Over a 6-year cycle, maintenance jobs over a 2-year period would vary from about 164 full-time equivalent jobs to about 272 full-time jobs per year. From 2005-2020, the direct operations workforce — carrier crew and maintenance personnel — would average about 3,408 full-time positions. Also, about 2,181 additional jobs in Hawaii would be supported by spending for the carrier, its crew, and maintenance activity. Major labor force impacts arise when a project brings more jobs than available workers or more new workers than available jobs. The direct jobs involved in homeporting would largely be taken by the CVN crew and specialized workers from other shipyards would likely handle periodic maintenance activities (temporary in-migrants). PHNSY personnel are expected to contribute to depot-level maintenance, but it would be impractical to hire new workers to handle overhauls that occur only for about 10 to 11 months in each 6-year cycle. Additional workers would temporarily relocate to PHNSY during these maintenance periods.

The major labor force impact associated with homeporting is the importation of family members likely to seek outside employment. Based on historical trends in Hawaii, it is likely that about 900 CVN family members would be employed. Since this amounts to about 38 percent of the indirect and induced jobs associated with homeporting, the net impact is one of job creation. In Hawaii's current and expected future economy, that impact would be positive. New CVN-related jobs would be a major addition to the labor market at the time of arrival and the following year or two. The average indirect and induced job impact would effectively increase the number of jobs created annually by about 54 percent if somehow it was concentrated in a single year. However, the job growth would occur more gradually.

Unemployed members of the civilian labor force on Oahu have averaged nearly 20,000 in recent years — nearly 15 times the net number of new direct, indirect, and induced jobs created in Hawaii and held by long-term residents (i.e., not including jobs for workers from outside shipyards and not including Navy family members in the civilian labor force). Many indirect and induced jobs would not be created quickly, but over a period of several years. Thus, the impact at any one time would be even smaller than suggested by the ratio of jobs to unemployed persons. Consequently, it would not affect wage levels to any great extent.

With a greater volume of work, PHNSY management can support a larger workforce and reach increased levels of efficiency. The new work for the yard would involve, on average, about 130 jobs annually. This is about 5 percent of current person-hours and 9 percent of current person-hours billable to the Pacific Fleet. At this level, the impact of the work would be positive in two ways: it would contribute to the ongoing effort to increase the yard's efficiency, yet be small enough not to utilize all the yard's resources for much of the time that a major maintenance activity was taking place.

New local government revenues are generated because CVN-related activities generate taxes, and property taxes are assessed to accommodate housing for in-migrant CVN personnel. Local government costs increase as in-migrants use or depend on services such as police protection and roads. This usage is comparable to tourists' use of local resources. For the State of Hawaii and City and County of Honolulu, taken together, the net impact of homeporting a CVN at Pearl Harbor is positive, but relatively small, since the bulk of military personnel earnings are not taxed locally.

POPULATION

Impacts of population growth would be spread throughout the urban area. The new CVN-related population living on Oahu—some 3,120 dependents full-time plus the crew part-time—would be less than 10 percent of anticipated growth from 2000 to 2010.

HOUSING

The CVN represents an addition of 3,217 uniformed personnel to the Oahu military population. With few quarters available under Navy control, it is assumed that:

- All E1 to E4 bachelors would live on the CVN;
- BEQ space would not be provided to bachelors E5 and above; with some bachelors choosing to share housing, this would result in a need for 860 civilian units;

- Navy family housing would be provided for 387 families; the other estimated 565 CVN married households (enlisted and officers) would find housing in the civilian housing market

Thus, the total new demand for civilian housing and PPV housing is estimated to be 1,425 units. At the time, competition for rental units would likely be strong. However, this impact would not lead to increased rents, inasmuch as vacancy rates would remain above 5 percent. The impact on housing is not significant.

Maintenance personnel are expected to live in hotels and vacation rentals. Occupancies vary in the hotels that are used most by military moving to Hawaii. Occupancy in these hotels is especially high in the summer months. Demand for short-term housing for maintenance workers would cause little difficulty in other months.

SCHOOLS

The addition of 606 students to the public school population represents an increase of about 0.3 percent in the public school population. Because these students would most likely be dispersed around Oahu, there should be little impact on the system. However, with some 600 new students arriving in a single year — perhaps half the increase in public school enrollments that would be expected annually apart from the CVN — some school-level problems of enrollment would arise. With students distributed among some 170 schools on Oahu, the Department of Education experiences such problems every year at one school or another. The short-term impact would then be an intensification of normal challenges, not a new problem. The impact would not be significant.

6.8.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Employment

No effects on employment would occur from the no action alternative.

Population

No effects on population would occur from the no action alternative.

Housing

No effects on housing would occur from the no action alternative.

Schools

No effects on schools would occur from the no action alternative.

6.8.2.3 Mitigation Measures

Employment

Homeporting one CVN in Pearl Harbor would result in positive employment impacts. Therefore no mitigation measures are required.

Population

In the absence of significant impacts, no mitigation measures are required.

Housing

In the absence of significant impacts, no mitigation would be needed for the long-term housing market.

Schools

In the absence of significant impacts, no mitigation measures are required.

6.9 TRANSPORTATION

6.9.1 Ground Transportation

The following subsections describe the ground transportation at Pearl Harbor and the external system providing access to the base. Data are based on a traffic study conducted specifically for this EIS (see Volume 6, section 6.9). Because any substantial change in population or activity at the base would result in an increase in the number of commuters and the number of deliveries, there would be a corresponding increase in the volume of traffic traveling to and from the base. The primary objective of the ground transportation analysis is to quantify the change in traffic levels that would occur as a result of the proposed homeporting activities and evaluate the ability of the street and roadway network to accommodate the projected traffic volumes.

6.9.1.1 Affected Environment

The ground transportation system includes the local street and regional highway network in and around Pearl Harbor, as well as the on-base system providing access to and from the shipyard.

Roadways

The primary regional access to the Pearl Harbor Naval Complex is provided by the H-1 Freeway and the Nimitz-Kamehameha Highway facilities. The Pearl Harbor interchange provides the primary linkage between the H-1 Freeway and the local area roadway network. The principal roadways in the study area, with the number of lanes and type of traffic controls at key intersections, are depicted in Figure 2 of Volume 6, Section 6.9.

The regional roadway system accesses Pearl Harbor via three main vehicular gates: Nimitz Gate, Makalapa Gate, and Halawa Gate (see Figure 6.9-1). Most traffic to/from the B2/3 area uses either the Nimitz Gate, which provides access to both the H-1 Freeway and the Nimitz-Kamehameha Highway facilities, or the Makalapa Gate, which provides access to Kamehameha Highway.

Nimitz Highway. This State highway links the Pearl Harbor Naval Complex to the H-1 Freeway and to the Honolulu International Airport and downtown Honolulu areas. The key traffic constraints are at the Nimitz Gate, where up to four inbound lanes and four outbound lanes can be provided through the security checkpoint, and at the adjacent intersection with North Road and South Avenue inside the Naval Station.

Kamehameha Highway. This State highway connects to the Nimitz Highway and to the H-1 Freeway at the Pearl Harbor interchange to provide access to the east. Kamehameha Highway extends west to provide access to the central and western areas of Oahu. In the Pearl Harbor area, the highway typically provides three through lanes in each direction and has a landscaped median divider separating the two travel directions.

Makalapa Road/Radford Drive. This roadway crosses Kamehameha Highway at Makalapa Gate and extends eastward outside the base as Radford Drive to provide access to the Moanalua-Johnson Circle NEX/Commissary area and to the Moanalua Terrace military housing areas. East of Kamehameha Highway this is a four-lane undivided highway. At Makalapa Gate, the roadway can provide up to three inbound lanes and two outbound lanes through the security checkpoint.

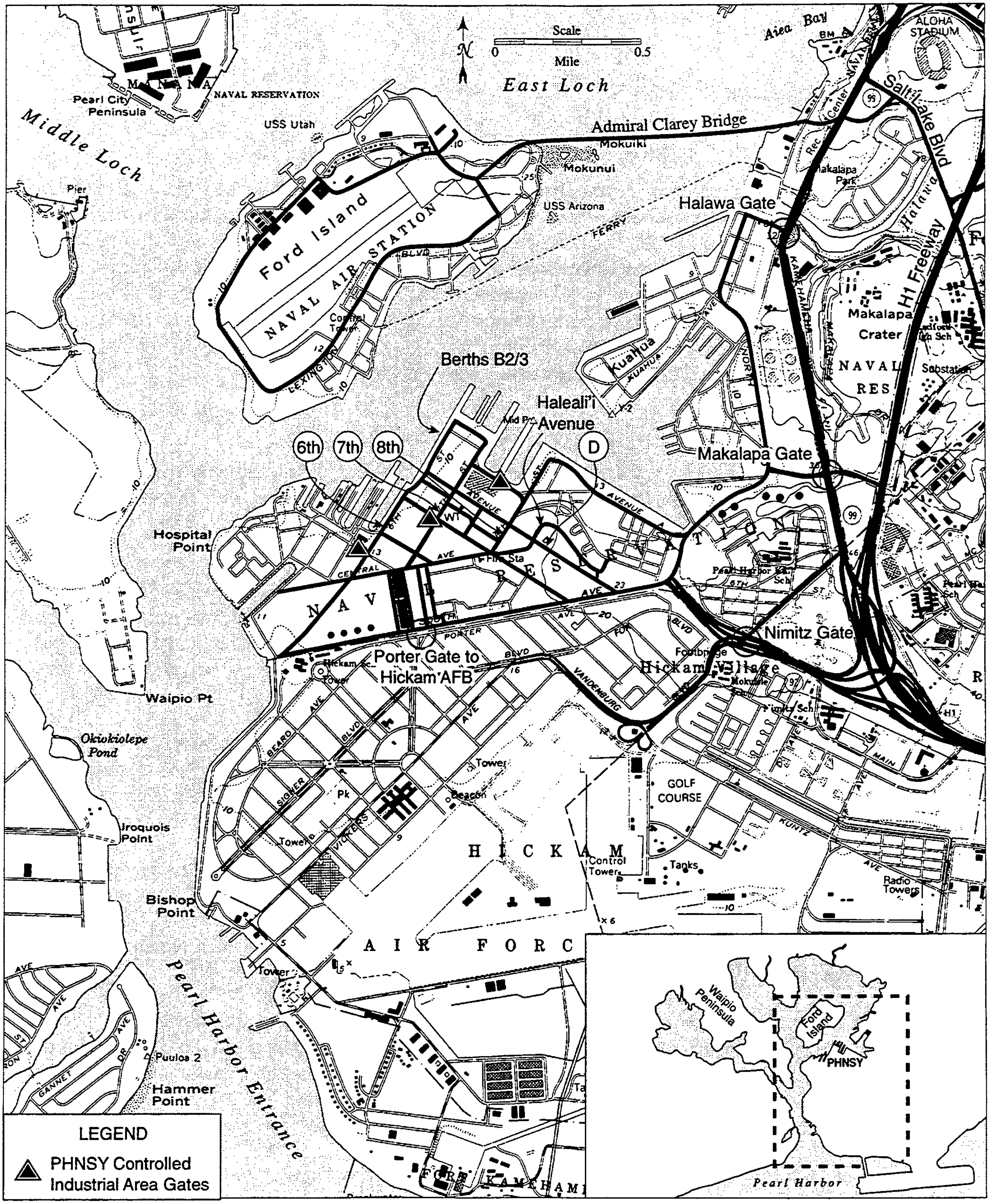

Figure 6.9-1. Pearl Harbor Naval Complex Ground Transportation Network

Traffic Conditions

Existing weekday traffic volumes are available for several roadways from recent State of Hawaii Department of Transportation (DOT) 24-hour counts. These include the intersection of Kamehameha Highway with Makalapa Road and Nimitz Highway near Nimitz Gate. Based on DOT counts, the typical weekday traffic volumes are as follows:

- Kamehameha Highway east of Makalapa Road — 24,700 vehicles
- Makalapa Road
  - South of Kamehameha Highway — 19,900 vehicles
  - North of Kamehameha Highway — 16,600 vehicles
- Nimitz Highway, east of Center Drive — 19,800 vehicles

Traffic conditions were analyzed for morning and afternoon 1-hour periods that would accommodate the highest volumes of future carrier traffic. The traffic conditions at each of the key intersections are summarized in Table 6.9-1.

Table 6.9-1. Existing Weekday Intersection Conditions

		Morning Arrival Hour			Afternoon Departure Hour		
Intersection	*Traffic Control*	*V/C*	*ADPV*	*LOS*	*V/C*	*ADPV*	*LOS*
Kamehameha Hwy/ Makalapa Rd/Radford Dr	Signal	0.721	37.8	D	0.866	44.0	E

Notes: V/C = Ratio of traffic volumes to theoretical capacity of intersection for traffic signals and security check stations
ADPV - Average Delay per Vehicle in seconds
LOS = Level of Service

The intersection of Kamehameha Highway with Makalapa Road accommodates the present morning traffic from 6:30 to 7:00 A.M. at acceptable overall traffic conditions, with traffic approximating 72 percent of the intersection capacity and conditions at level of service (LOS) D (see Volume 6, section 6.9 for LOS definitions). Long traffic queues occur for the northbound left turn into Pearl Harbor Naval Complex and on the Radford Drive approach. In the afternoon, existing traffic approximates 87 percent of intersection capacity and conditions at LOS E. Long traffic queues occur turning left from the Pearl Harbor Naval Complex onto Kamehameha Highway and for the southbound left turn from Kamehameha Highway onto Radford Drive. These waiting queues typically clear during each green phase (see Figure 2-4, Volume 6, section 6.9).

Vehicles entering the Nimitz and Makalapa gates must pass through a security checkpoint. Under normal conditions, entering vehicles slow down to permit security guards to view the base decal affixed to each vehicle. Each guard position/lane can accommodate about 600 vehicles per hour for this level of security check. Based on this capacity, the present traffic volumes entering the Pearl Harbor Naval Complex from 6:30 to 7:00 A.M. approximates 75 percent of the capacity at Nimitz Gate and about 71 percent of the capacity at Makalapa Gate.

The year 2005 is used as the basis for analysis of traffic conditions without the CVN. Forecast traffic conditions are the base from which the incremental effects of CVN operations on area traffic are described in section 6.9.1.2.

Traffic forecasts for the year 2005 without the CVN assume that traffic growth will be affected by following factors:

- General traffic growth in the area.
- Use of the Ford Island Bridge for vehicular traffic and related land use changes on Ford Island, such as the construction of up to 600 housing units.
- Presence of the ex-USS MISSOURI to Ford Island as a visitor attraction.

Two different growth factors were applied to existing (as of 1997) traffic volumes to reflect increased travel to and from the existing land uses in the Pearl Harbor Naval Complex area and any increases in through traffic. A low factor was applied to traffic entering or exiting the Pearl Harbor Naval Complex, and a higher factor was applied for other traffic movements along Kamehameha Highway. An annual growth factor of 0.5 percent was used for Pearl Harbor Naval Complex traffic, including vehicles entering and exiting the base via Kamehameha Highway. A growth factor of 2.5 percent, based on historical traffic counts, was used for traffic growth on Kamehameha Highway.

Table 6.9-2. Estimated Year 2005 Weekday Intersection Conditions without CVN

Intersection	*Traffic Control*	Morning Arrival Hour			Afternoon Departure Hour		
		V/C	*ADPV*	*LOS*	*V/C*	*ADPV*	*LOS*
Kamehameha Hwy/Makalapa Rd/ Radford Dr	Existing Lanes	0.808	40.2	E	1.054	66.5	F

Notes: V/C = Ratio of traffic volumes to theoretical capacity of intersection for traffic signals and security check locations.
ADPV = Average delay per vehicle, in seconds.
LOS = Level of Service (see Section 6.9, Volume 6)

Utilizing these growth factors, it is estimated traffic along Kamehameha Highway would be 21.8 percent greater, and traffic entering, exiting, and within Pearl Harbor Naval Complex will be 4.1 percent greater in the year 2005 than at present (as of 1997). Traffic conditions at key intersections would be as shown in Table 6.9-2.

Conditions at the intersection of Kamehameha Highway with Makalapa Road/Radford Drive would dramatically worsen in both peak hours. In the morning period, the forecast volumes would be within capacity (80 percent), but the increases would worsen the vehicle delay to LOS E. The projected traffic volumes would exceed intersection capacity by 5.4 percent in the afternoon period, with delays reflective of LOS F conditions.

The estimated number of vehicles entering the Nimitz and Makalapa gates during the 6:30-7:30 A.M. period would be within the estimated capacities of the gates. The forecast volumes would be approximately 77.3 percent of the Nimitz Gate capacity and 73.9 percent of the Makalapa Gate capacity.

6.9.1.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The project's impacts to the ground transportation system would be considered significant if one or more of the following impacts occur:

- Additional traffic generated by the homeporting activities would result in average daily traffic volume that is above the planned capacity of a roadway segment.
- Additional traffic generated by the homeporting activities would result in an increase of 0.02 or greater in the volume/capacity ratio of an intersection that is projected to operate at LOS E or F.
- Homeporting activities would result in a substantial traffic or parking intrusion.
- Homeporting activities would generate a demand for public transit services that could not be accommodated by the existing or planned transit system.

Impact Methodology

The traffic analysis for the year 2005 with one CVN was conducted to reflect worst-case conditions during the depot-level maintenance phase of the operational cycle (Drydock Planned Incremental Availability [DPIA] one year out of every six), during which both crew (3,217) and a maximum number of temporary maintenance workers (1,300) would be working at the ship each weekday. The following additional inputs and assumptions were used in the traffic forecasts:

- Eighty percent of the crew is assumed totravel to and from the base between the hours of 7:30 A.M. to 4:30 P.M. Twenty percent of the crew would travel to and from the base between the hours of 4:30 P.M. and 7:30 A.M.
- Unmarried crew members with a rank of E-5 or below are assumed to live on the CVN (i.e., on-base), while all others are assumed to live in military family housing or within the residential communities of Oahu. Of the crew, 2,509 will have a rank of E-5 or less and 44 percent of these personnel are expected to be married. Therefore, a total of 1,812 (708 E-6 and above plus 44 percent of 2,509 E-5 and below) was assumed to commute regularly.
- On a typical day, 10 percent of the crew are assumed to be absent from duty on the ship due to leave or temporary duty assignments.
- All of the crew living off-ship are assumed to drive to work, with an average of 1.09 crew members per vehicle, the average occupancy for work trips on Oahu.
- On a typical day, the crew and other trips related to routine activities on the vessel are estimated to generate 850 vehicle trips during the morning and afternoon peak traffic hours, with approximately 91 percent of these trips inbound to the vessel in the morning peak hour and outbound in the afternoon peak hour, and the remaining 9 percent in the off-peak direction.

- The directional distribution and routing of trips was based on the present traffic patterns for Pearl Harbor Naval Complex (see section 6.9.1.1).

- The largest number of special maintenance workers expected to be on the ship at any given time during the DPIA is 1,300. These workers would be quartered outside Pearl Harbor Naval Complex, most likely at hotels or other short-term accommodations.

- The special maintenance personnel are assumed to work weekdays with two work shifts each day. The shift hours are assumed to coincide with those of the crew, with the day shift working from 7:30 A.M. to 4:30 P.M. and the second shift working from 4:30 P.M. until after midnight. One-half of the maintenance specialists are assumed to work on each shift.

- On a typical weekday, all of the personnel are assumed to work at the aircraft carrier.

- The maintenance personnel are assumed to commute to the base via a combination of rental cars, vans, and special minibus transportation. An average of 2.5 workers per vehicle was used to estimate the traffic generation.

A total of 1,110 vehicle trip origins or destinations are estimated for the CVN during the morning peak hour, and 1,370 for the afternoon peak hour on a weekday during the depot-level maintenance period. Approximately 77 percent and 62 percent of the trips in the morning and afternoon peak hours, respectively, would be made by the ship's crew and other routine daily activities. Special maintenance personnel would contribute to 25 percent of the trips in the peak travel direction during each peak hour.

6.9.1.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Drydock #4 upgrade; and personnel support facilities.

DREDGING

Any dredged material requiring disposal in a CDF or upland disposal site would be transported by barge and crane, not by surface vehicles. Therefore, there would be no impacts on ground transportation.

FACILITY IMPROVEMENTS

During construction of the various facilities required to support homeporting, there would be a short-term increase in traffic associated with workers driving to and from Pearl Harbor and trucks delivering materials to Pearl Harbor. The proposed construction activities would not greatly add to the ground transportation (traffic) levels. Therefore, no significant impacts would occur.

OPERATIONS

Traffic volumes at key intersections during the DPIA in the year 2005 are summarized in Table 6.9-3. The crew and maintenance personnel would add large increases in traffic along Nimitz Highway, Makalapa Road, North Road, and South Avenue in the peak travel direction. CVN

Table 6.9-3. Estimated Year 2005 Traffic Increases with One CVN

		MORNING ARRIVAL TRAFFIC			AFTERNOON DEPARTURE TRAFFIC		
Roadway Location	*Direction*	*Traffic w/o CVN*	*Increase in # of Vehicles w/CVN*	*Percent Increase w/CVN*	*Traffic w/o CVN*	*Increase in # of Vehicles w/CVN*	*Percent Increase w/CVN*
Kamehameha Hwy North of Makalapa Rd.	Northbound	958	16	1.7	2,007	114	5.7
	Southbound	1,671	155	9.3	1,370	71	5.2
Radford Dr. east of Kamehameha Hwy	Eastbound	563	16	2.8	804	186	23.1
	Westbound	720	165	22.9	719	70	9.7
Makalapa Gate	Eastbound	474	36	7.6	953	351	36.8
	Westbound	1,331	341	25.6	584	148	25.3
Nimitz Gate	Eastbound	356	41	11.5	1,319	682	51.7
	Westbound	1,856	692	37.3	441	189	42.9
North Rd. south of Makalapa Rd.	Northbound	778	36	4.6	720	351	48.8
	Southbound	872	341	39.1	654	148	22.6
North Rd. north of Nimitz Highway	Northbound	630	196	31.1	477	189	39.6
	Southbound	285	0	0.0	724	310	42.8
South Ave. southwest of Nimitz Highway	Eastbound	310	41	13.2	684	372	54.5
	Westbound	1,465	496	33.9	53	0	0.0

traffic would increase traffic volumes along these road segments by 25-55 percent. Without maintenance personnel, increases would be approximately 18-40 percent.

North of Makalapa Gate, the CVN crew would increase southbound traffic along Kamehameha Highway by about 9 percent and northbound traffic by almost 2 percent in the morning peak hour. In the afternoon peak hour, the proportionate increases would amount to about 6 percent northbound and 5 percent southbound.

CVN crew traffic would significantly impact conditions at the Kamehameha Highway intersection with Makalapa Road/Radford Drive both during the peak arrival and departure hours. The worst conditions would occur in the afternoon peak hour when additional traffic would exacerbate the already congested conditions. With the CVN undergoing DPIA, the estimated traffic would exceed the intersection capacity by 17 percent versus about 5.4 percent without the CVN. Without the additional maintenance personnel, traffic associated with the crew would increase the V/C ratio to about 1.14, which would represent a substantial worsening of conditions in the afternoon peak hour. Traffic delays for all scenarios would reflect LOS F. In the morning peak arrival hour, the additional traffic would result in total volumes approximating 89 percent capacity. Conditions would remain at LOS E.

With the CVN undergoing DPIA, traffic would be significantly impacted at the North Road intersection with Avenue A during the afternoon peak hour. The estimated traffic would exceed the intersection capacity by about 5.2 percent from about 80 percent of capacity without the CVN. Traffic delay would reflect LOS F. Without the additional maintenance personnel, traffic associated with the crew would not result in a significant impact; the V/C ratio would approximate 84.3 percent of capacity. In the morning peak arrival hour, the additional traffic would result in total volumes approximating 63 percent capacity. Conditions would remain at LOS C.

Table 6.9-4 indicates the morning and afternoon weekday intersection conditions for one CVN in 2005.

Table 6.9-4. Estimated Year 2005 Weekday Intersection Conditions with One CVN

		MORNING ARRIVAL HOUR			AFTERNOON DEPARTURE HOUR		
Intersection	*Traffic Control*	*V/C*	*ADPV*	*LOS*	*V/C*	*ADPV*	*LOS*
Kamehameha Hwy/ Makalapa Rd/Radford Dr	Existing Lanes	0.891	420	E	1.170	*	F
North Rd./Avenue A	Existing Signals & Lanes	0.627	18.1	C	1.052	*	F

Notes: V/C = Ratio of traffic volumes to theoretical capacity of intersection for traffic signals and security check locations.
ADPV = Average delay per vehicle, in seconds.
LOS = Level of Service (see Section 6.9, Volume 6)
* = Not Calculated

During the DPIA maintenance period, the estimated traffic during the 6:30-7:30 A.M. period would exceed the capacity of the existing security checkpoints at the Nimitz Gate. Use is projected to exceed capacity by 26 percent at the Nimitz Gate.

6.9.1.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Because this alternative would result in no change in existing conditions, there would be no impacts on ground transportation.

6.9.1.2.3 Mitigation Measures

In order to improve traffic conditions with a homeported CVN, the Makalapa Road and Radford Drive approaches would each need to be widened by one lane. The one additional lane would be used to provide an exclusive left-turn lane, with left turns also permitted from one shared through/left-turn lane. This would mitigate the impacts of CVN traffic in the morning peak hour. However, the lanes would not fully mitigate the impacts of the CVN during a DPIA once every 6 years (V/C of 1.015).

To fully mitigate CVN traffic impacts, the north leg of Kamehameha Highway could be widened to provide a second (double) left-turn lane for traffic turning onto Radford Drive (see Table 6.9-5).

This measure, combined with additional lanes on Makalapa Road and Radford Drive approaches, would fully mitigate CVN impacts to less than significant. In order to improve traffic conditions at the North Road intersection with Avenue A, the northbound approach of North Road would be widened to provide a second (double) left-turn lane for traffic turning onto Avenue A. This improvement would mitigate CVN impact to less than significant (see Table 6.9-5). Alternately, if no roadway improvements are made, routing traffic along Avenue D and South Avenue would mitigate CVN impacts to less than significant.

Table 6.9-5. Estimated Year 2005 Weekday Intersection Conditions with One CVN and Mitigation

		Morning Arrival Hour			Afternoon Departure Hour		
Intersection	*Traffic Control*	*V/C*	*ADPV*	*LOS*	*V/C*	*ADPV*	*LOS*
Kamehameha Hwy/ Makalapa Rd/Radford Dr	Existing Lanes	0.891	42.0	E	1.170	*	F
	Add 1EB & 1 WB Lane	0.831	38.4	D	1.015	56.1	E
	Left-turn Lane	—	—	—	0.932	46.2	E
North Rd./Avenue A	Existing Signals & Lanes	0.627	18.1	C	1.052	*	F
	Add NB 2nd Left-Turn Lane	—	—	—	0.903	38.3	D

Notes: V/C = Ratio of traffic volumes to theoretical capacity of intersection for traffic signals and security check locations.
ADPV = Average delay per vehicle, in seconds.
LOS = Level of Service (see Section 6.9, Volume 6)
* = Not Calculated

During the DPIA maintenance period, the estimated 2005 traffic during the 6:30-7:30 A.M. period with the CVN in port might exceed gate capacity by as much as 6 percent at the Nimitz Gate. To mitigate these conditions, the following measures could be employed:

- Use of staggered start and end times for the CVN crew and maintenance workers on the day shift to disperse the traffic over a longer period of time;
- Emphasize the use of charter buses to transport maintenance workers between their housing and the ship;
- Restrict use of automobiles by maintenance workers to those with three or more occupants, or limit issuance of vehicle passes for maintenance workers; and
- Encourage public transit (bus) use by maintenance workers.

These mitigation measures would reduce impacts to less than significant.

6.9.2 Vessel Transportation

6.9.2.1 Affected Environment

Access to the major piers and berthing areas in Pearl Harbor is by way of the harbor's Main and South channels, which are well defined and charted (refer to Figure 2-9). All waters of Pearl Harbor are within the bounds of the Pearl Harbor Defensive Sea Area established by Executive Order (EO) 8143 of May 26, 1939. The EO establishes regulatory constraints regarding the use of the harbor and is intended to prohibit the general public from navigating the waters of Pearl Harbor.

NAVSTA Port Operations manages all Naval and private navigation in Pearl Harbor from a control tower stationed at Ford Island. The channels are marked with navigational aids, fixed buoys, and prominent day markers and illuminated day/night ranges. All ships transiting Pearl Harbor follow inland International Rules of the Road. Inland waters, including Pearl Harbor, extend between Diamond Head Point to the east and Barbers Point to the west.

Most recently, approximately 25 Navy ships and 17 submarines were berthed at over 30 active piers at PHNSY, NAVSTA, FISC, and NAVMAG Lualualei. South Channel Navy boat traffic consists of ships that are homeported at Pearl Harbor Naval Complex; the White Fleet, which departs Halawa Landing for the USS ARIZONA Memorial every half hour; and the gray boats that regularly shuttle military personnel from various mainside landings to Ford Island.

Port Operations permits limited harbor use for commercial (nehu) fishing and tour boats, recreational boating, and emergency vessels. Recreational boat use occurs in non-restricted waters throughout the harbor, but private boats are excluded from the South Channel and must pass west of Ford Island when transiting the harbor. On non-working days, weekends, and holidays, South Channel is generally open to private boats. Emergency and service vessels from the City and County of Honolulu and U.S. Coast Guard (USCG) are allowed in the harbor. The USCG SASSAFRAS navigates the waters of Pearl Harbor to service navigational aids. No boat anchorage is allowed in the open areas of the Main and South channels of the harbor.

In addition to regulatory constraints, the harbor's physical conditions also affect navigation. The navigation channel widths at the Main and South channels range from 1,200 feet near Hospital Point to 2,000 feet in the turning basin. West of the shipyard berths, the channel is approximately 1,500 feet wide. Channel depths range from 40 to 45 feet, with a requirement for periodic dredging for continued navigability. Routine maintenance dredging of the entire main navigable channel up to and including the turning basin is anticipated in the years 1999 to 2000 to a project depth of 45 feet. There are no plans to dredge farther into Middle or West Loch. No vertical obstructions are present in the Main and South channels.

Homeporting Alternative Site

Carriers entering Pearl Harbor currently berth at Hotel or Kilo wharves in the South Channel at the FISC. A CVN traveling to and from B2/3 would enter Pearl Harbor by way of the Main Channel and turning basin. The ship would be in continuous radio contact with the Port Operations control tower for navigational assistance. Two tugs would meet the CVN outside of the harbor entrance. Two additional tugs, arriving at Hospital Point, would assist the CVN to the berth. The CVN would berth with its starboard side facing B2/3. On departure, the tugs would assist in rotating the ship 90 degrees in the turning basin and then accompany the ship out of the harbor. Total distance traveled from the mouth of the harbor to B2/3 is approximately 3 miles. B2/3, measuring 1,500 feet in length, meets and exceeds the 1,300-foot requirement for a CVN. Deck width is adequate at 90 feet. Deck height is approximately 3 feet above mean higher high water. Water depth at the berths is -45 feet.

6.9.2.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The project's impacts to the vessel transportation system would be considered significant if one or more of the following impacts occur:

- Substantial reduction in current safety levels during either proposed action construction or operation related to:
  - vessel maneuvering room;
  - vessel congestion;
  - vessel anchorages;

- recreational boating access; and
- commercial fishing activity.

6.9.2.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Drydock #4 upgrade; and personnel support facilities.

DREDGING

No significant impacts to navigation would result from the dredging operation. Dredging activities would be coordinated with NAVSTA Port Operations, and dredging would be temporarily halted if necessary to allow passage of Navy vessels. Dredging activity is anticipated to be conducted with a clamshell dredge, barge, and hydraulic dredging vessel, which would collect dredge material and transfer it to an ocean or shoreline disposal site. Maintenance dredging of Pearl Harbor has occurred twice in the last 30 years, with no major safety incidents recorded.

FACILITY IMPROVEMENTS

Other than dredging, no in-water construction would occur with this alternative component. Therefore, no significant impacts to navigation would result.

OPERATIONS

The impact on navigation of homeporting a CVN at Pearl Harbor would be less than significant. Ship traffic in Pearl Harbor is restricted and relatively light. The navigation channels and turning basin are wide, providing ample room for maneuvering and berthing (Christofferson1997). CVNs have regularly entered Pearl Harbor with no interference to existing ship traffic and operations. The CVN would also be in direct communication with NAVSTA Port Operations prior to entering the harbor and throughout all fueling and berthing maneuvers.

On completion of the proposed dredging to increase channel depth to 50 feet, a CVN would have adequate draft depth for safe transiting. Military, recreational, and commercial fishing boat traffic in the harbor is controlled by NAVSTA Port Operations to avoid potential conflicts.

6.9.2.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

No significant impacts would result from the no action alternative because no dredging, in-water construction, or operations would occur.

6.9.2.2.3 Mitigation Measures

No significant impacts to navigation would result from the proposed action, therefore mitigation measures would not be required.

6.10 AIR QUALITY

Air quality in the PHNSY home port area and surrounding region would be affected by emissions from operation of the project alternatives. The following section describes the existing air quality resource, predicted impacts of the proposed actions, and mitigations that would lessen significant project impacts.

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing it to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards are established by the EPA and termed the National Ambient Air Quality Standards (NAAQS). The NAAQS are defined as the maximum acceptable ground-level concentrations that may not be exceeded more than once per year except for annual standards, which may never be exceeded. The Hawaii Department of Health (HDOH) has also established state standards that are at least as restrictive as the NAAQS. The national and state ambient air quality standards are shown in Volume 6, section 6.10, Table 6.10-1.

The main pollutants of concern considered in this air quality analysis include volatile organic compounds (VOCs), ozone (O_3), carbon monoxide CO, nitrogen oxides (NO_x), sulfur dioxide (SO_2), and particulate matter less than 10 microns in diameter (PM_{10}). Although there are no ambient standards for VOCs or NO_x, they are important as precursors to O_3 formation.

6.10.1 Affected Environment

Region of Influence

The area affected by project emission sources would include the Pearl Harbor Naval Complex and surrounding South Shore region. Specifically identifying the region of influence (ROI) for air quality requires knowledge of (1) the types of pollutants being emitted, (2) emission rates of the pollutant source, (3) the proximity of an emission source to other emission sources, and (4) meteorological conditions. The ROI for inert pollutant emissions (pollutants other than O_3 and its precursors) would be limited to a few miles downwind from project emission sources. The ROI for O_3 extends much farther downwind than for inert pollutants and could include much of the South Shore of Oahu, depending on the wind conditions.

Baseline Air Quality and Emissions

Hawaii is in attainment of all NAAQS in part due to the ventilating effects of the prevailing trade winds. State standards for CO may infrequently be exceeded along traffic corridors, such as the Kamehameha Highway, during wintertime conditions of stagnant winds.

Pearl Harbor Naval Complex Emissions

The primary source of emissions in the Pearl Harbor region is vehicles. Emission sources associated with the Naval complex include industrial facilities (such as industrial and sewage treatment plants), ship-loading cranes, diesel-powered equipment, and construction activities.

Table 6.10-2 of Volume 6, section 6.10, presents actual 1996 air emissions of permitted sources at Pearl Harbor Naval Complex commands, including PHNSY.

Radiological Air Emissions

Naval nuclear reactors and their support facilities are designed to ensure there are no significant discharges of radioactivity in exhausts. Radiological controls are exercised in support facilities to preclude exposure of working personnel to airborne radioactivity exceeding one-tenth of the limits specified in 10 C.F.R. 20. These controls include containment for radioactive materials and provide a barrier to prevent significant radioactivity from becoming airborne. Further, air exhausted from these facilities is passed through High Efficiency Particulate Air (HEPA) filters and monitored during discharge. Comparison of sensitive airborne radioactivity measurements in shipyards demonstrates that air exhausted from facilities actually contained a smaller amount of particulate radioactivity than this same air contained when it was drawn from the environment into the facilities. There were no discharges of airborne radioactivity above concentrations normally present in the atmosphere from these facilities (NNPP 1997).

Regional Climate

The Hawaiian Islands are at the edge of the Tropics Zone, where the climate is generally mild throughout the year and seasonal variation in temperature are small. The major influences on the regional climate are the moderating effects of the Pacific Ocean, prevailing trade winds, and topography.

Precipitation

The mean annual rainfall at Pearl Harbor is between 20 and 30 inches. The highest precipitation occurs in the months of October to April. Very heavy rains, accompanied by southerly winds, occasionally occur and may cause local flooding at Pearl Harbor's lower elevations (DON 1997c.)

Temperature

Regional temperatures vary by season and diurnally, with a median annual temperature of 70° to 80°F. Daily mean high and low temperatures in the summer are 89° and 72°F, respectively. Winter daily mean high and low temperatures are 78°F and the high 50s, respectively. Average relative humidity at Pearl Harbor varies from 58 percent in the afternoon to over 80 percent at night.

Prevailing Winds

The northeast trade winds prevail over Oahu from February through November, with a mean wind speed of 11 mph at PHNSY. Hurricanes pass infrequently through Hawaiian waters. The probability of a hurricane directly impacting Pearl Harbor is low, although storm winds may peak at up to 49 mph, accompanied by higher than normal ocean water levels and waves, potentially causing damages to structures and vegetation (DON 1990).

Applicable Regulations and Standards

Federal Regulations

Federal regulations that would apply to proposed emission sources at Pearl Harbor are presented in Volume 2, Appendix A. Since the State of Hawaii is in attainment of all NAAQS, a conformity determination outlined in Section 176(c) of the 1990 CAA would not be required for the proposed actions at this location.

State Regulations

The HDOH is responsible for regulating air quality within the region. State air regulations that would apply to project emissions sources include the Hawaii Administrative Rules (HAR) 11-60.1 and Ambient Air Quality Standards, HAR 11-59 (see also Volume 2, Appendix A).

The DON commands are in the process of obtaining operating-source permits required under Title V of the 1990 Clean Air Act (CAA). Multiple permit applications are currently under review by the state. The emission sources involved in this application include boilers, metalworking machines, coating operations, crane engines, and generators. Title V permits are renewed every 5 years or less.

6.10.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Criteria to determine the significance of air quality impacts are based on federal and state air pollution standards and regulations. Impacts would be considered significant if project emission sources (1) increase ambient pollutant levels from below to above a national or state ambient air quality standard or (2) require an operating permit under the federal Title V program by exceeding 100 tons per year of a regulated pollutant, 10 tons per year of a hazardous air pollutant (HAP), or 25 tons per year of combined HAPs.

6.10.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging

Air quality impacts from dredging and associated disposal activities would mainly occur from combustive emissions due to the operation of diesel-powered tug boats and dredges. It was assumed that the 3,000,000 cy of material would be removed with a hydraulic dredge, then disposed of at an ocean dumping site south of Honolulu. Specifics of the dredging and disposal technique were obtained from the methodology used in section 3.10.2.2. The peak annual emissions associated with these activities would be (1) 4.1 tons of VOC, (2) 29.6 tons of CO, and (3) 127.4 tons of NO_x. Air quality impacts from dredging activities would be insignificant, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Consequently, dredging activities would produce insignificant air quality impacts within the home port region. Air quality impacts would be temporary and would cease at the end of construction activities.

Facility Improvements

Air quality impacts from construction of a CIF would mainly occur from combustive emissions due to the operation of diesel-powered equipment, haul trucks, and cranes. Minor amounts of fugitive dust emissions (PM_{10}) could also occur during construction activities that involve earth moving and/or grading. Peak annual emissions associated with this construction activity would be 1.0 tons of VOC, 5.5 tons of CO, and 8.1 tons of NO_x. Peak annual construction emissions associated with the alternative (including dredging and disposal activities) would be 5.0 tons of VOC, 35.1 tons of CO, and 135.5 tons of NO_x. Air quality impacts from construction activities would be minor, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. Consequently, construction of the action would produce insignificant air quality impacts within the home port region. Air quality impacts would be temporary and would cease at the end of construction activities. Table 6.10-3, Volume 6, presents a summary of construction emissions that would occur from the action.

Operations

Operational impacts from the action were determined by comparing the increase in emissions that would occur from the addition of one CVN at PHNSY. The estimated time when this action would occur is 2005. Emission sources affected by the homeporting of a CVN a PHNSY are similar to those identified for the NASNI, PSNS, and NAVSTA Everett homeporting locations. Consequently, methods used to estimate emissions from these sources are similar to those presented in sections 3.10, 4.10, and 5.10. Volume 6, section 6.10, presents a summary of emission calculations for emission sources affected by the action at PHNSY.

In the case of PHNSY, energy needed to generate steam demand for the CVN would be provided by privately owned utility plants located off site. Developers of these facilities could be required to obtain stationary source air permits from the Clean Air Branch (CAB) of the HDOH. Therefore, emissions from this activity would be mitigated through the CAB permit process and they are not presented in this analysis. Vehicle trips estimated in transportation section 6.9 of this EIS were used to estimate commuter vehicle emissions for the action. The alternative would add an additional 4,530 average daily work trips to and from Pearl Harbor and 11,050 daily trips within the project region that would be associated with dependents at off-base housing. The average lengths of work and dependent vehicle trip used in the analysis was 15 and 3 miles, respectively, and is based on the geographic distribution of housing locations for future CVN personnel. The EPA MOBILE 5a model was used to obtain factors for the estimation of vehicular emissions for the year 2005.

Table 6.10-1 presents emissions associated with the homeporting of one CVN at PHNSY. These data show that the overwhelming majority of emissions would occur from commuter vehicles. The addition of one CVN would increase annual emissions within the PHNSY project region by (1) 68.5 tons VOCs, (2) 378.9 tons of CO, (3) 83.0 tons of NO_x, (4) 0.6 tons of SO_2, and (5) 4.2 tons of PM_{10}. These emissions are worst-case, as the 15/3 tons of VOC/PM_{10} from PIA maintenance would only occur every other year. Since the total emissions from stationary equipment would be less than the levels that would require a Title V operating permit, no significant air quality impacts would occur from these sources. Stationary source emissions would also be minimized, for example, with the use of HDOH-permitted paint booths.

The transportation analysis in section 6.9 determined that commuter traffic from the action would significantly increase congestion to roadways in proximity to PHNSY, especially during the CVN PIA cycle. This situation could produce exceedances of the ambient CO standards during the coldest mornings of the winter at congested security gates or intersections and would represent a significant air quality impact. However, with the implementation of traffic flow improvements recommended in section 6.9, significant air quality impacts would not be expected from project traffic.

Table 6.10-1. Worst-Case Annual Operational Emissions from the Project Alternatives at Pearl Harbor Naval Shipyard

	AIR POLLUTANT EMISSIONS (TONS/YEAR)				
Sources	*VOC*	*CO*	*NOx*	*SOx*	*PM10*
Addition of 1 CVN					
Vessels and Auxiliary Equipment	0.41	1.80	8.28	0.55	0.59
Onshore Infrastructure	4.10	0.00	0.00	0.00	0.00
Routine Maintenance	2.64	0.00	0.00	0.00	0.00
PIA Maintenance (1)	15.00	0.00	0.00	0.00	3.00
Commuter Vehicles	46.31	377.06	74.71	0.00	0.62
Total and Net Change of +1 CVN	**68.46**	**378.86**	**83.00**	**0.55**	**4.21**

Note: () Represents a net decrease in emissions.
(1) PIA maintenance emissions would occur every other year.

RADIOLOGICAL AIR EMISSIONS

The applicable National Emission Standards for Radionuclide Emissions from project vessels and facilities are contained in 40 C.F.R. 61, Subpart I. Similar facilities and ships at other Navy bases are exempt from the reporting requirements of 40 C.F.R. 61.104(a), consistent with the criteria outlined in 40 C.F.R. 61.104(b), since their emissions result in exposures to the public that are less than 10 percent of the standards established by the EPA in 40 C.F.R. 61.102 (NNPP 1997.) Thus, since radionuclide air emissions are not expected to increase beyond the levels established at other Navy bases, there would be no significant impacts on air quality due to NNPP radioactivity from the homeporting of one additional NIMITZ-class aircraft carrier at PHNSY.

6.10.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Since this alternative would result in no change in existing conditions, no impacts on air quality would result.

6.10.2.3 Mitigation Measures

Since air quality impacts from construction and operation of the project alternatives would be insignificant, no mitigation measures would be required to reduce project emissions at PHNSY.

6.11 NOISE

This section describes existing noise conditions and potential effects associated with the proposed actions. Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although exposure to very high noise levels can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and type of activity during which the noise occurs, and the sensitivity of the individual. Volume 2, Appendix C, provides additional background information about noise measurement and the noise terminology used in this section.

6.11.1 Affected Environment

Pearl Harbor Naval Complex is a military-industrial environment characterized by noise from vehicular traffic, ship-loading cranes, ship signal horns, diesel-powered equipment, compressors, and construction activity. The primary concentration of these noise sources is vehicular traffic. Industrial activity noise is generally contained within shipyard shops and in close vicinity to the ships being repaired at berth or at drydock. Noise is also generated by nearby military and commercial aircraft operations and flight paths from Hickam AFB and Honolulu International Airport.

Noise sensitive receptors are existing land uses associated with indoor and outdoor activities that may be subject to significant interference from noise. Such receptors would include residential (single- and multi-family dwellings, dormitories, barracks), hospitals, and educational facilities. Residential areas are buffered by distance from most of the industrial noise activities at Pearl Harbor Naval Complex. Previous noise studies indicate that the nearest residential and noise-sensitive areas are not affected by aircraft noise; noise levels are those typical of urban residential neighborhoods. COMNAVBASE indicates no significant noise complaints at the Naval Complex (N41, Environmental Office 1997).

On base, the closest sensitive receptors to the shipyard berths are the officer residences near Marine Barracks and the medical clinic along Central Avenue, both 2,000 feet to the south of B2/3; Hale Ali'i Avenue Housing, 2,000 to 3,000 feet to the southeast; Hospital Point Housing, 3,000 feet to the west; Iroquois Point Housing along the Entrance Channel's western shoreline; and the USS ARIZONA Memorial, 3,500 feet across the South Channel.

The closest off-base sensitive receptors are Hickam AFB housing and Hickam Elementary School, 1 mile south of the shipyard. Noise studies have quantified the noise impact of the surrounding aircraft operations on these sensitive receptor sites to be outside of the 60 L_{dn} (day-night equivalent sound levels) noise contour. (L_{dn} 60 to 65 noise levels represent noise effects that may be disturbing to some activities related to Hawaii residents' outdoor lifestyle [HDOH 1996].)

Based on information summarized in sections 6.5 and 6.6, there do not appear to be any sensitive animal receptors of concern in the project vicinity.

6.11.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Military Regulations

The Department of Defense (DOD) has established acceptable sound level criteria for various land uses. Where these criteria are exceeded, the impact would be significant. The criteria are outlined in the NAVFAC P-970 document, *Planning in the Noise Environment* (DOD 1978), and are presented in Table 6.11-1. In the table, the outdoor noise environment is considered in five noise "zones." For each zone, acceptability is noted by one of the following four entries: (1) a "yes", (2) noise level reduction (NLR), (3) a "no", or (4) one of the above with additional stipulations described in the footnotes.

Table 6.11-1. Acceptable Land Use and Minimum Building Sound Level Requirements at Military Facilities

Land Use	OUTDOOR NOISE ENVIRONMENT (LDN IN DBA)				
	85-89	*80-84*	*75-79*	*70-74*	*65-69*
Family Housing	No	No	No	NLR 30[4]	NLR 25[4]
Bachelor Housing	No	No	NLR 35[4]	NLR 30[4]	NLR 25[4]
Transient Lodging, Hotels, Motels, etc.	No	No	NLR 35[4]	NLR 35[4]	NLR 25[4]
Classrooms, Libraries, Churches	No	No	No	NLR 30	NLR 25
Office and Administration Buildings (Military)	NLR 40	NLR 35	NLR 30	NLR 25	Yes
Offices — Business and Professional	No	No	NLR 35	NLR 25	Yes
Hospitals and any Medical Facilities with 24-hr occupancy	No	No	No	NLR 30	NLR 25
Dental Clinics, Medical Dispensaries	No	No	NLR 30	NLR 25	Yes
Outdoor Music Shells	No	No	No	No	No
Commercial/Retail Stores, Restaurants/Cafeterias, Banks and Credit Unions, Exchanges, Theaters, EM/Officer Clubs	No	No	NLR 30	NLR 25	Yes
Flight Line Operations, Maintenance, and Training	NLR 35[5]	NLR 30[5]	Yes	Yes	Yes
Industrial, Manufacturing, and Laboratories	No	NLR 35[5]	NLR 30[5]	NLR 25[5]	Yes
Outdoor Sports Arenas, Outdoor Spectator Sports	No	No	No	Yes[1]	Yes[1]
Playgrounds, Active Sport Recreational Areas	No	No	No	Yes	Yes
Neighborhood Parks	No	No	No	Yes	Yes
Gymnasiums, Indoor Pools	No	NLR 30	NLR 25	Yes	Yes
Outdoor — Frequent Speech Communication	No[2,3]	No[2,3]	No[2]	No[2]	No[2]
Outdoor — Infrequent Speech Communication	No[2,3]	No[2,3]	Yes	Yes	Yes
Livestock Farming, Animal Breeding	No	No	No	Yes	Yes
Agricultural (except Livestock)	Yes[3]	Yes[3]	Yes	Yes	Yes

Notes: Yes - Land use compatible with noise environment. No special noise control restriction. Normal construction okay.
NLR- Appropriate noise level reduction where indoor activities predominate.
No — Land use not compatible with noise environment, even if special building noise insulation provided.

1. Land use is acceptable provided special sound reinforcement systems are installed.
2. Land use may be acceptable provided special speech communication systems are used.
3. Land use may be acceptable provided hearing protection devices are worn by personnel. Check applicable hearing damage regulations.
4. Although local conditions may require residential uses in these areas, this use is strongly discouraged in Ldn 70-74 and Ldn 75-79 and discouraged in Ldn 65-69. The absence of viable alternative development options should be determined. NLR criteria will not eliminate outdoor environment noise problems and, as a result, site planning and design should include measures to minimize this impact, particularly where the noise is from ground-level sources.
5. The NLR must only be incorporated into the design and construction of portions of these buildings where the public is received, office areas, and noise-sensitive work areas or where the normal noise level is low.

Source: *Planning in the Noise Environment* NAVFAC P-970 (DOD 1978).

Where "yes" is indicated, no special noise control restrictions are necessary, and normal construction appropriate to the activity may be used. For many land uses, higher levels of exterior noise exposure are acceptable if the proper degree of interior noise attenuation is provided. Such tradeoffs are possible for land uses where indoor activities predominate. When such tradeoffs are appropriate, the amount of noise insulation required is enumerated in the table in units of NLR, which is measured in dBA and is the difference between noise measured outside the building and noise measured inside the building. If land use compatibility is contingent on meeting the NLR requirements, then a site-specific interior acoustical analysis must be performed to ensure that the proposed building design will provide the required level of noise reduction. A "no" indication means that the noise environment is not suitable for the designated activity or facility, even if special building noise insulation is provided. The table footnotes indicate exceptions where special conditions apply.

Civilian Regulations

The state has no authority to enforce its regulations on activities and properties under federal jurisdiction, although it defines maximum permissible sound levels of noise sources emanating within a specified zoning district or beyond property lines in Hawaii Administrative Rules Title 11, Chapter 46, Community Noise Control (September 23, 1996). This regulation is applicable to stationary noise sources and equipment related to construction and industrial activities. Its noise limits are considered as guidelines to aid in assessing the potential noise impacts.

Under state guidelines, noise levels for construction activities may not exceed the maximum permissible sound levels indicated for more than 10 percent of the time for any 20-minute period. This means that excessive noise sources may not exceed 55 dBA during daytime hours (7:00 A.M. to 10:00 P.M.) and 45 dBA during nighttime hours (10:00 P.M. to 7:00 A.M.) at the property line of a residential zone. Corresponding maximum permissible sound levels in industrial zones are 70 dBA during the day or nighttime. The regulation also specifies hours and days when construction activity is allowed (Table 1, HAR 11-46-4).

6.11.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging

Dredging the Entrance and Main Channels of Pearl Harbor, as well as the entire turning basin, would not result in a significant impact to any sensitive noise receptors. Diesel-powered tug boats and operation of heavy equipment would create loud noise events. Noise levels from a diesel clamshell dredge were measured at 85 dBA at 50 feet (DON 1995a).

Sensitive on-base receptors along the channel shoreline include the military residential areas at Iroquois Point, Hickam AFB and Hospital Point, and the USS ARIZONA Memorial. Dredging would occur no closer than 400 feet from the shoreline, except adjacent to B2/3 and the Ford Island harbor area. Dredging would not occur closer than 2,500 feet from the USS ARIZONA Memorial. Noise from dredging equipment would range in the low to mid 60s dBA at most shorelines, not exceeding the military family housing criterion of 65 dBA. Dredging noise would be approximately 50 dBA at the USS ARIZONA Memorial, for which there is no specific noise criterion. No dredging would occur at night, and noise generated would be short term. Therefore, noise impacts from dredging would not be significant.

Facility Improvements

Construction activities would generate temporary noise impacts in the shipyard, but they would not be significant with appropriate construction procedures being followed.

Building demolition and repaving would occur adjacent to B2/3 to provide a CVN laydown area, along with possible demolition of Building 68 to clear an area for construction of a parking structure. Building demolition and construction of the CIF would occur adjacent to Drydock 1 and B1. At 500 to 1,000 feet away, a pile driver creates a noise impact of 80 dBA. At 2,000 feet, heavy equipment creates a noise impact in the low 60s dBA. These projected noise levels do not reflect the substantial noise-attenuating effects of intervening structures or excess atmospheric attenuation at great distances (over 500 feet) from the construction and industrial shipyard activity. It also does not account for the intermittent nature of construction activity. Demolition and construction will be restricted to daytime hours. Construction equipment and on-site vehicles or devices requiring exhaust of gas or air would be equipped with mufflers.

The nearest on-base receptor is Hale Ali'i Avenue housing, located 500 feet from Building 68. Noise from certain construction activities may generate more than 65 dBA during daytime hours at these senior officers' houses, unless portable noise barriers were erected. Other noise sensitive receptors—housing, a medical clinic, and the USS ARIZONA Memorial — are 1,500 to 3,500 feet from proposed shipyard construction and would not experience noise above the military's 65-dBA guideline for family housing. Noise at the shipyard would be intermittent and consistent with the shipyard's industrial nature; it would not be a significant impact in operational areas. Therefore, no significant noise impacts on sensitive receptors would occur.

Construction noise would not exceed state noise criteria at any non-military, off-base receptors, because all are located more than 1 mile away. Therefore, no significant noise impacts would occur.

Operations

Operational noise would not result in a significant impact. Operational noise generated on or in association with a CVN would be from stationary sources such as heavy equipment, industrial vehicles, machine shops, and power tools and would be typical of the industrial waterfront. Navy procurement specifications for new machinery and equipment require the lowest noise level that is technically and economically feasible, with the objective of an A-weighted sound level of 84 dBA or less at all locations where personnel are required to work. Routine noise from pier-side operations may be pre-mitigated by varying the hours of operation and selecting appropriate sound suppressed equipment for such tasks as material handling. Other noise reduction measures include limiting the number of noise producing equipment operations at any one time, selecting quieter equipment (electric or gas instead of diesel powered), addition of noise barriers, use of air conditioning in surrounding buildings, and a reduction of vehicular speed limits.

Assuming point source propagation characteristics, predicted sound levels from these operations could result in the low 50s dBA at the closest on-base sensitive receptors. Predicted sound levels reaching the closest off-site receptors, 1 mile away, would be in the low 40s dBA. Therefore, operational noise impacts would not be significant.

No significant noise impacts would occur as a result of increased traffic by crew members commuting to or industrial vehicles within the shipyard. As point of comparison, traffic in the 1980s included 2500–3800 more commuting workers per day than would occur with the CVN. No major traffic-related noise complaints were registered during the peak period.

6.11.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

No change in existing noise conditions would occur, thus no noise impacts would result.

6.11.2.3 Mitigation Measures

Because impacts on noise would be less than significant, no mitigation measures are required.

6.12 AESTHETICS

This section addresses the aesthetics or visual resources of the proposed Pearl Harbor Naval Complex homeporting site. Visual resources consist of topographic features such as landforms and bodies of water, and man-made features such as buildings, bridges, and recreational areas. The aesthetic quality of an area is evaluated by the extent to which important visual resources are seen from view corridors (vantage points) or experienced from roadways, parks, or buildings (public and private).

6.12.1 Affected Environment

The overall aesthetic quality of Pearl Harbor is characterized by industrial buildings, many of which were constructed during or soon after World War II. Pearl Harbor's existing visual conditions are consistent with its historic character as an open-water military port. PHNSY is characterized by piers, cranes, dry-docks, industrial buildings, and parking areas.

There are very few public view opportunities into the harbor due to the base's flat terrain and built-up military facilities. Panoramic views of Navy vessels and piers are visible from the harbor's open waters, from Aiea Bay State Recreation Park, Halawa Heights, and across the south channel from the USS ARIZONA Memorial and Ford Island.

The Pearl Harbor Naval Base has been designated a National Historic Landmark, and numerous structures on base are considered historic. Criteria used in evaluating the historic significance of individual structures within the landmark are inclusive of a structure's visual and physical prominence. Although many of the Pearl Harbor facilities appear ordinary and lacking in distinguishing aesthetic value, the collective significance of the base facilities' historic role in World War II is unique in history. The USS ARIZONA Memorial, a prominent historic property located within the boundaries of the Pearl Harbor Naval Base, is visible from the shipyard one-half mile across the South Channel. The shipyard contains a number of historic structures of minor importance in the vicinity of the CVN berth site. An Historic Preservation Plan for Pearl Harbor Naval Complex is discussed further in section 6.13, Cultural Resources.

A Pearl Harbor Base Exterior Architecture Plan (BEAP), Pearl Harbor Naval Complex (DON 1984) provides guidance for improving the exterior appearance and architecture of Navy facilities. The BEAP characterizes the base, including the shipyard, as visually chaotic and unattractive with no architectural commonality among command areas. The appearance from surrounding public roadways lacks attractiveness due to fencing, industrial structures, large, unlandscaped parking areas, and poorly maintained buildings. Hale Ali'i residential areas and Shipyard Building 1, Administrative Complex, are exceptions to this negative image. Building 1, two blocks south of B2/3, is historically significant.

The BEAP advocates that shipyard exterior improvements, such as landscaping and coordinated building color, lighting, and signage, focus on highly visible areas, avenues leading into the shipyard, Central Avenue, Shipyard Building 1, and parking lot H. New buildings should be designed to reflect their location in Hawaii and the historic aspects of surrounding buildings, and to achieve tasteful architectural consistency within the base and shipyard. The visual impacts of pre-engineered structures should be minimized.

6.12.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The proposed action would result in a significant aesthetic impact if it would result in either of the following:

- Substantially adverse degradation of the quality of an identified visual resource, including but not limited to unique topographic features, undisturbed native vegetation, surface waters and major drainages, and parks or recreational areas; or

- Substantially adverse obstruction of any scenic vista or view visible to the public.

6.12.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging

Dredging equipment and vessels would be consistent with the maritime-industrial visual character of Pearl Harbor and would not significantly impact harbor views from the USS ARIZONA Memorial. Dredging equipment and vessels would extend to within approximately 1,200 feet of the Memorial at the north end of the turning basin adjacent to Pier F5. Dredging would be temporary, and the vessels and dredge equipment would be consistent with the marine-industrial appearance of the harbor.

Facility Improvements

No significant aesthetic impacts would result from the proposed construction activities for this action. Facility improvements would occur primarily in the industrial shipyard and would not interfere or obstruct any public scenic views or disturb unique natural features.

New construction would include a 48,000 square foot CIF at Sixth Street and Avenue E, replacing buildings 4, 4A, 5, 5A, and 8 and would potentially include a three-story parking structure off Club Road that would replace the central tool shop warehouse (Building 68). Demolition of several smaller maintenance buildings adjacent to B2/3 and subsequent repaving would create space for a CVN laydown area. These building areas are only visible from adjacent shipyard roadways and structures, from Hale Ali'i housing, and at a great distance across the harbor and from Ford Island. The CIF would be a concrete and steel structure with two bays (the larger bay at 70-foot height) and an administrative area. The removal of the existing buildings and construction of the CIF would slightly alter the shipyard waterfront appearance. The new parking structure would be of similar scale, although somewhat larger than Building 68. Impacts to historic resources are discussed in section 6.13.

New building construction would conform to the BEAP. The proposed CIF would be designed to incorporate elements of adjacent historic structures, such as color and detailing. Large regular building surfaces would be avoided on the exteriors facing the waterfront and Building 1. Walls would be broken into smaller, more visually aesthetic features where possible. The building character would not be inconsistent with the Naval Complex warehouses, machine shops, and industrial facilities. The height of the proposed parking structure would be evaluated in terms of view impact. Treatment of the structure's facade facing Hale Ali'i Drive would complement adjacent historic structures. An alternative would be to park additional cars associated with the CVN crew and shipyard workers in underutilized shipyard parking lots rather than building a new parking structure. Landscaping the parking lots and adding plantings would improve and unify base appearance, as recommended by the BEAP.

Operations

Although larger and more visible than the ships and submarines currently homeported at Pearl Harbor, a CVN would be consistent with the existing marine-industrial setting and would not significantly change public views. Existing shipyard waterfront cranes would continue to be used for the homeporting activities. Maintenance, repair, and off-loading that would take place in the proposed laydown area would be comparable to current repair activities.

6.12.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Because this alternative component would result in no change in existing conditions, no impacts on aesthetics would result.

6.12.2.3 Mitigation Measures

Because impacts on aesthetics would be less than significant, no mitigation measures are required.

6.13 CULTURAL RESOURCES

The cultural resources of the Pearl Harbor Naval Complex, a National Historic Landmark, have been studied as a result of previously approved projects and master plans. This section focuses on the shipyard areas that would be affected as a result of homeporting a CVN at Pearl Harbor. Submerged cultural resources have been documented by the National Park Service (NPS). Sensitive areas are avoided during routine maintenance dredging of the navigation channels. The following is based on previously gathered studies, in particular the Pearl Harbor EIS of 1990 for various projects (DON 1990) and the related *Archaeological Assessment* (Davis 1990).

6.13.1 Affected Environment

Overview

Prior to western contact, Hawaiians recognized Pearl Harbor as a rich fishery and shellfish gathering area. According to Hawaiian tradition, Pearl Harbor is the home of the shark goddess, *Ka'ahupahau*. The harbor was also an area where pearl oysters were harvested (thus the harbor's name). Long-term settlement of the harbor is associated with fishing and cultivation of irrigated taro from the end of the first millennium A.D. Recorded history indicates the construction of fishponds at Pearl Harbor in the late 1400s. The rich inland soils supported taro, yams, banana, watermelon, and pili grass plantations. In 1899, Oahu Sugar Company acquired the land of the future Naval complex, which the U.S. Navy purchased for the shipyard and Naval station in 1901-1902. Pearl Harbor was established as a U.S. Naval Base in 1908 and remains a vital part of the U.S. defense establishment as the Navy's largest and most strategic island base in the Pacific. Pearl Harbor serves as headquarters of five major fleet commands, including the Commander-in-Chief, U.S. Pacific Fleet.

Pearl Harbor has been the site of numerous important historical events and is most noted for its role in the Pacific Theater defense during World War II. Battleships sunk during the December 7, 1941 Japanese bombing of Pearl Harbor, as well as sites where planes were downed, have been designated as historically significant. The USS ARIZONA and USS BOWFIN, a World War II fleet submarine, are National Historic Landmarks, as is the entire Pearl Harbor Naval Complex (designated in 1964). The USS Arizona Memorial structure and the Naval Complex are also listed on the National Register of Historic Places (NRHP). Figure 6.13-1 indicates the Pearl Harbor National Landmark Boundary. In 1978, to ensure protection of the integrity that qualified the base to be listed, the Navy adopted a Historic Preservation Plan. All Naval complex facilities were inventoried and classified according to their historical significance. A Memorandum of Agreement (MOA) between the Navy and the Advisory Council on Historic Preservation (ACHP) was executed in 1979, in consultation with the State Historic Preservation Officer (SHPO). The MOA was established to provide a planning process to avoid and/or assure appropriate mitigation of any adverse effects resulting from the Navy's missions whenever possible, and required detailed documentation when not possible, while at the same time not impairing military operations. Reviewed every 5 years, the MOA remains in effect until a determination is made that it should be modified or canceled.

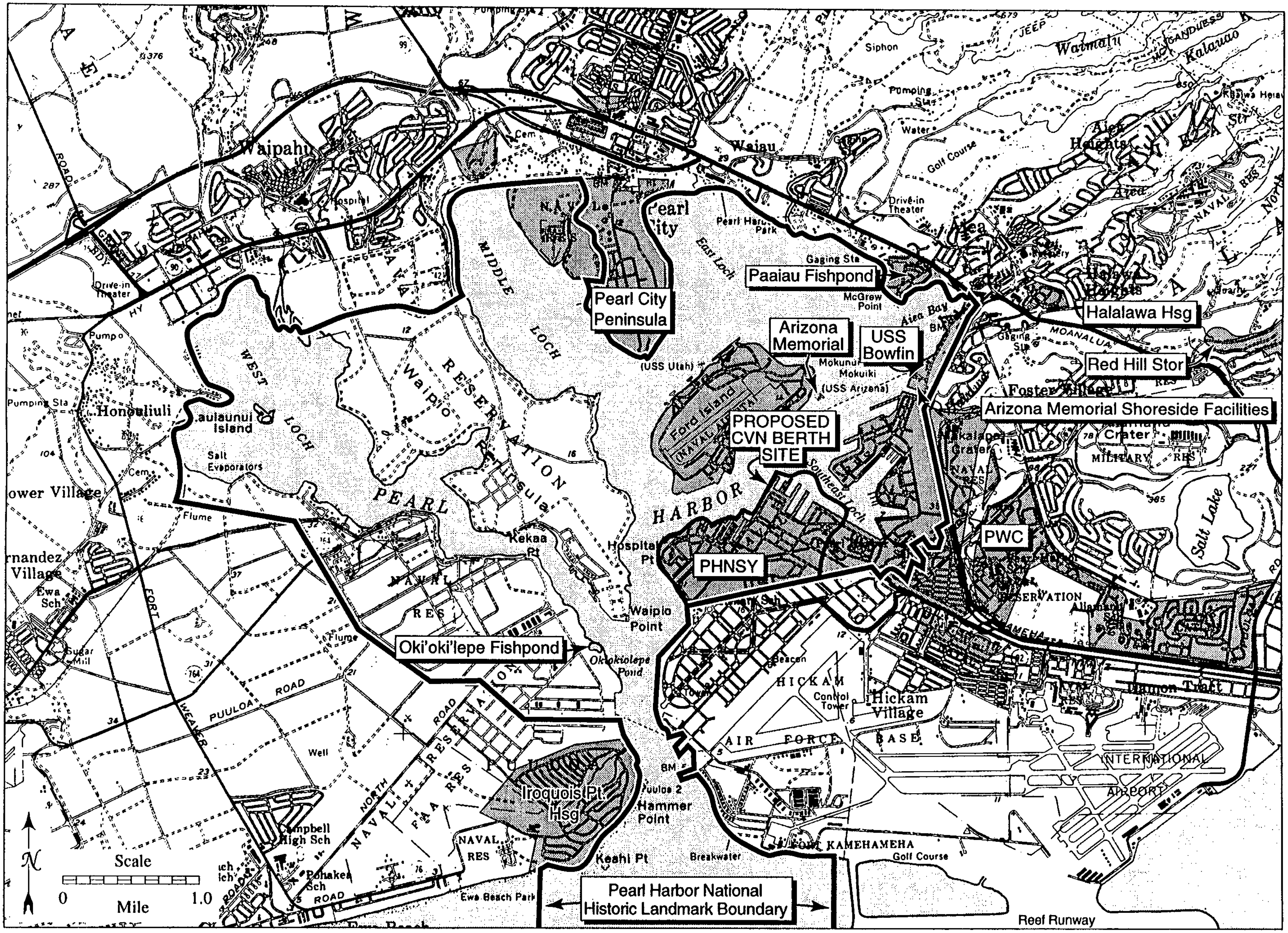

Figure 6.13-1. Cultural Resources — Pearl Harbor

Cultural Resources in the Project Area

Pearl Harbor has been heavily modified over the past 80 years, including extensive landfill intended to stabilize the marshy shorelines. Archival documentation shows a number of fishponds along the shipyard's now-buried shoreline, built roughly around the mid-15th or early 16th century. There is a possibility that prehistoric cultural deposits may be preserved along the buried shoreline; however, investigation would not be practical because many areas underlie wharves built on heavy pilings, as at B2/3 (Davis 1990).

The proposed parking structure (to replace Building 68) would rest over a known archaeological site, listed by the SHPO as Site #98 *Loko Amana* fishpond, filled in before 1900. A second archaeological site, *Loko Pahaku* fishpond State Site #97, now filled under the repair piers B13 to B21, is between the proposed parking structure and CVN laydown area.

The shipyard and B2/3 are entirely within the National Historic Landmark. The shipyard contains over a dozen structures that constitute prominent elements (Category 1) of the National Historic Landmark and approximately 138 structures of minor historic importance. A complete listing of the PHNSY historic inventory is provided in Volume 6, section 6.13. The intent of the Historic Preservation Plan for Pearl Harbor was to inventory all facilities on the base and to classify them according to their historical significance. The facilities have subsequently been assigned the categories listed in Table 6.13-1.

Table 6.13-1. Historic Significance Categories

Category	*Historic Significance*
1	A structure that constitutes a prominent element of the National Historic Landmark and played a major role in the operation of the base. These structures are to be retained and preserved if possible. If alteration or removal of Category 1 structures is deemed necessary for operational purposes, the Navy must consult with the SHPO and the ACHP.
2	A structure that functioned as an important part of the base and contributed to "the historic fabric of the Landmark." All Category 2 facilities will eventually be reclassified as either Category 1 or 3, in consultation with the SHPO, and the intent is to eliminate this category.
3	A structure of minor importance and that functioned as part of the base. Prior to alteration or demolition of Category 3 facilities, the Navy is required to record data according to the standards described in the MOA.
4	A structure lacking in historic importance.
5	A structure built after 1953 or an uncategorized structure.
4 and 5	Structures built after 1953 do not require the Navy to consider any mitigative actions. Uncategorized facilities built before 1946 require consultation with the SHPO to assess historical significance.

Source: Historic Preservation Plan, Pearl Harbor Naval Complex 1978.

Properties with historic value (Categories 1 and 3) within the PHNSY project area (see Figure 6.13-2 in Volume 6, section 6.13) include the following:

- Category 1—none
- Category 3
  - Shipyard repair wharves, B1 and B3, constructed between 1927 and 1936;
  - Central tool shop warehouse, Building 68, constructed in 1923;
  - Multi-use storehouse, Buildings 92 adjacent shipyard berths B2/3;
  - Welding training shops, Buildings 391 and 392, located dockside at B2/3;
  - Two large warehouses and battery shop, Building 393 and 394, along 7th street in the shipyard; and
  - Drydock #4, constructed in 1942.
  - Service shops, Buildings 4 and 4A, located dockside at Drydock #1.
  - Forge and propeller shop, Building 5, constructed in 1913.
  - Galvanizing shop, Building 5A.
  - Electric power plant, Building 8, constructed in 1913.

Additional historic properties within 1,000 feet of the proposed project area are presented in Table 6.13-1, Volume 6, section 6.13.

6.13.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Evaluation of significance is guided by specific criteria for listing cultural resources on the NRHP, as defined in 36 C.F.R. 60.4, as augmented by the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, and appropriate state guidelines, and in consultation with the SHPO. The quality of significance is present in districts, sites, buildings, structures, and objects that maintain the following:

- Association with events that have made a significant contribution to the broad patterns of history;
- Association with the lives of persons significant in the past;
- Design or construction techniques that embody the distinctive characteristics of a type, period, or method of construction or represent the work of a master or possess high artistic value or represent a significant and distinguishable entity whose components may lack individual distinction; and

- Cultural materials, including artifacts, features, and other remains, that have yielded, or may be likely to yield, information important in prehistory or history.

An action will have an effect on an eligible cultural resource when it alters those characteristics that qualify it for inclusion in the NRHP (36 C.F.R. 800.9[b]). Effects (impacts) may include the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Alteration of the character of the property's surrounding environment (i.e., setting) that contributes to the property's qualification for the NRHP. In the case of Pearl Harbor, alteration of the National Historic Landmark setting that is not in compliance with the Pearl Harbor Historic Preservation Plan as part of the MOA between the Navy, the ACHP, and the Hawaii SHPO;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or
- Neglect of a property resulting in its deterioration or destruction.

Other federal laws, including the American Indian Religious Freedom Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act, deal with cultural resources, but they do not establish criteria for determining significance of impacts. They only pertain after the pertinent cultural resources have been identified, or if their discovery seems likely.

6.13.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Drydock #4 upgrade; and personnel support facilities.

Dredging

Dredging of the South Channel and turning basin would not likely impact possible submerged cultural resources dating from the historic 7 December 1941 attack. Previous marine geophysical surveys indicate the presence of underwater buried objects in areas fronting Piers F4 and F5 on Ford Island (DON 1990). A study of Japanese Naval aircraft crash sites at Pearl Harbor identified no planes downed in the turning basin (DON 1990). Because channel maintenance dredging has occurred twice in the last 30 years and a maintenance dredging project is planned to a depth of 45 feet prior to the proposed action, it is not likely that historic objects would be newly encountered or damaged under this alternative. Due to the distance (approximately 1,200 feet) of the proposed dredging from the USS ARIZONA Memorial (a National Historic Landmark and Category 1 facility) and the temporary nature of dredging, no impacts to the Memorial would occur.

Facility Improvements

Impacts to subsurface archaeological resources would not be significant during excavation for construction of the CIF, a parking structure, and laydown area, because these areas are previously developed building sites. The proposed parking structure (to replace Building 68) would rest over a known archaeological site, *Loko Amana* fishpond, filled in before 1900. A second archeological site, *Loko Pahaku* fishpond, now filled under the repair piers B13 to B21, is between the proposed parking structure and CVN laydown area. Proposed demolition and construction would not affect these previously filled sites. Prior to construction, the Navy would consult with SHPO as part of the Section 106 consultation, to determine whether periodic archaeological monitoring of subsurface construction would be required. It is the Navy's intention to develop a Plan of Action under NAGPRA.

No prominent, Category 1 structures (such as the USS ARIZONA Memorial) would be affected by the construction of facilities for the proposed alternative. Historic structures rated Category 3 that would be directly impacted by the proposed facility improvements are as follows:

- The central tool warehouse (Building 68) would be demolished and replaced with a three-story parking structure.

- Service shops including sheetmetal, galvanizing, forge and propeller, shipfitting and boiler shops (Buildings 4, 4A, 5, 5A, and 8) would be demolished. A 48,000-square-foot CIF would be constructed on these sites.

- A multi-use storehouse (Building 92) and welding training shops (Buildings 391 and 392) would be demolished to make room for a new open paved area to serve as a laydown area for the CVN.

Prior to construction of new facilities and demolition of Buildings 4, 4A, 5, 5A, 8, 68, and 92, the Navy would be required to complete a Section 106 consultation with SHPO and complete photographic documentation, according to standards described in the MOA..

Operations

No impacts on archaeological resources would result from the proposed action.

No prominent, Category 1 structures would be affected by the proposed alternative. Historic structures rated Category 3 that would be directly impacted by the proposed operations are as follows:

- Two large warehouses (Buildings 393 and 394) would be reused for CVN-related equipment storage. There would be little or no impact on the exterior appearance or function of these buildings.

- Shipyard repair Berth B3 would become part of the home port site for the CVN. No significant impacts would occur, because the berth would be capable of accommodating all activities associated with a CVN homeporting. Routine structural maintenance to various shipyard piers are ongoing as part of unrelated projects that would be completed prior to the proposed action. Impacts to nearby Berth B1 would be insignificant.

- Drydock #4 has been designated an emergency repair facility for CVNs. Upgrades to drydock support facilities and utilities would be required to accommodate CVN repair. No significant impact on the appearance or dimensions of the drydock would result from this designation.

The Navy would document Category 3 structures (Buildings 393, 394, 68, and Drydock #4) that would potentially be altered during operations of the proposed action, in accordance with the MOA. Therefore, there would be no significant impacts on these resources.

As required for review every 5 years under the MOA, a historic inventory and reevaluation of all structures within the Pearl Harbor National Landmark is in progress. A preliminary reevaluation of facilities has been completed, and Buildings 68, 393, 394, Berth B3 and Drydock #4 are not classified in Category 1 or 2. If no changes are made to the preliminary findings, the Navy would consult only with the SHPO and not be required to consult with the ACHP for alterations to these structures.

6.13.2.2 Facilities for No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Because this alternative component would result in no change in existing conditions, no impacts to historic or archaeological resources would occur.

6.13.2.3 Mitigation Measures

Because impacts on cultural resources are less than significant, no mitigation measures are required.

6.14 GENERAL SERVICES/ACCESS

This section discusses general services affecting Navy personnel quality of life, including recreational facilities, community support facilities, medical care, fire protection, and police protection. Schools, housing, and cost of living are addressed in section 6.8. Access in and out of the Pearl Harbor Naval Complex is also addressed, although specifics of vehicular movements on roadways are discussed in section 6.9.1.

6.14.1 Affected Environment

Recreational Facilities

Recreational facilities at Pearl Harbor are administered by one of the Navy's largest Morale, Welfare, and Recreation (MWR) departments. All island military facilities are open to active military personnel and their dependents. On base, many are found at Subase and on Ford Island, including sports fields, a golf course, swimming pools, a bowling center, fitness and aerobic centers, ticket and tour offices, a library, and restaurants. Recreational boating activities for active duty and retired military personnel are available off base at Rainbow Marina. Other military recreation facilities in the area include an 18-hole Navy/Marine golf course and Bellows NAS beach and recreation center. Important memorial and tourist facilities include the USS ARIZONA Memorial and USS BOWFIN Museum. Current demand for these facilities exceeds facility and program capacity. In particular, there is a need for fitness centers and ballfields (personal communication, MWR 1997).

Regionally, city and state park facilities provide recreation opportunities ranging from a canoe racing complex, hiking trails, public fishing areas, three public golf courses, picnic areas, and bikeways. The primary park serving the area is the 6-acre Aiea Bay State Recreational Area along the banks of Pearl Harbor's East Loch.

Community Support Facilities

Community support facilities include the Navy Family Service Center at Pearl Harbor, providing a variety of support services to Navy personnel, retirees, and family members, including social services information, counseling, family education programs, volunteer programs, a resource library, and leisure activities. Community support facilities at the Pearl Harbor Naval Complex are generally adequate for the number of crew members currently stationed on Pearl Harbor-homeported ships and submarines except for family-support and youth programs (personal communication, MWR 1997).

Three child development centers operated by MWR are operating at full capacity with a waiting list. No new DOD child development centers are programmed. Additional community support facilities include an auto hobby shop, military clubs, a retail commissary, exchanges, bank and credit union branches, and a chapel.

Medical Facilities

The Naval Clinic Command, Pearl Harbor, provides out-patient medical services for active-duty personnel and families at two on-base clinics and one dispensary. The shipyard clinic primarily provides occupational health and safety services and annual physicals. The Makalapa medical clinic supports active duty personnel and Navy families. Families also have the option to receive in-patient and out-patient primary and specialty care at Tripler Army Medical Center (AMC), approximately 4 miles from the Pearl Harbor Naval Complex. Tripler AMC is adequately staffed to meet current medical demands (personal communication, Tripler Hospital 1997). Civilians (shipyard employees) in need of care may receive special immediate medical care at the Makalapa clinic or are referred to off-base private treatment. Emergency response service is operated by the Naval Clinic Command (personal communication, Naval Clinic Command 1997).

Fire Protection

The Federal Fire Department, housed in two stations on base, provides fire protection within the Pearl Harbor Naval Complex. A Mutual Aid Pact between the Federal Fire Department and the Honolulu Fire Department affords dual coverage in times of emergency.

City and County of Honolulu and the USCG operate utility boats in Pearl Harbor that are capable of harbor search and rescue and possess fire-fighting capabilities.

Law Enforcement

Naval Station Security Detachment has ultimate responsibility for law enforcement at the Pearl Harbor Naval Complex. A staff of 132 civilian officers and administrative staff are supported by over 70 military officers patrolling the base, surrounding housing and community military property, and manning base entry gates. The police station is one-half mile from the shipyard berths. Four Navy patrol boats are berthed at Ford Island, overseeing harbor and Controlled Industrial Area (CIA) security. PHNSY contracts designated NAVSTA security officers to patrol shipyard sectors. Boundary fencing and controlled gates protect the shipyard's CIA. Current staffing is adequate (DON 1997). Onboard security is provided by the Master of Arms onboard under the guidance of MIDPAC and NAVSTA security. Naval Criminal Investigative Services (NCIS) is a separate entity of investigators stationed in the shipyard to follow up generally on felony cases transferred from NAVSTA police. The City and County of Honolulu Police Department is responsible for traffic control in areas surrounding the base, with the closest station in Pearl City.

Access

There are three main vehicular access gates into the Pearl Harbor Naval Complex (Nimitz Gate, Makalapa Gate, and Halawa Gate) from the public highway. Installation roadways operate at an adequate LOS except at the main intersections/gates during peak commuter travel, between the hours of 6:30 and 7:30 A.M., and 3:30 and 4:30 P.M. and at lunch hours. Shipyard workers are shuttled from remote parking areas to shipyard facilities in shuttle buses. Navy personnel gray boats launch from a shipyard landing adjacent to the drydock. The gray boats ferry between mainside locations and Ford Island, operating between 6 A.M. and midnight and arriving every 10 to 15 minutes during peak periods and one per hour off peak.

6.14.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The proposed action would result in a significant impact on general services/access if it would result in any one of the following:

- A substantial adverse increase on the remaining service/access capacity;
- Reach or exceed the current capacity of the service/access such that accepted levels of service would not be maintained;
- Cause response times for fire protection or law enforcement to increase beyond their respective department standards; or
- Require development of new services/access beyond those existing or currently planned.

6.14.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Dredging operations would have a less than significant impact on general services/access because such dredging operations would occur on waterways not used for access or general services.

Facility Improvements

RECREATIONAL FACILITIES, COMMUNITY SUPPORT FACILITIES, MEDICAL FACILITIES, FIRE PROTECTION, LAW ENFORCEMENT, AND ACCESS

Construction of facilities would not significantly impact general services/access. Contractors would avoid blocking roadways or fire lanes with construction equipment.

Operations

RECREATIONAL AND COMMUNITY SUPPORT FACILITIES

Pending development of new recreation and community facilities, no significant impact to these facilities would occur as a result of implementation of the proposed alternative component. In an analysis of support facilities required to accommodate a CVN crew, families, and civilian shipyard workers, PACDIV estimated the need for a new child development center, a Fleet Shoreside Facility, and additional MWR facilities. Homeporting a CVN would add to the current deficiency in child care facilities, as there is currently a waiting list for entrance to Pearl Harbor child development centers, for children ages 6 months to 5 years. Approximately 606 military dependent children would be relocated to the area. With the arrival of a CVN, a deficiency would exist. MWR would need to evaluate future child care needs and funding options. In the short term, it is likely that the additional children would enroll in existing private programs in the area.

MEDICAL FACILITIES

The projected increase in military and shipyard maintenance personnel associated with homeporting a CVN at Pearl Harbor would increase the demand for health services, although ship personnel would also have access to health care aboard the ship. Conversations with staff at the Naval Clinic Command and Tripler AMC (personal communications, Naval Clinic Command 1997; Tripler AMC 1997) indicated that additional medical staff would be required to handle the increase. Facilities at both the clinic and Tripler AMC would be sufficient to meet the new requirements. Impacts would be less than significant.

FIRE PROTECTION

Federal fire department facilities and equipment would be adequate to meet the needs of homeporting a CVN at Pearl Harbor. There would be no increased demand for City and County of Honolulu fire services in areas where Navy personnel and families would reside because those areas are already covered by such services.

LAW ENFORCEMENT

The proposed alternative component would not significantly impact police protection of Pearl Harbor. NAVSTA Security detachment has adequate staff and is supported by military personnel. When a carrier is berthed at Pearl Harbor, the police do not change their patrol zones or enforcement numbers. The CVN crew would generally supply shore-duty personnel to supplement NAVSTA security. Actual ship security is under MIDPAC, and the ship's captain is ultimately responsible for ship security. The proposed berths B2/3 are located in the shipyard CIA. In 1998 as part of the internal shipyard consolidation program, the CIA boundary fence was moved, which would allow crew and service access from Avenue C directly to the laydown area and berths.

The City and County of Honolulu Police Department would not be significantly affected by the proposed alternative component. There would only be minor off-base consequences, such as increased traffic on Kamehameha Highway and other public roadways (see section 6.9.2.1).

ACCESS

Introduction of increased commuter traffic to the shipyard would worsen traffic conditions at Pearl Harbor Naval Complex entry gates and certain intersections during peak travel periods. Although the flow of traffic would be slowed, the additional commuter traffic would not preclude access to the Pearl Harbor Naval Complex entry gates. Impacts to access would be adverse, but less than significant.

6.14.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative would not require any new projects.

Because this alternative would result in no change to existing conditions, no significant impacts to general services or access would result.

6.14.2.3 Mitigation Measures

Recreational and Community Support Facilities, Medical Facilities, Fire Protection, Law Enforcement, and Access

Because the project would have a less than significant impact on general services and access, no mitigation is proposed.

6.15 HEALTH AND SAFETY

6.15.1 Affected Environment

This section addresses health and safety issues related to the project alternatives at Pearl Harbor Naval Complex. All operations at Pearl Harbor Naval Complex are governed by the Navy Occupational Health and Safety (NAVOSH) program (DON 1994). Volume 3, section 3.15 provides a detailed summary of the content of this program, which is applied by the Navy.

NAVOSH Program

The Navy has historically maintained health and safety programs to protect its personnel and property. Occupational health has been an element of the overall program, which includes explosive, nuclear, aviation, and off-duty safety. Each command at the Pearl Harbor Naval Complex conducts its own safety program under NAVOSH instruction. OPNAVINST 5100.d sets NAVOSH standards for the shoreside areas, the piers, support maintenance buildings, and utilities. A separate NAVOSH program, OPNAVINST 6100.19.c, is the responsibility of the ship captain and governs the ship and onboard crew. The PHNSY Health, Safety and Environmental office maintains a MOA regarding safety standards with crews berthed at the shipyard. The last Navy inspection of the PHNSY NAVOSH program was conducted in January 1997 and a satisfactory grade was assigned (personal communication, PHNSY 1997). PHSNY safety officers are required to attend regular regional safety training. Work process training for shipyard trades is incorporated under OPNAVINST for shore and afloat activities. Minimum requirements for OPNAVINST 5100.23 are met.

Hazardous Materials Program

All facilities within PHNSY turn in contaminated waste to the Hazardous Waste Accumulation and Packaging Facility at Building 1663 in the CIA. This HWAPF is a less than 90-day accumulation facility. Yearly hazardous waste volumes average 123,000 pounds. PHNSY coordinates the hazardous waste turnover to the Defense Reutilization Marketing Office (DRMO) for off-site shipment and disposal (personal communication, PHNSY 1997).

Oily waste from the shipyard is temporarily stored in two 4,500-gallon aboveground storage tanks (ASTs) located at Building 1670. Oily waste is collected in pumper trucks for transfer to FISC's ASTs near Makalapa Gate. Waste oil is tested for hazardous characteristics; reclaimable oil is burned as fuel for base activities at 1.2 mgy. Hazardous waste oil is properly packaged and disposed by DRMO.

PHNSY established a hazardous waste management and minimization program (NAVSHIPYD PEARL INS 5090.1C and 5090.3B) under OPNAVINST 5090.1B for controlling and reducing hazardous waste generation and procedures for managing the waste in accordance with applicable environmental regulations. The program also covers shipyard generated industrial wastes. The Hazardous Materials Management Program and NAVOSH program are summarized in Volume 3, section 3.15.

NNPP Radiological Impact

Chapter 7 provides detail on the radiological health and safety aspects of NNPP activities. Also, the Navy's safety and health record is well documented. As is discussed in the Navy's annual report (NNPP 1997a), procedures used by the Navy to control releases of radioactivity from Naval nuclear-powered ships and their support facilities have been effective in protecting the environment and the health and safety of the general public.

Other Federal Health and Safety Requirements

All proposed facilities at PHNSY are designed, constructed, and operated to meet the requirements of Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, to ensure whenever feasible that pollution would be prevented or reduced at the source, that pollution that cannot be prevented would be recycled in an environmentally safe manner; that pollution that cannot be prevented or recycled would be treated in an environmentally safe manner; and that disposal or other releases to the environment would be employed as a last resort. These requirements are contained in all contractual documents for the design, construction, and operation of the proposed facilities. Operations such as the proposed action are required to comply with regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

6.15.2 Environmental Consequences and Mitigation Measures

Significance Criteria

Impacts associated with hazardous waste generation are considered significant if the construction, and/or operation of the proposed action results in either of the following:

- Substantially increases in the risk of a hazardous substance release during construction; or
- Generates or otherwise manages hazardous materials in a manner that substantially increases the risk of hazardous waste upset (e.g., release or spill).

6.15.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging

No hazardous materials would be generated or used for dredging. The impact of an unlikely release of fuel from a ship or barge would be mitigated by immediate implementation of Pearl Harbor's spill response plan (COMNAVBASE Instruction 5090.1D, Oil and Hazardous Substances Pollution Contingency Plan).

Dredge crew and others with the potential to come into contact with dredged sediment would be exposed to contaminants in the sediment. These contaminants would pose a risk to dredge personnel only in the case of extended dermal contact or ingestion of the dredged sediment. Risks would be minimized by requiring workers to wear protective gloves, to wash thoroughly after completing work, and to avoid eating or drinking in the vicinity of dredged sediment.

Facility Improvements

Existing buildings proposed for demolition have the potential to contain hazardous materials, including asbestos building materials and/or lead-based paint. All hazardous materials and hazardous waste storage areas, transformers, and utility lines would be emptied and removed by OSHA-trained personnel prior to demolition. The potential for health hazards to demolition crews or surrounding residents and employees would be reduced to less than significant levels with the inspection of buildings for ABM and LBP prior to demolition and removal of such materials, in accordance with federal, state, and Navy regulations.

Operations

No significant impacts would result from operations. Additional hazardous materials and hazardous wastes required for or generated by homeporting would be safely handled, transported, stored, and disposed in compliance with existing federal, state, and Navy regulations and instructions. Potential releases of hazardous materials and hazardous wastes associated with operations are addressed in section 6.2.2.1. Operations would comply with the Navy's Hazardous Waste Minimization Program as well as regulations regarding the use or pesticides and herbicides defined in the Federal Insecticide, Fungicide, and Rodenticide Act.

The proposed action would not cause significant impacts on ordnance safety zones within Pearl Harbor because the electromagnetic spectrum is managed by internal Navy procedures in conjunction with the Federal Communications Commission. The Navy would coordinate the ship's emitters with ordnance handled in the ESQD hazard zones.

A quantitative analysis of a hypothetical accident involving the release of hazardous substances at PHNSY has been included in Volume 2, Appendix J. Using conservative assumptions, the analysis concludes that if an accident involving hazardous substances were to occur at PHNSY without the currently established mitigative measures (such as emergency planning) in place, there could be a potential impact to safety and environmental health. However, as described in Volume 2, Appendix J, the Navy already has mitigative measures in place at PHNSY that minimize the possibility of such an accident occurring, and minimize the impact if such an accident occurs. These mitigative measures include administrative controls for safe handling of hazardous substances, personnel protective equipment, and emergency response programs involving established resources such as fire departments and emergency command centers.

Nuclear-powered ships homeported at PHNSY and the propulsion plant maintenance facilities would comply with the NAVOSH program for the radiological aspects of the work. This program meets or exceeds all applicable OSHA regulations and has proven to be effective in ensuring safe and healthful conditions in the workplace. No significant occupational safety and health impacts are expected to occur.

PERSONNEL RADIATION EXPOSURE

Trained personnel would encounter radioactivity when performing work shipboard on the reactor plant, and in areas of the propulsion plant maintenance facilities that would handle radioactive materials (i.e., the CIF, the mixed-waste storage facility, and the container storage facility). Personnel radiation exposure would be controlled using the same controls used in shipyards performing Naval nuclear work. Individual radiation worker exposure is strictly controlled, resulting in exposures well below the federally established limit of 5 rem per year. In fact, no shipyard worker has exceeded 2 rem per year since 1980 (NNPP 1997b). These controls are discussed further in Chapter 7.

The effectiveness of these controls is demonstrated by the fact that the average occupational exposure of shipyard personnel is less than three-tenths of a rem per year, which is equivalent to the amount of radiation exposure a typical person in the United States receives each year from natural background radiation. For workers performing the mixed waste activities, their average occupational exposure is about 0.04 rem per year. With additional NIMITZ-class aircraft carriers at PHNSY, radiation levels outside of the facilities that handle radioactive material would continue to be well below federal standard for permissible levels of radiation in uncontrolled areas. There would continue to be no distinguishable effect on the normal background radiation levels at the site perimeter (NNPP 1997a).

The risk to radiation workers from occupational radiation exposure related to nuclear propulsion plant maintenance is small compared to the risks accepted in normal industrial activities and compared to the risks regularly accepted in daily life outside work (NNPP 1997b). In 1991, researchers form the Johns Hopkins University in Maryland completed a comprehensive epidemiological study of the health of workers at the six Navy shipyards and two private shipyards that serviced Navy nuclear-powered ships. This independent study evaluated a population of over 70,000 civilian workers over a period from 1957 through 1981 to determine whether there was an excess risk of leukemia or other cancers associated with exposure to low-levels of gamma radiation. This study did not show any cancer risks linked to radiation exposure. Furthermore, the overall death rate among radiation-exposed shipyard workers was less than the death rate for the general U.S. population. In conclusion, the Johns Hopkins study found no evidence to conclude that the health of people involved in work on U.S. nuclear-powered ships has been adversely affected by exposure to low levels of radiation incidental to their work (NNPP 1997b). Thus, homeporting additional NIMITZ-class aircraft carriers and performing Naval nuclear propulsion plant maintenance, either aboard the ship or in shoreside maintenance facilities, would pose no significant radiological risk to other Navy personnel or to the general public.

RADIOACTIVE MATERIAL CONTROL

The principal source of radioactive materials encountered during Naval nuclear propulsion plant maintenance is from trace amounts of corrosion and wear products from reactor plant metal surfaces in contact with reactor coolant water, which is either deposited internally or contained in the coolant water. Radioactive materials would be strictly controlled to protect the environment and human health, utilizing the same proven methods used in shipyards performing Naval nuclear work. Examples of techniques used to control the spread of radioactive contamination include use of multiple boundaries, High Efficiency Particulate Air (HEPA) filters, and impermeable easily cleaned surfaces. In addition, frequent monitoring is performed to detect contamination. Only specially trained personnel are permitted to handle radioactive material.

Environmental monitoring at facilities supporting Naval nuclear-powered ships shows these controls have been effective in protecting the environment, and that radioactivity associated with Naval nuclear-powered ships has had no significant or discernible effect on the quality of the environment. The results of this monitoring are reported annually in publicly available reports (NNPP 1997a). Thus, since stringent control of radioactive materials would continue, there would be no significant radiological impact on the environment from homeporting additional NIMITZ-class aircraft carriers at PHNSY.

SOLID RADIOACTIVE WASTE

The Navy uses stringent controls to minimize the generation of radioactive waste from nuclear propulsion plant operation and maintenance. Radioactive waste is waste that contains man-made radionuclides as described in the Atomic Energy Act of 1954 and its implementing regulations. This waste includes radioactively contaminated rags, plastic bags, paper, filters, ion exchange resin, and scrap materials resulting from operations and minor, routine work aboard ship. Liquids that cannot be processed for reuse are solidified. Radioactive waste is strictly controlled to prevent loss, and is packaged in rigid containers, shielded as necessary, accumulated in a controlled storage area, and shipped to licensed burial sites. Radioactive waste from the propulsion plant maintenance facilities would be shipped to a commercial or Department of Energy burial site. Radioactive waste generated at PHNSY is currently sent to the Hanford reservation in central Washington State for disposal. However, a controlled area would be available in the facility to manage waste for a limited time, should a commercial facility become unavailable. It is expected that for each CVN maintained at PHNSY, approximately 325 cubic feet of low-level radioactive waste per year would be generated.

Mixed waste generated from NNPP activities is a mixture of low-level radioactive waste and chemically hazardous waste. The Navy has implemented strict controls to prevent, to the maximum extent practicable, mixing radioactive and chemically hazardous waste. However, small amounts of mixed waste (less than 3 cubic meters per year from each CVN) would be generated by the Navy and stored at PHNSY. The mixed waste would be primarily solid in form. The radioactivity would be controlled as noted above. The chemically hazardous constituents of the waste would be regulated in accordance with 40 CFR 264, which implements the federal Resource Conservation and Recovery Act (RCRA). Detailed characterization of NNPP mixed waste has been accomplished using sampling and extensive process knowledge, and has confirmed that the waste is suitable for safe storage until it is shipped offsite for treatment and disposal. Mixed waste would be packaged in sealed containers, accumulated in a controlled area, and shipped to permitted treatment, storage, and disposal facilities. Mixed waste would be stored in a dedicated controlled mixed-waste storage facility that meets Navy and EPA requirements for storing mixed waste. The mixed-waste storage facility complies with 40 CFR 264. It is anticipated that this small amount of mixed waste would be stored pending availability of permitted treatment and disposal facilities.

The same effective methods used to control other radioactive materials and to minimize personnel radiation exposure would be used to control low-level radioactive and mixed wastes. Thus, there would be no significant radiological environmental impacts as a result of storing this waste generated by additional NIMITZ-class aircraft carriers at PHNSY.

RADIOACTIVE MATERIAL TRANSPORTATION

All shipments of radioactive materials in the NNPP are required to be made in accordance with the applicable regulations of the U.S. Department of Transportation, the U.S. Department of Energy, and the U.S. Nuclear Regulatory Commission. In addition, the Navy has issued instructions to further control these shipments. These regulations and instructions ensure that shipments of radioactive materials are adequately controlled to protect the environment and the health and safety of the general public, regardless of the transportation route taken, and have proven to be effective.

There have never been any significant accidents involving release of radioactive material during shipment since the NNPP began. Shipments of radioactive materials associated with Naval nuclear propulsion plants have not resulted in any measurable release of radioactivity to the environment. The maximum exposure to any individual member of the public is far less than that received from natural background radioactivity. Carriers of radioactive materials are required to have accident plans that identify the actions to be taken in case of an accident, including notification of the civil authorities and communication with the shipment originator for guidance and assistance. The Navy would communicate with and cooperate fully with state radiological officials in the event of occurrences involving shipments of radioactive materials (NNPP 1997a). Thus, there would be no significant impacts related to shipment of radioactive materials with homeporting additional NIMITZ-class aircraft carriers at PHNSY.

6.15.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Because this alternative would result in no change in existing conditions, no health and safety impacts would result.

6.15.2.3 Mitigation Measures

No significant impacts on health and safety have been identified. Therefore, no mitigation measures are proposed.

6.16 UTILITIES

This section addresses utilities including energy (natural gas and electricity), fuel supply, drinking water, wastewater (sanitary, industrial, and oily industrial) disposal, stormwater disposal, solid waste (hazardous and non-hazardous waste) disposal, steam and condensate return, and compressed air, which are required to serve the proposed homeporting alternative site.

6.16.1 Affected Environment

Navy Public Works Center, Pearl Harbor (PWC) is responsible for major utilities servicing Pearl Harbor Naval Complex such as water, sewer, and electricity. PWC operates steam, compressed air, and demineralized water plants, and the storm drain system. The fuel system is maintained by FISC.

B2/3 is used primarily by the shipyard for vessels under repair. B2/3 has existing potable water, compressed air, and wastewater hookups. Steam and electricity are provided by portable units capable of temporarily meeting CVN requirements. Utility corridors run underground in shipyard roadways and alongside the waterfront berths.

6.16.1.1 Energy

Natural Gas

Natural gas is not distributed or used in the shipyard or by PWC.

Electricity

Electricity is provided to Pearl Harbor Naval Complex by the Hawaiian Electric Company (HECO). The entire base is served via three 46-kV feeders, each from a separate 80-megavolt ampere (MVA) transformer. One 46-kV substation (Puuloa) constructed within the shipyard consists of two 20/33 MVA transformers. The feeder has a normal rating of 57 MVA and an emergency rating of 65 MVA. The 1996 peak demand for the entire Pearl Harbor Naval Complex load was 67.3 MVA and 41.2 MVA at the Puuloa Substation. A privately contracted cogeneration power plant is being studied as an option to reduce energy cost to the Navy.

Power is supplied to the shipyard through various 11.5-kV feeder lines and distributed to the shipyard berths from switching station B at power plant PP2 (Building 149) and switching station D at drydock power plant PP3 (Building 177). Substations located dockside at B2/3 provide 460-V power. A portable substation at the drydock steps down power to 480 V. The shipyard does not have a permanent 4,160-V shore power facility. Industrial power outlets rated at 10,000 amperes at 460V are available at the shipyard waterfront. Four shipyard gas turbine generators, rated at 2 megawatts each, provide capacity at peak loading periods and for emergency power.

Pearl Harbor has proposed to be designated a CVN emergency drydock repair facility. To temporarily meet the CVN electrical load requirements, PHNSY has a priority arrangement to lease high-voltage Mobile Utility Support Equipment (MUSE) substations from the Naval Facilities Engineering Service Center (NFESC) at Port Hueneme, California. MUSE substations have a capacity of 4.16 kV, 5/6.25 MVA with cable feed to ships berthed or in drydock. Two MUSE substations are required for CVN drydock activities; three MUSE and one backup would be required for a CVN while berthed.

6.16.1.2 Fuel Supply

FISC provides jet fuel to ships from distribution lines at the "H" piers. Navy fuel storage capacity is more than adequate to supply all Navy needs for proposals identified in this section. Fuel distribution does not extend into the shipyard. CVNs operating under their own power with air wing on board regularly transit to Pier H to take on JP-5 fuel. Auxiliary oiler ships may also transfer fuel to Navy ships offshore.

6.16.1.3 Water Supply

The Navy maintains a potable water system with three groundwater sources having a total pump capacity of 53 mgd and a State of Hawaii Department of Land and Natural Resources authorized use limit of 20.33 mgd. Over 260 miles of fresh water distribution lines ranging from 3/4 inch up to 42 inches in diameter run throughout the base. The Navy's water system is interconnected with the City and County of Honolulu's Board of Water Supply system, increasing flexibility in times of emergency. On average, an estimated 20 mgd of potable water from the Navy's water system is used at Pearl Harbor.

Potable water distribution and storage systems currently meet and exceed demand. Underground transmission mains in the shipyard include a 12-inch main along B2/3 and a separate 12-inch main to Drydock #4. Potable water is distributed to the pier and wharf with a maximum flow of 648,000 gpd at 60 pounds per square inch gauge (psig) to Drydock #4 and 178,000 gpd at 60 psig to B2/3.

Shipyard fire suppression consists of a saltwater system originally constructed at the drydocks for ship cooling and flushing. Normal operating fireflow capacity is 12,000 gpm at 125 psig from PP2 for the berths, and 7,000 gpm at 125 psig at PP3 for the drydocks. The system can be reconfigured in an emergency to provide fireflow from 150 to 175 psig.

Demineralized clean feedwater, for CVN boiler use, is generated at an ion-exchange plant within shipyard PP2 (Building 149) and distributed in underground lines to berths B2/3. The system capacity is 70,000 gpd.

6.16.1.4 Wastewater Disposal

Sanitary Wastewater

PHNSY sanitary wastewater (effluent) from domestic sewage, pretreated industrial wastewater from domestic sewage, pretreated industrial wastewater, and ship wastewater are treated at the Navy PWC-operated WWTP at Fort Kamehameha. The WWTP fronts the Pearl Harbor Entrance Channel on Navy property within the Hickam Air Force Complex. The treatment plant provides secondary treatment including filtration and disinfection before discharging the effluent through an outfall into the mouth of Pearl Harbor. The WWTP has a design capacity of 13 mgd and is operating at approximately 50 percent of capacity.

Sanitary wastewater generated onboard vessels at dockside is collected by a separate system of sewage pumping stations located near the docks and conveyed to 350,000-gallon aerated holding tank ahead of the main sewage pump station (SY001). Current flows through the main sewage pump station average 4.5 to 5 mgd. The station's design capacity is 6,200 gpm. It is subsequently pumped to the WWTP at Fort Kamehameha. The SWWCA has a 1.5-mgd capacity. There is no data on the current flow to the SWWCA. Sanitary hose stations (12 lines at 4-inch diameter) along B2/3 connect vessels to the sewer system. Sewage lift station pump capacities handling B2/3 vary based on the current lift station conditions and capacities, from an operational low of 230 gpm up to 2,500 gpm. One station is abandoned due to oil infiltration. Sludge from the WWTP at Fort Kamehameha is collected by a private contractor and disposed at the Navy's compost facility at NAS Barbers Point. The facility operates at maximum capacity.

Industrial Wastewater Disposal

Industrial wastewater consists of effluent from tank cleaning, neutralized acids, degreasers, and onshore maintenance activities. PHNSY industrial waste is collected in four 5,000-gallon treatment tanks and one 4,000-gallon oil waste treatment drum and pretreated at the new Industrial Waste Treatment Complex (IWTC). Pretreated industrial wastewater effluent is conveyed to the main shipyard sewage pump station (SY001) and pumped to the WWTP at Fort Kamehameha. The IWTC includes five treatment tanks at 5,000 gallons capacity each. Treatment capacity varies from one day to one week per batch of industrial wastewater, hazardous oily waste, and hazardous chemical waste.

Oily Wastewater

Oily wastewater (including bilge water, ballast and tank cleaning water, brake fluid, catapult piston oil, and grease) from vessels berthed at the shipyard is transported by waste oil barges or tanker trucks to an aboveground storage tank at PWC's Bilge and Oily Waste Treatment System (BOWTS) plant. The total tank capacity is 1.6 million gallons. The two waste oil barges have a capacity of 60,000 gallons each. Recovered oil is sent to the FISC Oil Reclamation Facility. Treated wastewater effluent from BOWTS is sent to sewage lift station SY001 for pumping to the WWTP at Fort Kamehameha. The BOWTS is scheduled to be relocated in the year 2000 to a permanent facility near the IWTC, including construction of distribution lines directly from the shipyard berths and dry docks. Risers are planned to be installed by 2000 on all piers for direct ship hook-up to the oily wastewater system, which would eliminate truck and barge transport. The new facility design capacity will be 432,000 gpd.

6.16.1.5 Stormwater Disposal

PHNSY stormwater disposal is provided by a conventional drainage system of localized swales, catchment structures, open grating, and underground pipes that convey runoff under roadways and other critical areas into the harbor through numerous pier outfalls. Shipyard surface water drainage is generally from east to west. The system is generally adequate with limited localized flooding near the Drydock #4 sandblasting facility during heavy rainstorms. Discharge of stormwater into the harbor is discussed in section 6.2.

6.16.1.6 Solid Waste Disposal

Approximately 600 tons/month of non-recyclable material from PHNSY is transported by private contractor to city-owned facilities: the Waimanalo Gulch landfill and the City and County of Honolulu Program of waste-to-energy recovery (H-Power) facility in leeward Oahu or turned in to the PWC IWTC for treatment and disposal. The installation promotes a qualified solid waste recycling program (OPNAVINST 5090.1B), collecting approximately 2,300 tons of aluminum, newspaper, paper, and metals each month that are transferred to HPower and private contractors for recycling.

Treatment and disposal of industrial wastewater is done by PWC Pearl Harbor Industrial Wastewater Treatment Plant. Bilgewater is processed through an oily waste/waste oil filtration/treatment system by PWC Bilge and Oily Waste Treatment System. The water is filtered and treated prior to disposal to the sanitary sewer. Wastewater is discussed further in section 6.16.1.4.

Asbestos is stored in designated dumpsters within the Treatment, Storage, and Disposal Facility. The various shops within PHNSY are responsible for the proper packaging (double bagging) of asbestos waste prior to delivery to the facility. Asbestos disposal is handled by a private contractor. PCBs are removed from the site by private contractors. Waste PCBs are not stored on base. Batteries and fluorescent ballasts are recycled in the shipyard.

Hazardous waste generated at PHNSY is stored in Department of Transportation (DOT)-approved containers before being transported to the Defense Reutilization Marketing Office (DRMO) off site (NAVSHIPYDPEARLINST 5090.1C Hazardous Management Plan for PHNSY). Open-head drums are used for solid waste storage, bung-type drums are used for non-corrosive liquids, and plastic-lined drums are used to store corrosive liquids/solids.

6.16.1.7 Steam and Condensate Return

Steam used for industrial activity is generated at shipyard PP2. Steam lines at B2/3 with a capacity of 120,000 pounds per hour (pph) (DON 1993) at 100 psi have been deactivated. The lines from this system run directly to B2/3. In place of the permanent system, the shipyard employs five portable steam plant units. The units, rated 10,000 pph at 100 psi, may be hooked in tandem and are powered by propane gas. Condensate is eventually discharged to Pearl Harbor. The state has waived the shipyard's requirement for NPDES coverage of this discharge.

6.16.1.8 Compressed Air

Compressed air used for industrial activities is generated at shipyard PP3. PHNSY has a compressed air capacity of 24,000 scfm at 120 psig maximum from four compressors at PP3. The low pressure air is distributed along the shipyard berths with 1/2-inch outlet connections spaced at 45-foot intervals. Total compressed air capacity is 2,400 cfm at Drydock #4 and 2,800 cfm at B2/3.

6.16.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The proposed action would result in a significant impact on utility systems if it would result in any one of the following:

- Use of a substantial proportion of remaining system capacity;
- Reach or exceed the current capacity of the system; or
- Require development of new facilities and sources beyond those existing or currently planned.

The facilities associated with the proposed project would be designed, constructed, and operated to meet the requirements of Section 306 of Executive Order 12902 to minimize the life cycle cost of the facilities by utilizing energy efficiency, water conservation, or solar or other renewable energy techniques when they are cost effective. These considerations are contained in all contractual documents for the design, construction, and operation of Naval facilities.

6.16.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Drydock #4 upgrade; and personnel support facilities.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM AND CONDENSATE RETURN; AND COMPRESSED AIR

Proposed dredging of Pearl Harbor's navigation channels would not significantly impact existing underwater utility distribution lines that run from the PHNSY to Ford Island and across various locations of the Entrance Channel. Dredging plans would require identification and location of all lines prior to operations. If the lines are unprotected and are located above 52 feet (the project dredge depth plus 2 feet), extension, retrenching, and/or relocation of the lines would be required. The distribution lines include wastewater, potable water, electricity, and telecommunication. Span length is approximately 1,800 feet between B2/3 and Ford Island, and over 2,000 feet near the Entrance Channel.

A NAVSTA project to move or bury existing utility lines in the turning basin approximately 10 feet below the design maintenance dredge depth of 45 feet (i.e., to 55 feet MLLW) would lessen the likelihood that home port dredging would damage the lines. The project is considered a "long-term solution to prevent physical hazard to utility cables and operational threats to missions critical to Commands on Ford Island."

Table 6.16-1. Comparison of CVN Utility Requirements to PHNSY Systems

Utilities	*Shore Utility Requirements, including Depot Maintenance Facility Requirements One CVN*	*Facility Design Capacity PHNSY B-2/3*	*Remaining Facility Capacity PHNSY B-2/3*	*Deficiency*
Energy				
Natural gas	None	None	None	None
Electricity	2,880 A at 4.16 kV, 7,013 MWH/yr	460V power only	Temporary MUSE substations at 4.16 kV, 5/6.25 MVA each	2,880 A at 4.16 kV, 13.78 MWH/yr
Fuel Supply	minimal	Adequate	Adequate	Adequate
Water Distribution				
Potable	227,000 gpd	178,000 gpd at 60 psig	>49,000 gpd	Adequate
Wastewater Disposal				
Sanitary wastewater	445,000 gpd (400 gpm pumps)	6.5 mgd (0-2,500 gpm pumps)		Local pumps inadequate
Industrial wastewater	16,500 gal/yr	20,000-gallon tanks		Adequate
Oily wastewater	151,000 gpd (200 gpm pumps)	427,000 gpd plus 1.6-Mgal storage tanks		Adequate
Stormwater Disposal	NA	NA	NA	NA
Solid Waste Disposal				
Non-hazardous waste	7.5 t/d	2,700-2,900 t/d island wide		Adequate
Hazardous waste	150 t/yr	Adequate (ships off-island)	NA	Adequate
Steam and Condensate Return (Certified Pure)	15,500 pph, 280 Mscfm/yr plus 2,200 mega BTU	50,000 pph at 100 psi (portable units) 120,000 pph at 10 psi (deactivated permanent system)		Adequate Adequate with repair
Compressed Air	2,400 scfm at 125 psig plus 2,800 scf per year	2,800 cfm at 100-120 psig		5 psig

Source: DON (1995) *Final EIS, Development of Facilities in San Diego/Coronado to Support Homeporting of One NIMITZ-Class Aircraft Carrier*, section 4.3.10, PHNSY, PWC, PACDIV.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM AND CONDENSATE RETURN; AND COMPRESSED AIR

Construction associated with this action would not significantly impact existing PHNSY utility services. During construction, there would be a possibility of encountering minor underground utility lines, but no major lines cross the proposed construction sites. Interruption of actively used electrical or stormwater lines for upgrade and repair would require installation of temporary or back-up services. During construction, responsible parties for affected activities would be notified prior to temporary utility service disruption.

Demolition of shipyard buildings would generate construction and demolition waste. Construction-generated solid waste that adds to local landfill capacity may be reduced by contracting with a private recycling contractor. The Nanakuli landfill in leeward Oahu accepts these materials. Demolition debris from the older shipyard structures could potentially contain asbestos, which would necessitate proper handling and disposal (see section 6.15).

Operations

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM AND CONDENSATE RETURN; AND COMPRESSED AIR

Operational impacts from homeporting one CVN at B2/3 were determined by comparing the CVN service requirements at maximum peak demand (DON 1995a) to PHNSY existing system capacities. Table 6.16-1 summarizes this comparison, with deficiencies noted. No significant impacts to underwater utility lines would result from CVN movements. Aircraft carriers, including CVNs, routinely transit the area of the cables and have not been associated with any damage.

ENERGY

Natural Gas. Additional demands by one additional CVN on natural gas would be minimal and accommodated by the current system (DON 1995a). Therefore, operational impacts on natural gas would be less than significant.

Electricity. No significant impacts on the electricity supply would result from the proposed action. A permanent, upgraded electrical distribution system would be needed at PHNSY to meet CVN needs. Currently, there is no permanent shore power rated at 4.16 kV at B2/3. However, PHNSY is able to access portable MUSE substations, each rated 4.16 kV, 5/6.25 MVA, to temporarily meet a CVN's electrical power needs. Adequate industrial power outlets rated at 11,000A at 460V are available from three waterfront substations.

The Navy has prepared a utility assessment, *Naval Shipyard Electrical Utility Technical Study PHNSY* (DON 1996), for permanent electrical infrastructure to support the carrier and drydock facilities. The study recommended installation of permanent power lines, tie feeders, and transformers to upgrade power to 4.16 kV. Implementation of all recommended phases would provide power to meet a CVN's anticipated peak demand and provide expanded operational flexibility and reliability for the carrier.

FUEL SUPPLY

The capacity of FISC's jet fuel supply and distribution system is adequate to meet the needs of the CVN. CVNs transiting Pearl Harbor regularly transit to Pier H to take on JP-5 fuel. Therefore, operational impacts to the supply and distribution of jet fuel would be less than significant.

WATER SUPPLY

The CVN would generate no significant impact on water supply. Potable water used by one CVN and at the CIF would represent less than a 2-percent increase in the current Naval Complex use of the aquifer and less than 1 percent of the Navy water system's assessed sustainable yield. There would be no significant impact to the potable water distribution system. The maximum water flow currently available at B2/3 (178,000 gpd) is 22,000 gpd below the peak CVN requirement. However, PHNSY would be able to divert the necessary additional flow through existing shipyard connections from Makalapa and Ford Island lines to adequately support the vessel's needs.

WASTEWATER DISPOSAL

Sanitary Wastewater. The proposed action would not significantly impact the Navy's WWTP at Fort Kamehameha, which treats both sanitary wastewater and ship wastewater collection onshore. The CVN's peak discharge of 445,000 gpd at total peak production would decrease the available WWTP capacity by 1.5 percent. The plant has recently been expanded and is currently operating at 50-percent capacity.

Increased sludge generation resulting from the additional CVN would affect the Navy's compost operation at NAS Barber's Point, which is currently at maximum capacity. An analysis of alternate or additional disposal sites would be required to accommodate increased wastewater flow-generated sludge from the CVN, as well as any other developments proposed for Pearl Harbor Naval Complex.

Major upgrades to the berth-side sanitary wastewater collection system would be necessary to service a CVN. Upgrades would replace deteriorated systems and would not be solely required to meet the needs of the proposed action. At least two sanitary sewage lift stations adjacent to B2/3 — SW008 (Station C) at 223 gpm capacity and SW007 (Station B), which has been abandoned due to infiltration — have insufficient capacity to accept the expected CVN wastewater flows. The pump stations and force mains would require upgrading. Overall, PHNSY wastewater flows would be improved by the proposed addition of variable-speed frequency drives to control the lift pumps for more efficient operation. Collector holding tanks and the main shipyard sewage pump station are adequately sized to handle the additional discharge. A sufficient number of sanitary hose stations are available at the PHNSY waterfront to service a CVN.

Industrial Wastewater Disposal. No significant impacts would occur to the overall PHNSY industrial wastewater system. The new system and IWTC plant would accommodate the additional industrial wastewater needs of one CVN. Industrial wastewater generated from CVN maintenance operations would not exceed the 25,000-gallon tank capacity of the IWTC.

Oily Wastewater. No significant impacts would occur to the overall Pearl Harbor Naval Complex oily wastewater system. The CVN would have a peak discharge of 151,000 gpd of oily wastewater during total peak production. Current Naval Complex oily wastewater discharge averages 24,000 gpd. Risers planned to be installed at the shipyard berths will transfer the wastewater directly to the industrial oily wastewater system. The discharge would be stored in the above-ground storage tanks and/or then be processed by PWC's BOWTS plant. The CVN load would decrease BOWTS' projected design capacity by 31 percent.

STORMWATER DISPOSAL

Because additional surface area or open space is planned for creation under this proposed action, no significant increase in stormwater disposal is anticipated. Localized surface drainage improvements (new catch basins, drain inlets, or small-diameter drain pipes) would be integral to each proposed construction project and would be completed as necessary. Stormwater runoff from the CVN and associated maintenance facilities would not affect the Naval Complex's (or PHNSY) current NPDES permit. Therefore, operational impacts on stormwater disposal would be less than significant.

SOLID WASTE DISPOSAL

Non-Hazardous Waste. The increase in solid waste production by activities, crew, and shipyard workers on a CVN would not create a significant impact on current disposal capacities. Non-hazardous solid waste generated by the proposed alternative would be approximately 7.5 tons per day of solid waste, an increase of less than 0.25 percent of Oahu's existing island-wide generation rate of 2,700 to 2,900 tons per day. Private collection trucks currently remove non-hazardous waste from the base. Based on the size of the compactor trucks currently serving the complex, one additional trip per week would be able to dispose additional solid waste generated by homeporting a CVN.

Hazardous Waste. The increase in hazardous waste production as a result of this proposed action would not exceed existing storage and disposal capacities of PHNSY or DRMO. Therefore, impacts on hazardous waste disposal would be less than significant.

STEAM AND CONDENSATE RETURN

The PHNSY permanent steam distribution system has been deactivated, although if repaired (at minimal cost), it would have more than adequate capacity at 120,000 pph to support a CVN's needs of 15,500 pph, plus during CVN maintenance, 2,200 mega Btu per year (DON 1995a). In its place, five portable steam plant units rated at 10,000 pph each are available. The steam units are primarily used for smaller shipyard activities, such as the cafeteria. Therefore, impacts to the PHNSY steam system would be less than significant.

COMPRESSED AIR

No significant impact to the PHNSY compressed air distribution system would occur. The PHNSY compressed air distribution system has a capacity of 2,800 scfm at 120 psig, compared to the CVN requirement of 2,400 scfm at 125 psig, plus an additional 2,800 scf per year during CVN maintenance. Ships currently homeported operate with no difficulty at 120 psig, and often operate at 100 psig, resulting in energy savings.

6.16.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Dredging

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM AND CONDENSATE RETURN; AND COMPRESSED AIR

Because no dredging would take place under this alternative, no impacts on utilities would result.

Facility Improvements

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM AND CONDENSATE RETURN; AND COMPRESSED AIR

Because no facility improvements would take place under this alternative, no impacts on utilities would result.

Operations

ENERGY (NATURAL GAS AND ELECTRICITY); FUEL SUPPLY; WATER SUPPLY; SANITARY, INDUSTRIAL, AND OILY WASTEWATER DISPOSAL; STORMWATER DISPOSAL; HAZARDOUS AND NON-HAZARDOUS WASTE DISPOSAL; STEAM AND CONDENSATE RETURN; AND COMPRESSED AIR

Because there would be no change in existing conditions under this alternative, no impacts on utilities would result.

6.16.2.3 Mitigation Measures

Because impacts on utilities would be less than significant, no mitigation measures are proposed.

6.17 ENVIRONMENTAL JUSTICE

This section addresses the proposed action's potential to generate disproportionately high and adverse human or environmental effects on minority and low-income populations, as required under Executive Order 12898. As part of this directive, the federal agency must promote enforcement of all health and environmental strategies in areas where minority and low-income populations reside. Identifying differential patterns of natural resource consumption and ensuring greater public is required. In addition, federal agencies may provide project information to non-English speaking populations whenever practicable and appropriate (DON 1995b). The EPA Office of Solid Waste and Emergency Response (OSWER) *Environmental Justice Task Force Draft Final Report* (EPA 1994) recommends identifying minority or low-income communities in the vicinity of the proposed action to determine whether they may be disproportionately or adversely affected by the proposed action, identifying any proposed health and safety risks, and proposing ways to distribute project information, including assessment of potential effects, to affected communities. Guidance provided by the Council on Environmental Quality (CEQ 1997) has been considered in developing the environmental justice analysis presented below.

Also addressed in this section is the proposed action's potential to generate disproportionately high environmental health and safety risks to children, as required under Executive Order 13045. This executive order was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults Under this order, the federal agency must ensure that its policies, programs, activities, and standards address disproportionate environmental health or safety risks to children that result from the project, described as those risks to health or safety that are attributable to product or substances that the child is likely to come into contact with or ingest. These impacts include increases in noise levels in public school areas, which could disrupt children while they are in a learning environment.

6.17.1 Affected Environment

Minority Populations

In general, the closest residential populations are military families assigned to Pearl Harbor Naval Complex or other military bases on Oahu. No minority or low-income populations live adjacent to the proposed action area within Pearl Harbor Naval Complex. Land uses in the project site include a variety of ship and Naval base support activities.

Information on the presence of minority populations in the vicinity of the project alternative site is from the 1990 Census. The census provides demographic information in terms of the City and County of Honolulu and State of Hawaii (Table 6.17-1).

The 1990 Census is the definitive source of information on race in the United States. More recent data on ethnic stocks is available from the Hawaii State Department of Health. However, the state tabulation uses different categories and definitions. Because it allows for "mixed" identities, whites accounted for only 23 percent of the population statewide in 1992 (DBEDT 1996).

The area surrounding Pearl Harbor Naval Complex includes the neighborhoods of the Airport, Aiea, Pearl City, and Waipahu. This area is populous, with relatively large households; less well-

Table 6.17-1. City and County of Honolulu Populations by Ethnicity

	City and County of Honolulu		State of Hawaii	
Ethnicity	*Number*	*Percent*	*Number*	*Percent*
Asian/Pacific Islander	526,459	63.0	685,236	61.8
Caucasian	264,372	31.6	369,616	33.4
Black	25,875	3.1	27,195	2.5
Native American	3,532	0.4	5,099	0.5
Other	15,993	1.9	21,083	1.9
Total	836,231	100.0	1,108,229	100.0

Source: U.S. Census, Summary Tape File 1A from the 1990 Census of Population and Housing

educated than the average, especially at the ends of the area where military and first-generation immigrants are numerous; and part of a busy and (in 1990) prosperous urban area, where household incomes were above the island (Oahu) average. However, incomes were lower in the Airport/Salt Lake area with a large concentration of military families. Table 6.17-2 indicates population, household size, and incomes for the neighborhoods surrounding the proposed action area.

Table 6.17-2. Neighborhood Area Population/Income

Area	*Population*	*Average Household Size*	*Percent Adults with BAs and Above*	*Median Household Income*	*Per Capita Income*
Oahu Total	836,231	3.02	24.6	$40,581	$13,437
Airport	26,734	3.40	19.3	$29,984	$8,815
Aiea	32,648	2.93	24.4	$45,572	$15,560
Pearl City	46,758	3.44	22.3	$55,068	$16,003
Waipahu	51,295	3.68	15.9	$46,506	$12,630

Source: City and County of Honolulu Planning Department Tabulations of 1990, U.S. Census Data, DBEDT 1996.

City and County of Honolulu (Metropolitan Statistical Area) figures are used to characterize populations in the vicinity of Pearl Harbor Naval Complex. The Metropolitan Statistical Area is composed of several ethnicities, with Asian/Pacific Islanders as the major ethnic group. The area's composite of minority populations is generally similar to the State of Hawaii. These data indicate residential areas adjacent to and in the vicinity of Pearl Harbor Naval Complex do not contain a disproportionate minority population.

Pearl Harbor was once an important fishing ground for Native Hawaiians and others prior to establishment of the U.S. Pearl Harbor Naval Complex in 1908. Subsistence fishing continues today in waters of Pearl Harbor. However, as stated in section 6.5.1, the Hawaii Department of Health has issued an advisory to the public that marine life taken from Pearl Harbor should not be consumed by humans due to unacceptable levels of toxins found in the tissue of certain fish and shellfish that feed off the bottom of the harbor. Based on recommendations from DOH, Navy has posted signs around the harbor's shoreline advising the public of the State's fish consumption advisory. (See section 6.5.1).

Income

As discussed previously (see section 6.8.1.2), civilian residential populations do not live adjacent to the project alternative site. Based on analysis in 1997, approximately 21.3 percent of non-military households in the City and County of Honolulu are considered low income (earning 50 percent of the median income). Within the proposed action area, approximately 23.0 percent of the households are considered to be in the low-income group.

Public Participation and Informational Access

The proposed action has been subject to public participation as required under NEPA. The EIS Notice of Intent (NOI) was circulated to neighborhood and community groups who have demonstrated an interest in or are considered likely to show interest in the environmental review process. A scoping meeting was held at Leeward Community College on 6 February 1997 (see section 1.6) to solicit input on the EIS scope of investigation. On 22 October 1998, a public hearing was held at Makalapa Elementary School to receive input and comments on the Draft EIS from public agencies and the public.

Local Public Schools

There are no public schools or day care facilities located immediately adjacent PHNSY. The nearest is north of Nimitz Gate at Hickam Air Force Base, both more than one mile from the home port site.

6.17.2 Environmental Consequences and Mitigation Measures

Significance Criteria

The proposed action would result in a significant impact on environmental justice if it would result in any one of the following:

- Degrading the health and safety of low-income or minority communities disproportionately when compared to the regional population;
- Causing a disproportionately high and adverse impact on members of low-income or minority communities adjacent to the proposed action area;
- Failing to provide for or encourage effective participation of members of low-income or minority communities adjacent to the proposed action area in the associated environmental review and decision-making process; or
- Relocating public schools within a 65 dBA CNEL contour that was not previously located in such an area. The proposed action would have no effect on native Hawaiian traditional or customary practices or impact subsistence activities in Pearl Harbor because the PHNSY berthing piers for the CVN are inaccessible to the public.
- Substantially increase project air emissions of carbon monoxide (CO), toxic pollutants, or odors to sensitive receptors (such as day care centers and hospitals) in proximity to the project site.

6.17.2.1 Facilities for One CVN: Capacity for Total of One CVN (Alternatives Three, Five)

Alternatives Three and Five consist of dredging turning basins; controlled industrial facility (CIF); a pump/valve testing facility; a pure water production facility; utility and structural upgrades; a parking garage; Dry Dock #4 upgrade; and personnel support facilities.

Dredging

Proposed dredging would not cause disproportionate effects to the health and safety of low-income or minority communities when compared to the regional population, because dredging would occur in areas restricted to the public. Dredging would not occur in populated areas or areas used for native Hawaiian customary or traditional practice; or for subsistence fishing.

Public schools and day care facilities are all further from the noise source than the closest sensitive receptor, and thus experience a comparatively lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 6.11.2.1). In addition, dredging activity would be short term and not located near any schools or day care facilities. Dredging equipment is not close enough to schools or day care facilities to present air toxic effects at these facilities. Therefore, there would be no impacts on environmental justice.

Facility Improvements

Proposed construction would not cause disproportionate effects to the health and safety of low-income or minority communities when compared to the regional population, because it would not occur in or near such a community.

Public schools and day care facilities are all further from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 6.11.2.1). In addition, construction activity would be short term and not located near any schools or day care facilities. Air emissions during construction would not result in air toxic effects at these facilities. Therefore, there would be no impacts on environmental justice.

Operations

The proposed action would not cause disproportionate effects to the health and safety of low-income or minority communities when compared to the regional population. Similarly, the proposed action does not preclude members of low-income or minority communities adjacent to the proposed action area from sharing in the economic benefits of the action.

Public schools and day care facilities are all further from the noise source than the closest sensitive receptor, and thus experience a lower noise level than at sensitive receptors. Because the closest sensitive receptor would not experience noise levels above 65 dBA CNEL, no public schools or day care facilities would be located within a 65-dBA CNEL contour (see section 6.11.2.1). Air emissions during operations would not result in air toxic effects at these facilities. Based on the preceding, no adverse effects to low-income or minority groups are expected.

6.17.2.2 No CVN: No Change (Alternative Six: No Action)

The No Action Alternative will not require any new projects.

Because this alternative would result in no change in existing conditions, no impacts on low-income or minority communities would result.

6.17.2.3 Mitigation Measures

Because impacts on environmental justice would be less than significant, no mitigation measures are proposed.

6.18 CUMULATIVE IMPACTS

In this section, the proposed action is analyzed in relation to the other projects in the area. Cumulative impacts on environmental resources result from the incremental effects of the project when added to other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from minor but collectively significant actions undertaken over a period of time. In accordance with NEPA, a discussion of past projects, under construction, proposed, or that are reasonably anticipated to be built in the near future are included. This section addresses the cumulative impacts associated with the alternative that has the greatest potential for adverse environmental impacts, the homeporting of one CVN (including construction starting in 2003 and homeporting starting in 2005), in combination with other military and civilian projects in the area. In order to ensure a comprehensive impact analysis, this section considers the region of influence for each environmental resource area for which cumulative impacts are evaluated, and the time frame during which all reasonably foreseeable projects would occur. The combined impact of the proposed action and reasonably foreseeable projects is discussed. When the proposed action's incremental contribution to the cumulative impact is significant, mitigation is proposed to reduce this effect. Guidance provided by the Council on Environmental Quality (CEQ 1997) has been taken into account in developing the cumulative analysis presented below.

Reasonably Foreseeable Projects

A total of eight approved, planned, and reasonably foreseeable projects have been included in this analysis. These projects are identified on Figure 6.18-1, and are summarized below.

1. The USS MISSOURI Memorial Museum

The decommissioned battleship is temporarily berthed at Pier F-5 on Ford Island from 1998-2001; long-term berthing is anticipated to be at Pier F-2/3. Approximately 2,000 visitors per day would be transported to Ford Island by bus from the visitor ticketing area adjacent to the USS ARIZONA Memorial Visitors Center.

2. Ford Island Bridge

This bridge from Ford Island to the intersection of Kamehameha Highway and Salt Lake Boulevard was completed in 1998. After its completion, the ferry boat service to Ford Island was discontinued.

3. Ford Island Master Plan Development

There are conceptual plans to develop military housing, operational and administrative facilities and perhaps one or more visitor destinations on Ford Island. Any decisions to implement these plans would be subject to appropriate environmental analysis and documentation. No date has been set for construction.

4. Pearl Harbor Naval Shipyard Facilities Consolidation

Various shipyard functions are being consolidated to make better use of available space.

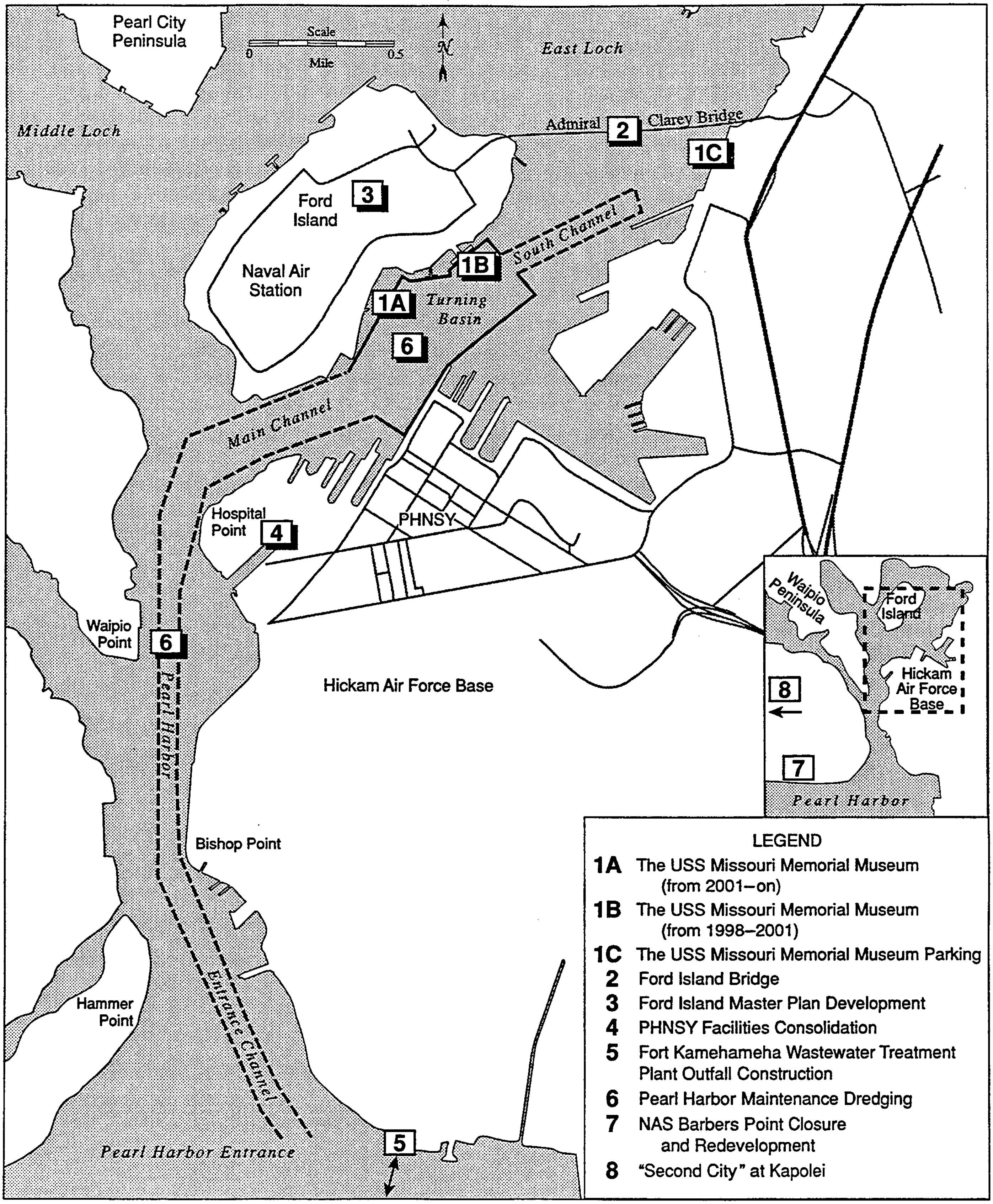

Figure 6.18-1. Projects Considered in Cumulative Impact Analysis

5. Outfall Construction, Wastewater Treatment Plant at Fort Kamehameha

An EIS is in process for replacing the existing outfall with a much longer ocean outfall, to be constructed partially in the Outer Entrance Channel to Pearl Harbor.

6. Pearl Harbor Maintenance Dredging

Entrance channels, piers, and the turning basin will be dredged in approximately the year 2000, returning all areas to design dredge depths of 35 to 45 feet MLLW.

7. NAS Barbers Point Closure and Redevelopment

NAS Barbers Point will be closed in July 1999, as part of BRAC 93. Various redevelopment plans call for a civilian airport, substantial park land, and a major sports center on the disposed lands. Redevelopment is expected to occur between 2000 and 2020.

8. "Second City" at Kapolei

The City and County of Honolulu has targeted this area west of Pearl Harbor for new urban growth to relieve congestion in Honolulu. Some City and County offices will be relocating to Kapolei, and businesses are actively encouraged to relocate there. Kapolei is just north of NAS Barbers Point.

In addition to these existing and reasonably foreseeable future projects, some existing impacts would be cumulative with the proposed action. These include existing contamination of soil, groundwater, storm drain systems, and harbor sediments at Pearl Harbor Naval Complex; the economic downturn in Hawaii of the 1990s; congested traffic conditions along the leeward side of Oahu; and regular ship traffic in Pearl Harbor, which resuspends contaminated harbor sediment.

Cumulative Impacts for Each Environmental Resource

6.18.1 Topography, Geology, and Soils

The region of influence for topography, geology, and soils includes the greater Oahu region, due to the interrelated nature of the geology and soils of this region. The time frame for projects considered in this analysis includes past, present, and reasonably foreseeable projects. Past projects are included in the cumulative impact analysis since existing structures would be exposed to the same earthquake-related hazards as those affecting reasonably foreseeable project construction. Significance criteria described in section 6.1.2 are applicable to the cumulative analysis.

Analysis of the geographic distribution of past, present, and reasonably foreseeable projects suggest that most of the reasonably foreseeable projects are located within PHNSY (Nos. 1-4, 6), with other projects to the west and south of Honolulu (Nos. 5, 7, and 8). A significant seismic event, however, would have the potential to affect all of the reasonably foreseeable project sites concurrently.

Earthquake-related hazards associated with the proposed action of one CVN are unlikely on Oahu and are extremely unlikely to result in the rupture of chemical storage containers and release of chemicals to the environment. Operation-related impacts would be reduced to levels that are less than significant by the implementation of the existing SWPP, existing safety and health programs, and compliance with federal, state, and local statutes and regulations pertaining to storm water retention and treatment and soil and groundwater contamination. Project facility designs would incorporate UBC criteria for Seismic Zone 3. Cumulative construction impacts associated with CVN homeporting and other projects at various sites in the Pearl Harbor Naval Complex (Missouri Memorial, Ford Island Bridge and housing, shipyard consolidation, and WWTP outfall construction) would expose additional property and occupants to earthquake-related hazards. The reasonably foreseeable projects would be required to implement the regulations defined above to address these hazards. The proposed action (Alternative 3) would add incrementally to risks to property and human safety associated with geologic hazards and erosional hazards; however measures incorporated into the proposed action including implementation of the existing SWPP, existing safety and health programs, and compliance with federal, state, and local statutes and regulations pertaining to storm water retention and treatment and soil and groundwater contamination would reduce the incremental effects such that there would not be a cumulatively significant impact.

The proposed action would modify slightly previously graded topography. Short-term erosional impacts would be less than significant. Other reasonably foreseeable projects on the Pearl Harbor Naval Complex would require grading, resulting in similar short-term disturbances to the level topography. The combined cumulative impact of these disturbances would be less than significant as erosion would be minimal and short-term. The proposed action's incremental contribution to this effect would be reduced by implementing standard erosion control measures such as silt fences and hay bales such that there would not be a cumulatively significant impact.

6.18.2 Terrestrial Hydrology and Water Quality

The geographical region of influence for terrestrial hydrology and water quality includes the Pearl Harbor watershed, the area in which local water sources are related. Past, present and reasonably foreseeable projects occurring in this area that impact local water quality also have the potential to impact water quality of the region as a whole. Projects considered in this analysis are those occurring from 1998 to 2005, as well as past projects which have influenced the water quality of the region. Due to the high level of industrial activity in the region, bay waters have historically been subject to contaminants from runoff. Significance criteria described in section 6.2.2 is applicable to this cumulative analysis.

The proposed action that would result in the homeporting of a CVN (Alternative Three) would contribute incrementally to impacts on surface water or groundwater. The only other reasonably foreseeable project affecting the region of influence is the consolidation of shipyard facilities that would occur in approximately the same time frame as the proposed action. Though these impacts would be extremely short-term, they could result in cumulatively significant impacts on water quality. The proposed action's incremental contribution to this effect would be reduced by implementing standard erosion control measures and pollution control measures such that there would not be a cumulatively significant impact.

The geographical region of influence for cumulative impacts on groundwater resources is the nonpotable caprock aquifer underlying Pearl Harbor Naval Complex, any land areas downgradient of the project site (only PHNSY), and the nonpotable caprock aquifer downgradient of any Navy upland sediment disposal site which could be constructed. The period of time is the time required for contaminated groundwater to be naturally or technologically cleaned up after an accidental release; this period would depend on the nature of contamination but could be a period of years or decades). Reasonably foreseeable project construction in the vicinity of Pearl Harbor, if not designed properly, could result in short-term degradation of stormwater quality or accidental release of hydrocarbons or hazardous waste to soil and then to groundwater. The homeporting of one CVN would add a small incremental potential to the cumulative contamination of soil, stormwater runoff, and the nonpotable caprock aquifer to the geographical region of influence. The proposed action's incremental contribution to this effect would be reduced by implementing standard erosion control measures such as use of silt curtains and hay bales and pollution control measures such that there would not be a cumulatively significant impact. Accidental contamination of the caprock aquifer by release of hydrocarbons from construction vehicles would be minimized by procedures identified in section 6.2.2.1. Such contamination would not be a significant incremental contribution to cumulative impacts, as there are no existing or future beneficial uses of the caprock aquifer downgradient of the project site.

Deposition of CVN homeporting dredge material in a properly constructed Navy-owned sediment disposal facility would represent an incremental addition to cumulatively impacts on the capacity of such a facility to receive future (i.e., year 2010 or beyond) maintenance dredge materials. Analysis of screening samples from the CVN homeporting dredge area has not identified any materials which would require disposal in such a facility. Therefore, the proposed action's incremental contribution to cumulative impacts is not likely to be significant. In addition, soil and groundwater remediation associated with the homeporting of one CVN, in conjunction with any similar remediation occurring during other related project development in the vicinity, would be a beneficial cumulative impact.

6.18.3 Marine Water Quality

The geographical region of influence for impacts on marine water quality is the waters of Pearl Harbor in which ocean waters flow. The time period considered includes historical and present-day conditions. Significance criteria used to evaluate cumulative impacts to marine water quality are the same as those used to evaluate project-specific impacts (section 6.3.2). As turbidity (the primary water quality impact of the project) is a very short-term phenomenon, the time period would include maintenance dredging in 2000 and dredging of proposed action improvement areas in approximately 2003.

Impacts to marine water quality from the proposed action are associated with the following: (1) resuspension of sediments during the dredging and pier construction activities causing localized and temporary increases in turbidity; (2) contaminant inputs from leaching anti-fouling hull paints, metal corrosion, and sacrificial anodes; and (3) potential contaminant inputs from accidental spills. Temporary resuspension of sediments and associated increases in turbidity would also occur at the mitigation site. Overall, impacts to marine water quality from the proposed action would be less than significant.

Reasonably foreseeable projects that involve land-based demolition or construction adjacent to Pearl Harbor (Nos. 1 through 5 above), together with the proposed action (Alternative Three), would result in land use changes that could result in cumulative, indirect impacts marine water quality through stormwater runoff. Direct discharges of reasonably foreseeable project wastewaters would be covered under a required NPDES permit, and non-point source runoff would be covered under a standard stormwater permit. Monitoring associated with these programs would be conducted to ensure that the cumulative project discharge would meet applicable water quality objectives. The proposed action's incremental contribution to this effect would be reduced by implementing required NPDES permit erosion control measures and pollution control measures such that there would not be a cumulatively significant impact.

The two reasonably foreseeable dredging projects, together with daily large ship traffic through the harbor, would result in short-term increased turbidity and resuspension of potentially contaminated sediments. The addition of turbidity from the proposed action dredging in the area would be temporary and would not generate persistent adverse effects on water quality. Therefore, cumulative impacts on water quality resulting from the proposed action and reasonably foreseeable dredging would be less than significant. No mitigation is required.

Although the impacts associated with individual projects are expected to be less than significant, cumulative changes to marine water quality from historical inputs combined with other past, present, and future projects may constitute impaired water quality. Cumulative changes could be considered significant if they cause incremental increases in certain contaminants or in areas that are already affected by historical waste discharges. Because the impacts from this project and other foreseeable projects would be temporary and less than significant, cumulative impacts on marine water quality from the homeporting of one CVN under the proposed action, combined with those from related projects in the vicinity, would be less than significant.

6.18.4 Sediment Quality

The region of influence of potential cumulative impacts to sediment quality is the waters of Pearl Harbor in which ocean water currents are responsible for transport and resuspension of sediments and sediment particles. The time period considered includes historical and present-day conditions, representing substantial improvements in sediment quality since the early 1900s and particularly the 1950s and 1960s, as well as future projects, including cumulative maintenance and proposed action dredging in 2000 to 2003. The significance criteria used to evaluate cumulative impacts to sediment quality are the same as those used to evaluate project-specific impacts (section 6.4.2). Impacts to sediment quality from the proposed project are associated with the following: (1) potential changes to the texture of bottom sediments in dredged areas and in the vicinity of pier construction activities; (2) contaminant inputs to bottom sediments from leaching anti-fouling hull paints, metal corrosion, and sacrificial anodes; and (3) potential contaminant inputs to bottom sediments from accidental spills. The impacts to sediment quality from the proposed action associated with homeporting one CVN (Alternative Three) would be less than significant.

The proposed action (Alternative Three) would result in a less than significant incremental contribution to cumulative sediment quality impacts. Neither proposed action dredging nor maintenance dredging would generate significant changes in physical or chemical characteristics of sediments, except to remove sediments unsuitable for ocean disposal from some areas. These cumulative impacts on sediment quality would be beneficial. Direct discharges of wastewaters would be managed by the required NPDES permit, and non-point-source runoff would be covered under a general stormwater permit. Monitoring associated with these programs would be conducted to ensure that the discharge meet applicable water quality objectives. Reasonably foreseeable projects that involve land-based demolition or construction adjacent to San Diego Bay could result in increased transport of contaminants by stormwater runoff that, if not regulated, could significantly impact sediment quality. All of these reasonably foreseeable projects, however, would be required to comply with the applicable federal, state, and local regulations such as a NPDES permit, mandating management plans to regulate soil and groundwater contamination, and hazardous materials releases. Therefore, cumulative impacts from these projects would be less than significant. The proposed action's incremental contribution to this effect would be reduced by implementing required NPDES mandating management plans to regulate soil and groundwater contamination and hazardous materials releases such that there would not be a cumulatively significant impact.

6.18.5 Marine Biology

The geographical region of influence includes much of Pearl Harbor due to the influence of ocean current transport. This is based on the substantial historical degradation that has occurred to many marine habitats and species throughout Pearl Harbor from surrounding urbanization, industrial use and pollutants, sedimentation, and maintenance dredging activities, and is particularly relevant to consider for cumulative impacts. Sedimentation is a predominant factor influencing the harbor's marine community. Large volumes of freshwater runoff from streams discharge sediment into the harbor, creating relatively high turbidity.

Like most bays and harbors located near large urban centers, the health of Pearl Harbor and its biological resources has been substantially affected by human activities (e.g., dredging and construction activities) during the past century. The time period for considering cumulative impacts incorporates this activity, and includes cumulative maintenance and proposed action dredging between 2000 to 2003.

The significance criteria used to evaluate cumulative impacts on marine biological resources are the same as those used to evaluate project-specific impacts (section 6.5.2). Potential impacts from construction and operations associated with homeporting one CVN (Alternative Three) on marine biota would be temporary and less than significant. Propeller wash from the homeporting of one CVN would not incrementally increase impacts to marine biology in the area. Reasonably foreseeable projects including the Pearl Harbor maintenance dredging could impact marine biological resources. Impacts from maintenance dredging would occur to many benthic invertebrates that would be removed from the dredging area. Fish would avoid dredge areas and be temporarily displaced to adjacent habitat. In addition, ship operations from these reasonably foreseeable projects would disturb sediment and biological communities in the area. However, the invertebrates and fish already represent an environmentally stressed community resulting from disturbance in this heavily used area (ship traffic). Due to this historical degradation, the reasonably foreseeable project impacts would be less than significant. The proposed action's incremental contribution to these cumulative impacts would also be less than significant.

6.18.6 Terrestrial Biology

The region of influence for terrestrial biological resources generally includes the near-bay areas over much of Pearl Harbor and the adjacent coastal area. Many of the potentially affected species are associated with habitats that have been substantially degraded and/or reduced in size, principally due to historical impacts such as building and parking lot construction. The time period under consideration cumulative impact analysis includes the past several decades during which much of the degradation and habitat loss occurred, and extends to include and future projects through 2005. Significance criteria used to evaluate cumulative impacts on terrestrial biological resources are the same as those used to evaluate project-specific impacts (section 6.6.2). As discussed in section 6.6.2.1, no impact on terrestrial biology would result from the homeporting of one CVN. Nearby projects, such as the new Ford Island Bridge (DON 1995c) and the recent relocation of the ex-USS MISSOURI to Pearl Harbor (DON 1997), would not result in any significant cumulative impacts on the flora and fauna of the proposed action site or area as there are no sensitive, rare, threatened, or endangered plant or animal communities within or in the immediate vicinity of the project area. Reasonably foreseeable projects in undeveloped areas including the Ford Island Master Plan Development could result in the incremental reduction of habitat areas and population sizes for sensitive plant and animal species that could potentially affect survival and reproductive success, or contribute to their extirpation. Therefore the cumulative impact on terrestrial biology resulting from the proposed action and reasonably foreseeable projects could be significant. The proposed action's incremental contribution to this impact, however, would be less that significant.

6.18.7 Land Use

The geographical region of influence for land use impacts includes the surrounding land areas on PHNSY, in the immediate vicinities of the proposed action berth. With increasing distance from the proposed project site, land use changes resulting from other projects would have a decreasing contribution to cumulative impacts on land use. The time period of the impacts would include the construction period through the lifetime of the constructed facilities. The cumulative land use significance thresholds are the same as those presented in section 6.7.2.

The proposed action (Alternative Three) would not result in any significant cumulative impacts on land use at the home port site or in the surrounding area. The CVN homeporting berth B2/3 area is presently designated for ship berthing, maintenance, and operation activities. The home port site is already a marine industrial area, and the reasonably foreseeable projects would be compatible with this land use. The cumulative development projects are consistent with local jurisdiction and military land use plans, and surrounding land uses. Several of the reasonably foreseeable activities, such as the outfall construction at the WWTP at Fort Kamehameha, the NAS Barbers Point Closure and Redevelopment, and Second City at Kapolei, are outside the immediate vicinity of the proposed home port site, and would have no impact on land uses at PHNSY. Therefore, the cumulative impacts on land use from the homeporting of one CVN under the proposed action, combined with those from related projects in the vicinity, would be less than significant.

6.18.8 Socioeconomics

The geographic region of influence associated with cumulative socioeconomic impacts generally extends over the Island of Oahu, and specifically over Central and West Oahu that encompasses a range of potential living and working locations. Although the socioeconomics of this area is a function of growth throughout the 20th century, the historic time frame for the cumulative analysis is reasonably defined in the last 5 years, as economic trends have substantially changed since then. This time frame for evaluation of socioeconomic impacts extends into the future beyond the 2005 arrival of the homeported CVN. Significance criteria used to evaluate potential cumulative impacts are the same as those used to address project-specific impacts (section 6.8.2).

The homeporting of one CVN would result in a beneficial contribution to cumulative impacts on employment for Oahu in general, especially during the construction period. In the long-term, the homeporting of one CVN would add a small amount of employment for maintenance personnel. The proposed action (Alternative Three) would not significantly contribute to cumulative impacts on economic, housing, or social conditions of Oahu caused by other reasonably foreseeable projects because construction of these other projects would not occur at the same time as the CVN homeporting proposed action. The relocation of the ex-USS MISSOURI would have no effect on CVN-related employment in-migration (due to employment of specialized maintenance or construction workers that are not available in Hawaii or of sailors on a CVN). Therefore, cumulative impacts on socioeconomics from the homeporting of one CVN under the proposed action combined with those from related projects in the vicinity would be less than significant.

Housing conditions on Oahu during the 1990s have been shaped by the expansion of housing stock (both military housing and private-sector development), the economic downturn of the 1990s, and consolidation of military personnel and operations. The result has been decreases in the number of occupied rental units and a decline in rental rates. The cumulative Ford Island Master Plan Development would increase the housing stock, while the "Second City" at Kapolei would not contribute to the regional housing demand. The cumulative effect of these reasonably forseeable projects, together with the proposed action's provision of private public venture housing, would result in less than significant cumulative impacts on housing .

With urban growth directed to Central Oahu and Ewa, the Leeward and Central district schools on Oahu are largely at or beyond listed capacity, while schools in Honolulu and Windward Oahu may be operating below capacity. As a result of these actions, the current problem of school facilities could well diminish by 2005 or sooner. Reasonably foreseeable housing development including the Ford Island Master Plan Development and "Second City" at Kapolei would contribute to regional demands on schools. The proposed action's incremental contribution to cumulative school impacts, 606 public school students associated with homeporting of one CVN (Alternative Three), would represent an increase of about 0.3 percent in the public school population. The combined cumulative effect on schools would be less than significant, and the proposed action's incremental contribution to cumulative impacts would be less than significant. No mitigation measures are proposed.

6.18.9 Transportation

Ground Transportation

The region of influence relative to traffic impacts for PHNSY consists of the local street network within the Island of Oahu in general and specifically the PHNSY, Central, and West Oahu areas and the regional highways that provide access to the area. The cumulative traffic analysis of these facilities uses 2005 as the target year, and the significance criteria for the traffic analysis are the same as those used to address project-specific impacts (section 6.9.1.2). Traffic generated by numerous activities within Pearl Harbor Naval Complex, nearby Honolulu International Airport, and the industrial, commercial, recreational, and residential areas around Pearl Harbor, contribute to the total cumulative level of traffic on the roadways in and around the base.

Cumulative impacts of projected growth in and around Pearl Harbor have been analyzed in section 6.9. This analysis addresses the cumulative impacts of natural growth and other proposed developments in and around Pearl Harbor. An annual growth factor of 0.5 percent was used for

Pearl Harbor Naval Complex traffic, including vehicles entering/exiting the base via Kamehameha Highway. A growth factor of 2.5 percent, based on historical traffic counts, was used for traffic growth on Kamehameha Highway. Using these growth factors, estimated traffic in 2005 along the Kamehameha Highway would be increased by 21.8 percent, and traffic entering, exiting, and within Pearl Harbor Naval Complex would increase by 4.1 percent. The cumulative activity associated with the docking of the ex-USS MISSOURI and the new Ford Island Bridge would contribute to the total cumulative level of traffic on the roadways in and around PHNSY. Cumulative traffic associated with the ex-USS MISSOURI would be primarily during the non-commuting hours, after 6:30 a.m. to 7:30 a.m. and before 3:30 to 4:30 p.m. The cumulative effects of projected annual growth in the region, combined with the traffic generated by a homeported CVN would be significant. The proposed action's incremental contribution to this effect would be reduced by implementing mitigation measures described in section 6.9.

Vessel Transportation

The region of influence for vessel transportation would include the water areas of Pearl Harbor from the B2/3 wharf to the Pacific Ocean. By definition, this environmental resource area includes only water-based activities. Historical naval operations in Pearl Harbor have contributed to the existing setting. The time period involved is the present condition through 2005, and continue into the future. The significance criteria to evaluate cumulative impacts are the same as those used to address project-specific impacts (section 6.9.2). The proposed action that would result in the homeporting of one CVN would have a less than significant cumulative impact on vessel transportation. The only reasonably foreseeable project capable of adversely impacting vessel transportation is the relocation of the ex-USS MISSOURI. This ship would be permanently berthed as a museum at Ford Island. Temporarily, the vessel is berthed at Pier F-5, projecting over 150 feet into the turning basin. Port operations staff consider that there would be adequate room for vessels to maneuver safely in the turning basin with both the ex-USS MISSOURI and proposed CVN berthed simultaneously (personal communication, NAVSTA Port Ops Chief Quartermaster 1997). In addition, vessel congestion in the turning basin and South Channel has declined since 1998 upon opening of the Ford Island bridge and subsequent retirement of the Ford Island ferries. Therefore, the cumulative impacts on vessel transportation from the homeporting of one CVN under the proposed action combined with related reasonably foreseeable projects in the vicinity would have no impact on vessel transportation.

6.18.10 Air Quality

The region of influence for air quality impacts would be the South Shore region of the Island of Oahu and specifically the PHNSY. The existing quality of the air basin is a function of previous development and pollution control measures. Significance thresholds are based on past and existing cumulative emission levels, as well as regional plans that take into account projected regional growth and land uses. These thresholds are the same as the project-specific thresholds (see section 6.10.2). Air quality impacts from dredging and construction activities would be insignificant, since most emission sources would be mobile and intermittent in nature and their resulting pollutant impacts would not be large enough in a localized area to cause an exceedance of any ambient air quality standard. In addition, they would be temporary impacts that would cease upon completion of construction. Homeporting a CVN at PHNSY would increase emissions within the region, mainly from commuter vehicles. The project transportation analysis determined that commuter traffic from the action in the year 2005 would significantly increase congestion to roadways in proximity to PHNSY, especially during the CVN PIA cycle. This situation could occasionally produce exceedances of the ambient CO standards within congested roadways in proximity to PHNSY and would represent a significant air quality impact. However, with the implementation of traffic flow improvements recommended in section 6.9, significant cumulative air quality impacts would not be expected from proposed action-related traffic.

The following reasonably foreseeable projects would add to traffic congestion along the Kamehameha Highway adjacent to PHNSY: (1) completion of the Ford Island bridge in 1998 and (2) the introduction of the USS MISSOURI Memorial Museum in the year 2001 with facilities at Ford Island and the mainland. However, these projects were considered in the project traffic analysis mentioned above. Consequently, with the implementation of project traffic flow improvements, the proposed action would have an insignificant impact on air quality.

6.18.11 Noise

The region of influence for noise impacts consists of circle-shaped areas around each of the noise sensitive receptors that are within hearing distance of the noise source. The radius of each circle varies, and it is approximately equal to the distance between the noise source and the receptor. Any cumulative project that falls within one or more of these areas is within the same region of influence. The time period of the impacts would include the construction period for the homeported CVN in 2003 through the lifetime of the constructed facilities. The cumulative impact significance thresholds are the same as those presented in section 6.11.2. Cumulative construction and dredging projects would result in additional short-term increases in noise levels. The two reasonably foreseeable projects closest to the proposed action, the opening of Ford Island Bridge for vehicular traffic and the opening of the USS MISSOURI Memorial Museum as a visitor attraction, along with the general increase in Oahu's population (estimated at less than 1 percent gain per year) would increase vehicular traffic at Pearl Harbor Naval Complex and the surrounding public roadways. The increase in traffic would potentially increase the duration of traffic noise levels in the short term throughout the region, especially at peak traffic hours. Because this condition would be temporary, the cumulative incremental effect would not be significant. Other reasonably foreseeable projects are all very distant from the PHNSY CVN homeporting site and outside the region of influence, such that any noise they would generate would not be perceivable by sensitive receptors combined with noise generated at PHNSY. Conversely, noise from PHNSY homeporting activities would not be significantly perceptible by noise receptors in the vicinity of other cumulative project areas. Therefore, the cumulative impacts on noise from the homeporting of one CVN under the proposed action combined with those from related projects in the vicinity, over the long term, would be less than significant.

6.18.12 Aesthetics

The region of influence includes Pearl Harbor and the surrounding land areas of the Pearl City Peninsula, Ford Island, and Hickam Air Force Base. These areas comprise the view corridors experienced from prominent public vantage points around the harbor. Large naval vessels have been recognized as part of the view of PHNSY for decades, including two large warships visible along the main channel, and the nature of the seascape consistently changes with vessels calling and leaving the area. Reasonably foreseeable projects considered are those that would occur from 1998 through 2005. The cumulative impact significance thresholds are the same as those presented in section 6.12.2. The proposed action that would result in the addition of one CVN would have a less than significant impact on aesthetics. The CVN would be consistent with the existing marine industrial setting and would not significantly change public views in the region of influence.

The proposed CVN homeporting at B2/3 and the ex-USS MISSOURI would be visible across the turning basin at Ford Island. The ships would not alter the visual character of the facility's historical landmark status and would be consistent with existing surrounding vessels berthed along the waterfront and battleship row. Although cumulative maintenance and dredging operations would impact views across the harbor, these reasonable foreseeable activities would be consistent with the marine industrial visual character of the area, resulting in less than significant impacts. Therefore, cumulative impacts on aesthetics from the homeporting of one CVN under the proposed action combined with those from reasonable foreseeable projects in the vicinity would be less than significant.

6.18.13 Cultural Resources

The region of influence for cultural resources (i.e., historic properties) is the Pearl Harbor Naval Complex, a National Historic Landmark, and the Island of Oahu in general. The time period covers previous development in the area as well as the period between the present (1998) and 2005. Criteria for accessing the cumulative impacts do not differ from the significance criteria used to address project-specific impacts (section 6.13.2). Any impacts on historic properties resulting from the proposed action of homeporting one CVN would be mitigated to less than significance by Section 106 consultation with SHPO and record data according to standards described in the MOA for the Pearl Harbor Naval Complex. Cumulative military projects such as the Ford Island Master Plan Development, NAS Barbers Point Closure and Redevelopment, and the current internal shipyard consolidation program could result in effects on historical properties. Any impacts would be subject to the Section 106 evaluation process that mandates the systematic inventory, assessment, and mitigation of significant effects. The internal shipyard consolidation program within the PHNSY industrial area has been intensively developed, lowering the likelihood of discovering unrecorded prehistoric archaeological resources. Other reasonably foreseeable projects that would occur in primarily previously disturbed areas, such as Pearl Harbor maintenance dredging and outfall construction at the WWTP at Fort Kamehameha, would have a relatively low potential of impacting intact cultural resources. The disturbed nature of the soils would, in most cases, compromise the integrity and significance value of the property under federal evaluation criteria. Undeveloped areas of the island of Oahu are characterized by comparatively high densities of prehistoric archaeological sites. Cumulative development projects in Honolulu County, such as Second City at Kapolei, could result in significant impacts on cultural resources on an individual basis and contribute to regional cumulative effects. Therefore, there is the potential for reasonably foreseeable projects, in concert with the proposed action, to impact cultural resources within the greater Honolulu area. The proposed action's incremental contribution to this effect would be reduced by implementing Section 106 evaluation process requirements that mandate the systematic inventory, assessment, and mitigation of significant effects, such that there would not be a cumulatively significant impact.

6.18.14 General Services/Access

The region of influence for general services is PHNSY, as all services are provided for on-base. Previous PHNSY development has contributed to cumulative impacts on general services and access that are reflected in current conditions. Reasonably foreseeable projects considered are those that would occur from 1998 through 2005. Significance criteria for cumulative impacts are identical to those used to address project-specific impacts (section 6.14.2). The proposed action of homeporting one CVN would result in less than significant impacts on regional general services. Military personnel and their families would increase by 3,217 persons, and most general services would be accommodated for by existing facilities. An increased demand on child care would result, although this impact would be short term. In addition, increased demands on medical facilities would require additional personnel, although this impact would be less than significant.

Because the region of influence for general services is confined by the borders of PHNSY, reasonably foreseeable projects off-base would not contribute to cumulative impacts on general services and access at the facility. The proposed action's demand on general services would be served by existing PHNSY capacity. Therefore, the reasonably foreseeable projects, combined with the proposed action, would result in less than significant cumulative impacts on general services. No mitigation is required.

The region of influence for access in the area includes the shipyard perimeter where the three main gates are located, as well as major streets that lead to PHNSY such as Kamehameha Highway, Makalpa Road, and Radford Drive. In addition, the waters of Pearl Harbor are included in the region of influence. Reasonably foreseeable projects considered in this analysis include those occurring between 1998 and 2005. The proposed action would not result in a significant impact on access during construction. Introduction of increased commuter traffic to the shipyard would worsen traffic conditions at Pearl Harbor Naval Complex entry gates and certain intersections during peak travel periods. Although the flow of traffic would be slowed, the additional commuter traffic would not preclude access to the Pearl Harbor Naval Complex entry gates. Impacts on access would be adverse, but less than significant.

Access impacts during construction of the other foreseeable reasonably foreseeable projects would be addressed by individual construction management plans. The completion of the Ford Island Bridge in 1998 provides beneficial impacts on access. All of the other reasonably foreseeable projects are located sufficient distances from one another that they would not produce a cumulative effect on access.

Several of the reasonably foreseeable projects have the potential to impact water-based access. These projects include the relocation of the ex-USS MISSOURI, construction of the Ford Island Bridge, and Pearl Harbor Maintenance dredging. Although the ex-USS MISSOURI is located at Pier F-5, where it projects into the turning basin, this location is temporary and would have a less than significant impact on access. In addition, in-water construction for the Ford Island bridge was a temporary activity and maintenance dredging would also be temporary. Therefore, any impacts to water-based access would be transient and less than significant. All of the water-based activities are located sufficient distances from one another and would not be permanent, such that cumulative impacts would be less than significant. Impacts from the proposed action of homeporting one CVN would be highly localized and less than significant. Consequently, the proposed action and reasonably foreseeable projects' cumulative impact on access would be insignificant. No mitigations are required.

6.18.15 Health and Safety

The region of influence is defined as the area around B2/3 and PHNSY. This is the area in which handling of hazardous materials associated with the proposed action would occur. The time period includes the construction activities associated with the homeporting of one CVN in 2003 and for continuing operations into the future. The significance criteria for cumulative impacts are the same as stated for project-specific impacts (section 6.15.2). The proposed action alternative that would result in the homeporting of one CVN would result in less than significant impacts to health and safety, as the action would comply with the NAVOSH program to ensure safe conditions in the workplace. Other reasonably foreseeable naval projects would be subject to similar hazardous waste management programs and procedures, resulting in less than significant cumulative impacts. Reasonably foreseeable civilian projects including residential and commercial development would not involve the use of hazardous substances. Impacts to health and safety would be limited to construction activities and would be subject to standard safety mitigations precluding non-construction personnel access to activity areas. These projects would not have an impact on cumulative health and safety impacts. The proposed action's incremental contribution to this effect would be reduced by implementing NAVOSH and hazardous waste management program procedures such that there would not be a cumulatively significant impact. In addition, Volume 2, Appendix F, section 3.3 presents a discussion of cumulative radiological impacts. No significant impacts are identified.

As described in the annual report referenced in the EIS, 26 previous versions of that report, and the 1998 update of the report, the total long-lived gamma radioactivity in liquids released annually to all ports and harbors from all Naval nuclear-powered ships and supporting tenders, Naval bases and shipyards is less than 0.002 curies. This annual total includes any accidental releases of radioactivity that occurred during the year. For perspective, the total annual amount is less than the amount of naturally occurring radioactivity present in the seawater displaced by a single submarine, and is environmentally inconsequential. Since the total amount released was inconsequential, any individual release was also inconsequential, and was not subject to reporting, immediate or otherwise, by any regulatory requirements. Thus, there would be no cumulative impacts from releases to any one water body from various NNPP activities in close proximity to that water body.

6.18.16 Utilities

The region of influence for utilities encompasses the greater Honolulu metropolitan service area. Previous regional development and particularly that at Pearl Harbor has contributed to cumulative impacts on general services and access that are reflected in current conditions. Projects considered in the cumulative analysis are those that would occur between 1998 and 2005. Historic utility demands would not increase or decrease cumulative impacts. The significance criteria for cumulative impacts are the same as stated for project-specific impacts (section 6.16.2) The proposed action alternative that would result in the homeporting of one CVN (Alternative Three) would result in less than significant impacts on regional utilities, as increased demands would be accommodated by existing and planned facilities. Utility increases that remain below existing PHNSY capacity would have a less than significant impact to the environment because the regional utility grid capacity is determined on the conservative assumption that PHNSY operations could occur at full capacity.

Other reasonably foreseeable projects with the highest potential for cumulative impacts are new construction projects, rather than reuse of existing urban infrastructure. These projects, including Ford Island Master Plan Development and "Second City" at Kapolei, could create additional, previously unaccounted for demands on utilities. Individual project permit conditions of approval would require that each project provide fees to compensate for the increased demand on utilities, including needed infrastructure improvements. However, these projects represent a very small portion of the total demand on utilities within the region of influence. Other reasonably foreseeable development, such as the NAS Barbers Point Closure and Redevelopment, would occur on existing facilities. These projects would not represent an excessive demand on utilities so that their contribution to cumulative impacts on utilities would be less than significant. Because the proposed action represents no new unaccounted for demands on utilities, it would have a less than significant contribution to cumulative impacts. Therefore, the cumulative impact of the proposed action and other reasonably foreseeable projects on utilities would be less than significant.

6.18.17 Environmental Justice

The region of influence for environmental justice includes the of the City and County of Honolulu. This area provides regional census data that characterize minority and low income communities. Reasonably foreseeable projects considered include historic environmental justice conditions of the area as well as projects occurring between 1998 and 2005. The Metropolitan Statistical Area surrounding Pearl Harbor Naval Complex includes the neighborhoods of the Airport, Aiea, Pearl City, and Waipahu. The area's composite of minority populations is generally similar to the State of Hawaii and is composed of several ethnicities, with Asian/Pacific Islanders as the major ethnic group. The proposed action of homeporting one CVN would not cause disproportionate effects to the health and safety of low-income or minority communities when compared to the regional population. Similarly, the proposed action does not preclude members of low-income or minority communities adjacent to the proposed action area from sharing in the economic benefits of the action. The proposed action would have no effect on native Hawaiian traditional or customary practices or impact subsistence activities in Pearl Harbor as the PHNSY berthing piers for the CVN are inaccessible to the public. Public schools and day care facilities would not be significantly affected by noise or air quality emissions associated with the proposed action. Based on the preceding, no adverse effects to low-income or minority groups are expected.

Other reasonably foreseeable Naval projects are not located adjacent to disproportionately minority or low-income residential areas, and would not have impacts on environmental justice. Any adverse impacts resulting from these projects would be experienced proportionally by the population as a whole. Cumulative civilian development such as the Second City is distant from these residential areas, and would not have impacts on environmental justice. Therefore, the cumulative impact on environmental justice resulting from the proposed action, together with reasonably foreseeable projects, would be insignificant.

7.0 RADIOLOGICAL ASPECTS OF NIMITZ-CLASS AIRCRAFT CARRIER HOMEPORTING

This section evaluates the radiological aspects of homeporting a NIMITZ-class aircraft carrier and related shore-based support facilities, and provides relevant information on the Naval Nuclear Propulsion Program (NNPP), which, pursuant to federal law, regulates radioactivity associated with Naval nuclear propulsion work. The policies of the NNPP are applied consistently to all locations where nuclear-powered ships are berthed or maintained. Thus, the procedures and controls discussed in this section apply to all alternatives considered in this EIS.

This section has been developed making full use of the extensive body of unclassified environmental information available on nuclear propulsion matters. This information includes detailed annual reports published over three decades; independent environmental surveys performed by the EPA, by states in which NNPP facilities are located, and by some foreign countries; and a thorough independent review performed by the Government Accounting Office in 1991 (GAO 1991). The analyses summarized in this chapter are fully discussed in Appendix F, including input data and methodology, to facilitate independent verification of results.

Because nuclear propulsion technology is among the most sensitive military technologies possessed by the United States, Congress has placed stringent limitations on foreign access under the Atomic Energy Act of 1954 (amended) and other federal statutes. Appendix D, which is classified, contains Naval reactor design information and analysis of postulated accidents. The analysis of Appendix D supports the discussion of potential impacts presented in the unclassified portion of the EIS. However, all potential environmental impacts or conclusions discussed in Appendix D are covered in the unclassified sections of this EIS.

A glossary and a list of abbreviations and acronyms are located in Chapter 12 of this EIS. Information on radiation exposure and risks associated with radiation exposure is contained in Appendix E. Appendix E provides information on radiation in general and includes discussions on background radiation and the risks as compared to some of the everyday hazards of life.

7.1 THE NNPP

7.1.1 History and Mission of the Program

In 1946, at the conclusion of World War II, Congress passed the Atomic Energy Act, which established the Atomic Energy Commission (AEC) to succeed the wartime Manhattan Project. In the Atomic Energy Act, Congress gave the AEC sole responsibility for developing atomic energy. At that time, then-Captain (later Admiral) Hyman G. Rickover was assigned to the Navy Bureau of Ships, the organization responsible for Naval ship design. Rickover recognized the military implications of successfully harnessing atomic power for submarine propulsion, and that it would be necessary for the Navy to work with the AEC to develop such a program. By 1949, Rickover had forged an arrangement between the AEC and the Navy that led to the formation of the NNPP.

In 1955, the nuclear submarine USS NAUTILUS was put to sea and demonstrated the basis for all subsequent U.S. nuclear-powered warship designs. In the 1970s, government restructuring moved the NNPP from the AEC (which was disestablished) to what became the Department of Energy (DOE). As the NNPP grew in size over the years, it retained its dual responsibilities with the DOE and the Department of the Navy, and its basic organization, responsibilities, and technical discipline have remained as it was when first established.

Today, the NNPP continues as a joint Navy/DOE organization responsible for all matters pertaining to Naval nuclear propulsion pursuant to Presidential Executive Order 12344, permanently enacted as Public Law 98-525 (42 U.S.C. 7158). The NNPP is responsible for the following:

- The nuclear propulsion plants in approximately 100 U.S. nuclear-powered ships.
- Two moored training ships located in Charleston, South Carolina used for Naval nuclear propulsion plant operator training.
- Nuclear work performed at six shipyards (four public and two private).
- Two DOE-owned, contractor-operated laboratories devoted solely to Naval nuclear propulsion research, development, and design work.
- Two land-based prototype Naval nuclear reactors used for research and development and for training Naval nuclear propulsion plant operators.

The NNPP's conservative design practices and stringent operating procedures have resulted in the demonstrated safety record of Naval nuclear propulsion plants. U.S. Naval reactors have accumulated over 4,900 reactor-years of operation and have steamed over 114 million miles without a reactor accident or any significant radiological effect on the environment. The following sections provide a detailed discussion of the NNPP. For further information on this subject see DOE/DOD 1993, Duncan 1990, and Hewlett and Duncan 1974.

7.1.2 Nuclear Propulsion for Navy Ships

The source of energy for powering a Naval nuclear ship originates from fissioning uranium atoms within the reactor core. Pressurized water circulating through a closed primary piping system transfers heat from the reactor core to a secondary steam system isolated from the reactor cooling water. The heat energy is then converted to mechanical energy to propel the ship, and provides electrical power to the rest of the ship.

Nuclear propulsion significantly enhances the military capability of aircraft carriers. Nuclear propulsion provides virtually unlimited high-speed endurance without dependence on tankers and their escorts. Moreover, the space normally required for propulsion fuel in oil-fired ships can be used for aircraft fuel in nuclear-powered ships. Because of these enhanced military capabilities, the older conventionally powered aircraft carriers (CVs) are being replaced by modern nuclear-powered aircraft carriers (CVNs).

7.1.3 Philosophy of the NNPP

Since radioactive material is an inherent by-product of the nuclear fission process, its control has been a central concern for the Navy's nuclear propulsion program. Radiation levels and releases of radioactivity have historically been controlled well below those permitted by national and international standards. All features of design, construction, operation, maintenance, and personnel selection, training, and qualification have been oriented toward minimizing environmental effects and ensuring the health and safety of workers, ships' crew members, and the general public. Conservative reactor safety design has, from the beginning, been a hallmark of the NNPP.

7.1.4 Safety Record of the NNPP

The history of safe operation of the Navy's nuclear-powered ships and their support facilities is a matter of public record. This record shows a long and extensive history of the NNPP's activities having no significant effect on the environment. Detailed environmental monitoring results published yearly provide a comprehensive description of environmental performance for all NNPP facilities. Report NT-97-1 (NNPP 1997a) discusses the performance for all the ships, bases, and shipyards. This record confirms that the procedures used by the Navy to control radioactivity from U.S. Naval nuclear-powered ships and their support facilities are effective in protecting the environment and the health and safety of the general public.

NNPP reactor designs have received independent evaluations from the Nuclear Regulatory Commission (NRC) and the Advisory Commission on Reactor Safeguards (ACRS). These reviews were conducted as a means to provide confirmation and added assurance that nuclear propulsion plant design, operation, and maintenance pose no significant risk to public health and safety.

In addition, in 1991 the GAO completed a thorough 14-month review of DOE sites under the cognizance of the NNPP (GAO 1991). This review included full access to classified documents. The GAO investigators also made visits to the DOE laboratory and prototype sites supporting the NNPP, which operate to the same stringent standards imposed on Naval facilities and activities; and spent time on a nuclear-powered warship. The GAO review concentrated on environmental, health, and safety matters, including reactor safety. In congressional testimony on April 25, 1991, the GAO stated in part:

> In the past we have testified many times before this committee regarding problems in the Department of Energy (DOE). It is a pleasure to be here today to discuss a positive program in DOE. In summary, Mr. Chairman, we have reviewed the environmental, health, and safety practices at the Naval Reactors laboratories and sites and have found no significant deficiencies.

The U.S. Environmental Protection Agency (EPA) has conducted independent environmental monitoring in U.S. harbors during the past several decades. The results of these extensive, detailed surveys have been consistent with Navy results. These surveys have confirmed that U.S. Naval nuclear-powered ships and support facilities have had no significant effect on the radioactivity of the environment (Puget Sound, Washington area: EPA 1977; EPA 1989b. Pearl Harbor, Hawaii area: PHS 1966; EPA 1972; EPA 1987b. San Diego, California area: PHS 1968; EPA 1989a).

The safety record of U.S. Naval nuclear propulsion plants aboard nuclear-powered warships is well known; there has never been a reactor accident in the 44 years since the first Naval reactor began operation, a record comprising over 4,900 reactor-years of experience. The NNPP currently operates approximately 100 nuclear-powered warships, one research vessel, moored training ships, and land-based prototypes powered by approximately 115 Naval nuclear reactors. Since

1955, U.S. Naval nuclear-powered warships have steamed over 114 million miles. These ships have visited more than 150 ports in over 50 foreign countries and dependencies.

U.S. nuclear-powered warships and their reactors are designed to exacting and rigorous standards. They must be able to survive battle shock and protect crews in combat. Naval nuclear propulsion plants include redundant systems and are operated by highly trained crews using rigorously applied procedures. These features enhance reactor safety just as they contribute to the ability of the ship to survive combat.

Critical to safety are the officers and sailors who operate the Naval nuclear propulsion plants aboard nuclear-powered warships. Since the 1950s, approximately 100,000 officers and enlisted technicians have been trained for this purpose. The officer selection process accepts only applicants who have high standing at colleges and universities. All personnel receive 1 to 2 years of training in theoretical knowledge and practical experience on operating reactors that are like the reactors used on ships. Even after completing this training, before manning a nuclear propulsion plant watch station, the personnel must requalify on the ship to which they are assigned. In addition to the extensive training and qualification program, multiple layers of supervision and inspection are employed to ensure a high state of readiness and compliance with safety standards. When a ship's reactor is in operation at sea, there are both enlisted technicians and officers on duty, with an average total of 40 years of experience in Naval nuclear propulsion.

All U.S. Naval nuclear-powered warships use pressurized water reactors. The radioactive fission products are contained within high-integrity fuel elements that are designed to meet battle shock well in excess of 50 times the force of gravity. The fuel is designed to preclude release of fission products to the primary coolant. Only limited radioactivity is found in the pure water used in the all-welded primary coolant system. The reactor compartment forms a container and shields the crew from radiation. This compartment is radiologically clean so that it can be entered without any protective clothing within minutes of shutting down the reactor.

Substantial data exist verifying the high integrity of U.S. Naval reactor designs. Two nuclear-powered submarines (USS THRESHER and USS SCORPION) sank during operations at sea in the 1960s. Neither was lost due to a reactor accident, but both losses resulted in the ship exceeding crush depth and the hull being crushed inward by tremendous sea pressure. Radiological surveys of the debris sites have been performed on several occasions over the past three decades and confirm that, despite the catastrophic manner in which these ships were lost, no detectable radioactive fission products have been released into the environment. The only radioactivity found at these sites was from corrosion products from the primary coolant system. The amount of radioactivity found in the surveys was less than the naturally occurring radioactivity in the seabed sediment. These data are reported in detail in separate available public reports (KAPL 1993a and 1993b).

In addition to the many safety considerations referred to above, there are several other factors that enhance Naval reactor safety. Naval reactors are smaller and lower in power rating than typical commercial plants. They also operate at power levels well below their rated power, particularly when transiting restricted waters. Thus, the amount of radioactivity potentially available for release typically is less than one hundredth of that for a commercial reactor. The plant is designed to withstand a wide variety of casualty conditions without damage to the reactor core or release of significant amounts of radioactivity. Naval reactors are mobile and move through a source of unlimited sea water that can be used for emergency cooling and shielding. In the event of a nuclear accident, the ship can be rigged and towed away from populated areas, which, of course, is not the case for a fixed, land-based reactor. There are numerous ways to move a NIMITZ-class aircraft carrier including the use of the other reactor plant and the use of tugs or other tow craft. Sufficient time exists to support safe movement in the unlikely event of such an occurrence. Not withstanding the remote possibility of occurrence, the potential of postulated nuclear accidents have been analyzed and are discussed in Appendix D (classified).

Consistent with past practice, NIMITZ-class aircraft carrier nuclear propulsion plant design was independently reviewed by the NRC (the Directorate of Licensing Division of the Atomic Energy Commission at the time) and the ACRS. These reviews concluded that NIMITZ-class aircraft carrier reactors can be safely operated.

7.2 NAVAL NUCLEAR-POWERED SHIPS

In Naval nuclear propulsion plants, fissioning of uranium atoms in the reactor core produces heat. Since the fission process also produces radiation, shielding is placed around the reactor to protect the crew. U.S. Naval nuclear propulsion plants, including NIMITZ-class aircraft carriers, use a pressurized water reactor design that has two basic systems: the primary system and the secondary system. The arrangement is shown in Figure 7-1. The primary system circulates ordinary demineralized water in an all-welded, closed-loop system consisting of the reactor vessel,

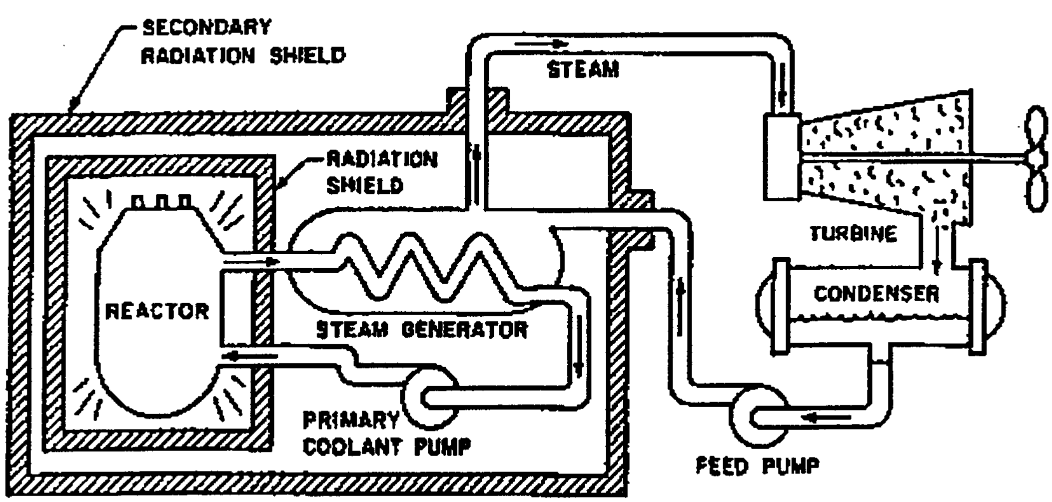

Figure 7-1. Pressurized Water Reactor

piping, pumps, and steam generators. The heat produced in the reactor core is transferred to the water, which is kept under pressure to prevent boiling. The heated water passes through the steam generators where it transfers its energy. The primary water is then pumped back to the reactor to be heated again.

Inside the steam generators, the heat from the primary system is transferred across a water-tight boundary to the water in the secondary system, also a closed loop. The secondary water, which is at a relatively low pressure, boils, creating steam. Isolation of the secondary system from the primary system prevents water in the two systems from intermixing, keeping radioactivity out of the secondary water.

In the secondary system, steam flows from the steam generators to drive the main propulsion turbines, which turn the ship's propellers, and the turbine generators, which supply the ship with electricity. After passing through the turbines, the steam is condensed back into water and feed pumps return it to the steam generators for reuse. Thus, the primary and secondary systems are separate, closed systems in which constantly circulating water transforms energy produced in the nuclear chain reaction into useful work.

The reactor core is installed in a heavy-walled pressure vessel within a primary shield. This shield limits exposure from gamma and neutron radiation produced when the reactor is at power. Reactor plant piping systems are installed primarily inside a reactor compartment, which is surrounded by a secondary shield. Because of these two shields, the resulting radiation outside the propulsion plant spaces during reactor plant operation is generally not any greater than background radiation (NNPP 1997b).

7.2.1 Reactor Design and Operation

The design and operation of Naval nuclear-powered ships result in minimal risk of accidents, particularly while in port, and the consequences would be small should a problem occur. There are a number of reasons why this is so. A Naval reactor aboard a CVN is rated at only a fraction of the power of a commercial nuclear power plant. When a nuclear-powered aircraft carrier is moored in port, its reactor is normally shut down or operating at very low power levels since no power is required for propulsion. Since the plants are designed to accommodate significant transients to respond to the variable demands of warship propulsion while at sea, in-port operation is far less demanding on the plant. The plants must also meet stringent military requirements for shock and battle conditions and are installed within strong hulls that also must meet stringent military requirements. The operators of Naval nuclear reactors are carefully selected, qualified to exacting standards, and trained to explicit procedures. Finally, the mobility of a ship provides for the removal of the problem source in the unlikely event of an accident.

The nuclear fuel in Naval nuclear propulsion reactor cores uses highly corrosion-resistant and highly radiation-resistant materials. The resistance to corrosion on the protective cladding of the fuel elements is so high that the corrosion rate is negligible. The reactor could remain submerged in sea water indefinitely without releasing fission products while the radioactivity decays. As a result, the fuel is very strong and has very high integrity. The fuel is designed, built, and tested to ensure that the fuel construction will contain the radioactive fission products both during normal reactor operations and in more severe conditions such as extreme battle shock. Typical commercial nuclear power plants differ from Naval nuclear propulsion plants in fuel design. Civilian fuel is designed to meet the requirements of peacetime power production ashore. This allows for some release of fission products within regulatory limits under normal operations.

Naval nuclear fuel can withstand combat shock loads that are well in excess of 50 times the force of gravity — well in excess of the seismic loads a commercial plant might experience in a severe earthquake. Naval nuclear fuel routinely operates with rapid changes in power level since Naval ships must be able to change speed quickly. Naval nuclear fuel consists of solid components that are non-explosive, non-flammable, and non-corrosive. The ruggedness of Naval fuel is demonstrated by the fact that in the history of the NNPP, there has been no measurable fission product release from a Naval nuclear reactor that uses the type of fuel being used in NIMITZ-class aircraft carriers.

Strict adherence to conservative principles of design and operation of Naval reactors was discussed on May 24, 1979, by the Director of Naval Nuclear Propulsion (then Admiral H. G. Rickover) in congressional testimony following the accident at Three Mile Island (House of Representatives 1979). Admiral Rickover emphasized that ensuring reactor safety is the responsibility of all personnel who work on Naval nuclear propulsion plants and that each NNPP element from training, to design, to construction, and to operation must be properly carried out in a coordinated fashion to achieve the goal of safe performance. A more thorough discussion of this topic can be found in the official history of the NNPP written by a member of the DOE historian's staff, Francis Duncan (*Rickover and the Nuclear Navy: The Discipline of Technology*, Duncan 1990).

7.3 FACILITIES THAT SUPPORT THE NNPP

The NNPP has set standards for construction of facilities that will be used to handle or store radioactive materials. These standards prevent the spread of contamination within the facilities or to the environment, minimize exposure to personnel within the facility, ensure that exposure to personnel outside the facilities is negligible, and minimize the effort required to decontaminate and decommission the facilities. All aspects of facilities construction and future modifications are engineered.

7.3.1 Pre-Construction and Post-Construction Radiological Surveys

To provide a baseline for radiological information on radiological work facilities, radiation surveys of the building site, and analysis of soil and building construction material samples are performed. After construction, a radiological survey of the building is performed before any radiological work is allowed in the facility. The baseline data established by these surveys is retained to provide information needed for decommissioning the facility and returning it to its pre-radiological work condition.

7.3.2 Special Design Features

Standardized design features of NNPP radiological facilities have been developed to minimize the potential risk to the environment, the general public, and workers. These features are as follows:

- ***Impermeable Floors, Walls and Liquid Containment Curbs in Radiological Work Areas.*** The floors consist of a heavy structural concrete slab topped with an impermeable surface that eliminates the possibility of migration of liquid through the floor into the underlying soils. No underground piping is permitted in or under the floors. Wherever liquids are handled, containment curbs or basins are provided to contain the largest potential spill. All floors, walls, and ceilings are smooth, free of crevices, and sealed to aid in decontamination, if necessary. All entrances to the building are ramped or sealed, where practicable, to prevent any potential inadvertent loss of contaminated liquids.

- ***Negative Air Pressure and High Efficiency Particulate Air (HEPA) Filtration Systems.*** Radiological work spaces are designed to operate at a negative pressure with respect to the outside atmosphere so that air leakage is into rather than out of the building. Walls and roofs are tightly constructed and sealed to minimize the sources of air leakage. Doors and windows are made to be as leak tight as possible. The negative pressure is maintained by a ventilation system that passes the building air through HEPA filters prior to being exhausted to the atmosphere. Each HEPA filter is tested when installed and at least annually thereafter using standard test methods widely used in the nuclear industry to verify that HEPA filters are at least 99.95 percent efficient at removing submicron-sized particles (NNPP 1997b). In addition, all exhausted air utilizes a single exhaust duct. This duct is monitored by an Air Particulate Sampler (APS) to verify that HEPA filters have been effective and ensure compliance with applicable regulations. Performance of this system is certified prior to operation of the facility and periodically over the life of the facility.

- *Radiation Shielding.* The facilities are designed so that all exterior areas and interior non-radiological support areas have radiation levels so low that monitoring personnel for radiation exposure is not required. This is achieved by the use of radiation shielding integral to the permanent walls of the facilities as well as by the use of portable shielding as work conditions dictate.

- *Mixed Waste is Segregated and Stored in a Dedicated Storage Area.* Mixed waste is segregated into containers that hold similar (chemically compatible) wastes.

7.3.3 Decommissioning Facilities

Due to facilities design and the control of radioactivity during operation, NNPP facilities can be decommissioned without any residual environmental impact. Within the past two decades, three shipyards involved in Naval nuclear work have been successfully radiologically deactivated and closed.

From 1958 to 1980, Ingalls Shipbuilding was engaged in the construction and overhaul of Naval nuclear-powered ships in Pascagoula, Mississippi. The shipyard radiological facilities that supported this work were deactivated between 1980 and 1982 by removing and disposing of all radioactive material associated with Naval nuclear propulsion plants. Extensive radiological decommissioning surveys were performed on over 274,000 square feet of building and facility surfaces. Over 11,000 samples of these surfaces as well as soil, ground cover, and concrete were taken from all areas where radioactive work was previously performed. In addition, both the State of Mississippi and the EPA performed over-check surveys of these deactivated facilities. After these surveys were completed, the Ingalls facilities were released for unrestricted use.

As at Ingalls, extensive radiological decommissioning surveys were performed at the Mare Island and Charleston Naval shipyards to verify the removal of radioactive material. These shipyards were deactivated following the 1993 round of Base Realignment and Closure (BRAC) proceedings. At each shipyard, direct radiological surveys on over 5,000,000 square feet of building and facility surfaces and analyses of over 40,000 samples of soil, ground cover, and concrete using sensitive laboratory equipment detected no cobalt-60 other than trace concentrations in a few localized areas. Simple, proven cleanup methods were used to remediate these areas. The total amount of NNPP radioactivity removed from the environment at each shipyard was equivalent to that in a single home smoke detector. Both shipyards were released for unrestricted use with respect to

NNPP radioactivity by the operational closure date of April 1, 1996, with State and EPA agreement.

The successful radiological deactivation and closure of the Ingalls, Mare Island, and Charleston shipyards demonstrates that the stringent control over radioactivity exercised by the NNPP from its inception has been successful in preventing significant radiological contamination of the environment. Personnel who subsequently occupy these facilities will not receive measurable radiation exposure above natural background levels that exist in areas not affected by Naval nuclear propulsion plant work (NNPP 1997a). Since the same standards would apply to servicing and homeporting a NIMITZ-class aircraft carrier at any location, there would be no significant short- or long-term environmental impact from those activities.

7.4 RADIOLOGICAL IMPACT OF THE NNPP

The following discussions characterize the radiological impacts of all NNPP operations. This includes impacts due to both homeporting NIMITZ-class aircraft carriers and operating related support facilities. As discussed below, the cumulative radiological impacts from all NNPP operations is very small and conservatively bounds the impacts associated with NIMITZ-class aircraft carrier homeporting.

7.4.1 Source of Radioactivity

Nearly all (99 percent) of the radioactive atoms in a nuclear reactor are found in two forms: (1) the uranium fuel itself or (2) fission products created by the nuclear chain reaction. As discussed above, the fuel elements in Naval propulsion reactor cores are designed and built with high fuel integrity to retain this radioactivity. This high fuel integrity has been confirmed by operating experience. Such integrity is a necessity for sailors who must live in the enclosed atmosphere of a nuclear-powered ship.

The remaining radioactive atoms present in a Naval nuclear reactor are encountered in two forms. The majority of the remaining radioactive atoms (99.9 percent of the remaining 1 percent) are part of the metal of the reactor plant piping and components. These radioactive atoms are created by neutron activation of iron and alloying elements during operation of the reactor plant. The balance (0.1 percent of the remaining 1 percent) is in the form of radioactive corrosion and wear products originating from metal surfaces in contact with reactor coolant. These corrosion and wear products are transported in the reactor coolant through the reactor core where they are activated by neutrons, and then deposited on piping system internal surfaces. Most of these corrosion products tightly adhere to piping system internal surfaces. The small amount that does not adhere is the source of potential radioactive contamination encountered during work on Naval nuclear reactor plants. Stringent controls are used to keep this material contained when working on system internals.

Corrosion and wear products in Naval nuclear reactor plants include the following radionuclides with half-lives of about 1 day or greater: tungsten-187, chromium-51, hafnium-181, iron-59, iron-55, nickel-63, niobium-95, zirconium-95, tantalum-182, manganese-54, cobalt-58, and cobalt-60. The predominant radionuclide is cobalt-60, which has a 5.2-year half-life and emits gamma radiation, which is the one of the most penetrating forms of radiation. Cobalt-60 also has the most restrictive concentration limit in water as listed by organizations that set radiological standards for these corrosion and wear radionuclides (CFR 1994; National Council on Radiation Protection and

Measurements [NCRPM] 1959). Therefore, cobalt-60 is the primary radionuclide of interest for Naval nuclear propulsion plants.

7.4.2 Control of Radioactivity

Stringent radiological control practices are used in the NNPP. The effectiveness of these stringent radiological control practices has been proven and documented (NNPP 1997b). The following discussion outlines some of the NNPP's practices for controlling radioactivity.

7.4.2.1 Radioactive Liquid and Surface Contamination

Some of the most restrictive practices in the NNPP's radiological control program are those established for controlling radioactive contamination. The controls for radioactive contamination are so strict that precautions have sometimes been taken to prevent tracking contamination from fallout and natural sources into controlled radiological work areas. This is because the control limits used in the radiological work areas were well below the levels occurring outside in general public areas.

The basic approach in the NNPP is to avoid the need for anti-contamination clothing by containing radioactivity so personnel cannot come in contact with it. Another basic requirement of contamination control is monitoring all personnel leaving an area where radioactive contamination could possibly exist. This confirms that contamination has not been spread.

Work surfaces are designed to be easily cleanable (plastic or seamless sheetmetal containments) to aid in fast and effective cleanup. Work surfaces are decontaminated during and after work to maintain positive contamination control. Frequent contamination surveys are conducted during work evolutions. Results of these surveys are reviewed by supervisory personnel to provide a double-check that no abnormal conditions exist. The instruments used for these surveys are checked against a radioactive source daily, and they are calibrated at least every 6 months.

Radioactive liquids transferred from ships are placed in collection tanks and are processed at a dock-side processing facility. After processing the water to remove cobalt-60 and other particulate radioactivity, the water is returned to the ships for reuse or evaporated. This process has been proven in the Naval NNPP's shipyards, operating bases, and other facilities.

7.4.2.2 Airborne Radioactivity

As noted, Naval fuel elements are designed to retain all fission products, including radioactive gases. Very minute amounts of fission products are created from fission that occurs in trace amounts of uranium in the fuel cladding. Because these amounts are extremely small, there is no need for special equipment to remove or control fission products.

However, special controls are used in areas where radioactive corrosion and wear products could become airborne to prevent their reaching the environment. This radioactivity is controlled during maintenance so contamination is contained and respiratory equipment is not normally required. To prevent exposure of personnel to airborne radioactivity, and to prevent radioactivity from escaping to the atmosphere, work that might generate airborne contamination is performed inside sealed containments. These containments are ventilated to the atmosphere only through HEPA filters. In addition, radiologically controlled areas are also required to be ventilated through HEPA filters any time radiological work is in progress. Airborne radioactivity surveys are performed regularly in radioactive work areas. If airborne radioactivity above the limit is detected in occupied areas, work that might be causing airborne radioactivity is immediately stopped, and the potential source is identified and fixed.

Radiological work facilities have special design features to minimize the possibility of releasing airborne radioactivity to the surrounding atmosphere. These features include operating the building at a negative pressure, using HEPA filters to ensure the cleanliness of the discharged air, and using APSs to verify that the HEPA filters have been effective. These same design techniques have been used, and continue to be used, at NNPP facilities to avoid significant environmental impact from radiological work.

The results of APS monitoring shows that the average concentration of radioactivity and the total radioactivity in the air released from these facilities is consistently lower than that measured in ambient air away from the monitored facilities. In other words, there is less radioactivity in the filtered air exhausted from the facility than was originally in the air brought into the facility. Releases from these work facilities cause minute levels of radiation exposure far below that allowed by the EPA in the Code of Federal Regulations (CFR 1992). These results clearly demonstrate that the design features used in the facilities are effective in preventing release of airborne radioactivity.

All liquid collection tanks used to store radioactivity are sealed by mechanical closures except for one penetration. This penetration vents any small pressure build-ups caused by filling or draining or by atmospheric changes. A HEPA filter on the penetration ensures that airborne radioactivity is retained in the tanks.

7.4.3 Radiological Control Practices

Besides the contamination control practices listed above, several other key radiological control practices used by the NNPP provide additional assurance that positive control of radioactivity is maintained. Among those NNPP-wide practices are the following:

- A radioactive materials accountability system is used to ensure that no radioactive material is lost or misplaced.

- All radioactive materials are specially packaged, sealed, and tagged with yellow and magenta tags bearing the standard radiation symbol and the measured radiation level. The use of yellow packaging material is reserved solely for radioactive material.

- Access to radiological facilities is controlled by trained radiological control personnel. In addition, all personnel entering radiological work and storage areas of the facilities are required to wear dosimetry devices.

- Only specially trained personnel are authorized to handle radioactive materials.

- Radiological surveys are conducted by qualified radiological control personnel inside and outside of facilities and ships where radiological materials are handled. This is a check to verify that the methods used to control radioactivity are effective.

- Written procedures are used to perform all radiological work. This not only ensures the work is carefully planned and documented, but also allows situation-specific radiological controls to be used. All written procedures are strictly adhered to word for word (i.e., verbatim compliance) in the NNPP. If this cannot be done, work is stopped until a change to the procedure is approved.

- Radioactive material or radioactive waste transported off-site is packaged and shipped per Department of Transportation (DOT) regulations. Specially trained personnel accomplish this function.

- Technical problems encountered during radiological work are documented and corrected before work is allowed to continue.

7.4.3.1 Occupational Radiation Exposure

The NNPP invokes stringent controls on occupational radiation exposure. Radiation exposure levels resulting from these controls are discussed in detail in Appendix E, and they support the position that the analyses discussed later in this section are conservative. The NNPP's policy is to reduce to as low as reasonably achievable the exposure to personnel from ionizing radiation associated with Naval nuclear propulsion plants. These stringent controls on occupational radiation exposure have been successful.

Until 1994, the occupational radiation exposure limits used in the U.S. for whole-body radiation were 3 roentgen-equivalent-man (rem) per quarter year and 5 rem accumulated dose for each year beyond the age of 18. In 1967, however, the NNPP adopted radiation exposure limits of 3 rem per quarter year and 5 rem per year. No civilian or military personnel in the NNPP ever exceeded the federal accumulated radiation exposure limit that allowed 5 rem exposure for each year beyond age 18. Since 1967, no civilian or military personnel in the NNPP have exceeded the federal limit that allows up to 3 rem per quarter year, nor the Navy's self-imposed limit of 5 rem per year for radiation associated with Naval nuclear propulsion plants. On January 1, 1994 the Federal Annual Radiation Exposure Limit was set at 5 rem per year by the NRC. This is the same limit that the NNPP has observed since 1967.

No person in the NNPP has received greater than 2 rem in a year since 1980. In recent years, the average occupational exposure of workers monitored at all shipyards has been less than 0.3 rem per year. For comparison, the amount of radiation exposure a typical person in the U.S. receives each year from natural background radiation is 0.3 rem. The average lifetime accumulated radiation exposure from radiation associated with Naval nuclear propulsion plants for all shipyard personnel who were monitored is 1.2 rem.

In the late 1980s, the NCRPM reviewed occupational exposures to the U.S. working population (NCRPM 1989a). This included a review of the occupational exposures to personnel from the NNPP. Based on this review, the NCRPM concluded: "These small values (of occupational exposure) reflect the success of the Navy's efforts to keep doses as low as reasonably achievable (ALARA)."

7.4.3.2 Radioactive Solid Waste Disposal

The amount of low-level radioactive solid waste generated during Naval ship and maintenance facility operations is small in comparison to other waste generators. This waste includes radioactively contaminated rags, plastic bags, paper, filters, ion exchange resin, and scrap materials resulting from work aboard ship and in the shoreside support facilities. Liquids that cannot be processed for reuse are solidified and properly disposed of. This waste is packaged in DOT-approved containers, shielded if necessary, and accumulated in a controlled storage area until it can be shipped for disposal at a burial site that is either licensed by the NRC or by a State under agreement with the NRC.

The annual volume of solid low-level radioactive waste generated by all Naval nuclear-powered ships and their support facilities is about 14 percent of the total volume disposed of at U.S. commercial disposal sites (NNPP 1997a). The amount of radioactive waste that would be generated by the Navy at CVN home port facilities would be a small fraction of the Navy total.

7.4.3.3 Mixed Hazardous and Radioactive Waste

Hazardous waste is waste that poses a potential threat to human health or the environment if not properly managed. These substances can be toxic, corrosive, ignitable, or chemically reactive (note that this does not include radioactive substances regulated under the Atomic Energy Act). Radioactive waste is a waste that contains radionuclides regulated under the Atomic Energy Act. Mixed waste generated as a result of NNPP activities is a mixture of chemically hazardous waste and low-level radioactive waste. Within the NNPP, concerted efforts are taken to prevent commingling radioactive and chemically hazardous substances to minimize the potential for generation of mixed waste. Examples of these efforts include avoiding the use of hazardous solvents, lead-based paints, and lead shielding in disposal containers. As a result of NNPP efforts to avoid the use of chemically hazardous substances in radiological work, NNPP activities typically generate a total of only about 35 cubic meters of mixed waste per year. Implementing the proposed action would not result in an increase in the total amount of mixed waste generated as a result of NNPP activities. Moreover, detailed characterization of NNPP mixed waste has been accomplished using sampling and extensive process knowledge, and has confirmed that the waste is suitable for safe storage until it is shipped off site for treatment and disposal.

7.4.3.4 Radioactive Material Transportation

Only specially trained, designated people who are knowledgeable in shipping regulations are permitted to authorize shipments of radioactive material. Special transportation services, such as signature security service or sealed shipping vehicles used exclusively to transport radioactive material, ensure point-to-point control and traceability are maintained from shipper to receiver.

Shipments of radioactive material in the NNPP are made per regulations of the DOT, DOE, and NRC. These regulations ensure shipments of radioactive material are adequately controlled to protect the environment and the health and safety of the general public, regardless of the transportation route taken.

Shipments of radioactive material associated with Naval nuclear propulsion plants have not resulted in any measurable release of radioactivity to the environment. There have never been any accidents involving a significant release of radioactivity during shipment of NNPP radioactive waste. In particular, the NNPP has shipped low-level radioactive material since the 1950s with no release of radioactivity

Estimates of annual radiation exposure to transportation crews and the general public from shipments of radioactive material have been made in a manner consistent with that used by the NRC as discussed in NRC 1977. As discussed in reference NNPP 1997a, NNPP shipments have not resulted in any significant exposure to the general population. The maximum exposure to any individual member of the public is far less than that received from natural background radioactivity.

7.4.4 Radiological Environmental Monitoring Program

Radiological environmental monitoring is conducted by the Navy in U.S. harbors frequented by Naval nuclear-powered ships. This monitoring includes comprehensive marine, air, and terrestrial environmental contamination and radiation sampling. Radionuclides other than cobalt-60 were considered both in environmental monitoring and in hypothetical risk assessments. Both Navy and EPA environmental monitoring includes highly sensitive gamma spectroscopic analysis of the full range of gamma energies of environmental samples (NNPP 1997a). Cobalt-60 is the only radionuclide associated with Naval nuclear propulsion plants that was detected in the environment, and then in only trace quantities at very few locations. Other radionuclides detected were either naturally occurring or were associated with world wide fallout from atmospheric nuclear weapons testing. The following information from NNPP 1997a summarizes environmental monitoring efforts of the Navy and other independent government agencies.

7.4.4.1 Marine Monitoring

Marine monitoring consists of analyzing harbor water, sediment, and marine life for radioactivity associated with Naval nuclear propulsion plants. This monitoring is supplemented by shoreline surveys. Sampling harbor water and sediment each quarter year is emphasized since these materials would be the most likely to be affected by releases of radioactivity.

Sediment samples are collected and analyzed specifically for the presence of cobalt-60, which, as discussed earlier, is the predominant radionuclide of environmental interest resulting from Naval nuclear reactor operations. Sampling points are selected to form a pattern around ship berthing locations and to provide points in areas away from berthing locations. These sampling points consider characteristics of the harbor. Results of the 1996 sampling show that most harbors do not have detectable levels of cobalt-60 in sediment. The detectable level of cobalt-60 for Navy radiological surveys is about 0.1 pCi/gram. The actual value varies depending on the amount of naturally occurring radioactivity in the survey sample. Low levels of cobalt-60, less than three millionths of a microcurie per gram, are detected around a few operating base and shipyard piers where nuclear-powered ship maintenance and overhauls were conducted in the early 1960s. These low levels are well below the naturally occurring radioactivity levels in these harbors. A measure of significance of these low levels is that if all of a person's food were to contain three millionths of a microcurie of cobalt-60 per gram, that person would receive less than 10 percent of the annual dose one gets from natural background radiation. Cobalt 60 is also not detected in general harbor areas where nuclear-powered ship operations commenced after 1970.

Harbor water samples are taken in areas where nuclear-powered ships are berthed, and from upstream and downstream locations. No cobalt-60 has been detected in any of the water samples from all the harbors monitored.

Marine-life samples, such as mollusks, crustaceans, and plants, have been taken from all harbors monitored. No buildup of cobalt-60 has been detected in these samples of marine life.

Shoreline areas uncovered at low tide are surveyed with sensitive gamma scintillation detectors to determine if any radioactivity from bottom sediment has washed ashore. All results have been the same as background radiation levels in these regions. Thus, there is no evidence that these areas are being affected by nuclear-powered ship operations.

7.4.4.2 *Air Monitoring*

Naval nuclear reactors and their support facilities are designed to ensure that discharges of radioactivity are well below EPA regulatory limits (CFR 1994) in airborne exhausts. Radiological controls such as the use of containments, special ventilation, frequent radiological monitoring when work is in progress, frequent decontamination of work containments to maintain positive control of radioactive contamination, and HEPA filtration systems serve to prevent significant radioactivity from becoming airborne. Air exhausted from the support facilities is monitored during discharge. The total air emission from any facility and its co-located ships is less than 1 percent of the applicable EPA (CFR 1994) limits. In fact, comparison of sensitive radioactivity measurements in shipyards demonstrates that air exhausted from Naval nuclear propulsion facilities contained a smaller amount of radioactivity than was present in the ambient air outside the facilities.

7.4.4.3 *Perimeter Monitoring*

Ambient radiation levels are measured using sensitive thermoluminescent dosimeters continuously posted at locations outside of the boundaries of areas where radiological work is performed. Dosimeters are also posted at locations away from radiological work areas to measure background radiation levels from natural radioactivity. The results show that NNPP activities have had no distinguishable effect on normal background radiation levels at the perimeter of the work sites.

7.4.4.4 *Independent Agency Monitoring*

Environmental samples from each harbor monitored are also independently checked at least annually by a DOE laboratory to ensure that analytical procedures are correct and standardized. Additionally, the EPA has conducted independent surveys in U.S. harbors, including areas encompassed by the San Diego Naval Facilities (PHS 1968; EPA 1989a), Puget Sound Naval Shipyard (EPA 1977, 1989b), and Pearl Harbor Naval Shipyard (PHS 1966; EPA 1972, 1987b). The results are consistent with Navy monitoring results cited in NNPP 1997a. These surveys have confirmed that Naval nuclear-powered ships and their support facilities have had no significant impact on the radioactivity of the marine or terrestrial environment.

7.4.4.5 *Results of Environmental Monitoring*

The Navy issues an annual report that describes the Navy's policies and practices regarding such things as disposal of radioactive liquid, transportation and disposal of radioactive materials and solid wastes, and monitoring of the environment to determine the effect of nuclear-powered warship operations (NNPP 1997a). This report is provided to Congress and to cognizant federal, state, and local officials in areas frequented by nuclear-powered ships. This report shows that the total amount of long-lived gamma radioactivity released into harbors and seas within 12 miles of shore have been less than 0.002 curies during each of the last 26 years.

NRC regulations (10 CFR 20) list water concentration limits for discharge of radioactivity in effluents. These limits are based on limiting the dose to members of the public from continuous ingestion of the activity discharged to 50 millirem per year. The control of radioactive liquid discharges at Navy facilities is much more stringent than at facilities that comply with the limits of 10 CFR 20, such as commercial nuclear power plants. The total combined radioactivity discharged from all Navy nuclear-powered vessels annually within 12 miles of shore is less than one hundredth of the amount of radioactivity released by one typical commercial nuclear power plant. To put this small quantity of radioactivity into perspective, it is less than the quantity of naturally occurring radioactivity in the volume of saline harbor water occupied by a single Naval nuclear-powered submarine.

As a measure of the significance of this data, if one person were able to drink the entire amount of radioactivity discharged into any harbor in any of the last 26 years by U.S. nuclear-powered warships and support facilities, that person would not exceed the annual radiation exposure permitted for an individual worker by the NRC.

Since 1975, the total long-lived gamma radioactivity released farther than 12 miles from shore by Naval nuclear-powered ships and supporting tenders has been less than or equal to 0.4 curie per year. This is the total amount released from over 100 ships at different times of the year in the open sea at long distances from land in small incremental amounts, and under rapid dispersal conditions due to wave action. This 0.4 curie is less than the naturally occurring radioactivity in a cube of sea water approximately 100 yards on a side.

This data can be extrapolated to a NIMITZ-class aircraft carrier. The procedures used to operate and service a nuclear-powered NIMITZ-class aircraft carrier are based on the same principles used to develop those for U.S. nuclear-powered ships at any time in the past or any place in the world. Thus, homeporting a NIMITZ-class aircraft carrier would have no significant radiological environmental effect, and no adverse impact on the health and safety of the public.

7.5 EMERGENCY PREPAREDNESS

Owing to the extent and nature of activities at Naval bases, emergency preparedness is part of ongoing planning and training. Such planning covers fires, hazardous material spills, natural disasters, transportation of radioactive material, and other accidents. Measures include activation of emergency response teams provided by the site, establishment of a central control center with communications to headquarters activities, and other support activities. In addition to local site resources, the resources of the entire NNPP are available to provide additional assistance. If necessary, the extensive resources of the federal emergency response network, as outlined in the Federal Radiological Emergency Response Plan, could also be used for a specific site problem.

Emergency response measures include provisions for immediate response to any emergency at Naval bases, identification of the accident conditions, and communications with civil authorities to provide radiological data and recommendations for protective actions. In the event of an accident involving radioactive or toxic materials, workers in the immediate vicinity of the accident would promptly evacuate the area. This evacuation can typically be accomplished within minutes of the accident and would reduce the hazard to workers.

Regularly scheduled exercises are conducted at each site to test the site's ability to respond to accidents. These exercises include realistic tests of people, equipment, and communications, and the results are regularly reviewed to incorporate experience gained from the exercises. These exercises also periodically include steps to verify the adequacy of interactions with local hospitals and state and local emergency personnel and officials.

However, Naval nuclear propulsion operation and work performed at Naval bases are such that there is no need for unique emergency preparedness programs outside the base. Nevertheless, procedures are in place for notification of state and/or local authorities in the unlikely event of an emergency.

7.6 OVERVIEW OF RADIOLOGICAL IMPACT ANALYSES AND HEALTH EFFECTS

This chapter has discussed at length the history and philosophy of the NNPP to illustrate the absence of any notable radiological impact on homeporting NIMITZ-class aircraft carriers. Discussion has centered on the small amount of radioactive material that has been released during normal operations and the conservative nature of Naval fuel design and facilities design that make the likelihood of accidents and their consequences small.

Nonetheless, the radiological impacts of normal operations and facility accidents on the environment and exposure to the general public were evaluated at each of the alternative home port locations. These evaluations were performed taking into account local meteorological and geological data, population, water movements, and other factors that could influence severity of an accident using a computer-programmed pathways analysis. A detailed discussion of analysis methods is contained in Appendix F. Estimated environmental consequences, event probabilities, and risk (a product of probability and consequence) for both normal operations and postulated accident scenarios related to the homeporting of NIMITZ-class aircraft carriers are presented.

7.6.1 Potential for Release of Radioactive Material to the Environment

Normal operations and accidents at support facilities were evaluated to estimate the potential for releases of radioactive material. The results of these analyses are presented in terms of the health effects to facility workers and the public as predicted due to the release of radioactive materials into the environment. For perspective, an additional discussion on radiation exposure and risk is provided in Appendix E, and supports the position that these analyses are conservative. Effects on environmental factors are also presented, based on the amount of land that could be impacted due to postulated accidents. The detailed analyses of normal operations and accident conditions for radiological support facilities are presented in Appendix F. The evaluation of normal operations was based on conditions at a large Naval shipyard performing maintenance and nuclear refueling work. Such conditions are conservative relative to those in a home port where less extensive maintenance is done.

Accidents were considered for inclusion in detailed analyses if they were expected to contribute substantially to risk (defined as the product of the probability of occurrence of the accident times the consequence of the accident). The following example serves to illustrate the calculation of risk. The lifetime risk of dying in a motor vehicle accident can be computed from the likelihood of an individual being in an automobile accident and the consequences or number of fatalities per accident. There were 10,000,000 motor vehicle accidents during 1992 in the U.S. resulting in about 40,000 deaths (National Safety Council [NSC] 1993). Thus, the probability of a person being in an automobile accident is 10,000,000 accidents divided by approximately 250,000,000 persons in the U.S., or 0.04 per year. The number of fatalities per accident, 0.004 (40,000 deaths divided by 10,000,000 accidents), is less than 1 since many accidents do not cause fatalities. Multiplying the probability of the accident (0.04 per year) by the consequences of the accident (0.004 deaths per accident) by the number of years the person is exposed to the risk (72 years is considered to be an average lifetime) gives the risk for any individual being killed in an automobile accident. From this calculation, the overall risk of someone dying in a motor vehicle accident is about 1 chance in 87 over their lifetime. Further perspective on the calculation of risk can be found in section 1.5 of Appendix F.

Accidents were categorized into three types: Abnormal Events, Design Basis Accidents, or Beyond Design Basis Accidents. These categories are characterized by their probability of occurrence as described further in section 2.6 of Appendix F. Construction and industrial accidents are included in these categories. Two hypothetical accidents were analyzed using area specific data. The first scenario is a fire in a radiological support facility that spreads to radioactive material resulting in an airborne release of radioactivity. The second scenario is a spill into surrounding waters of radioactive liquid from a collection facility.

It is important to note that the annual risks presented in these analyses extrapolated over a lifetime result in less than 1 chance in 1,000,000 of any member of the general population dying from radiological operations. This is below the threshold of concern established in California Proposition 65 and in the EPA regulations implementing the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Moreover, due to the conservatism in these analyses, the calculated risks are believed to be at least 10 to 100 times larger than what would actually occur.

7.6.1.1 Normal Operation

This section summarizes the detailed pathways analyses performed in Appendix F to determine the radiological impact of normal operations based on the maximum number of CVNs added to each site by this EIS. A detailed discussion of how the analyses were performed is contained in Appendix F.

Table 7-1 presents the estimated risk of fatal cancer to the general population and individuals at each site due to radiological releases from normal operations. The normal incidence of cancer for a typical population has been included for comparison. Details for deriving data in Table 7-1 are described in Appendix F. The radiation exposures to the general public would be so small at each of the home port locations that they would be indistinguishable from naturally occurring background radiation. The results show that the additional annual individual risk of a latent fatal cancer occurring in the general population within 50 miles of a NIMITZ-class aircraft carrier home port is very low at each of the home port locations evaluated, less than 1 chance in 2 billion.

Table 7-1. Radiological Health Effects from Normal Operations

Possible Home Port Location	*Total Radiation Exposure to Affected Population from Normal Operation* [1]	*Annual Risk of Single Latent Fatal Cancer in Entire Affected Population from Normal Operation*[2]	*Population Estimate Within 50 Miles of Home Port Location* [3]	*Average Annual Risk of Latent Fatal Cancer to a Member of the General Population from Normal Operation*[4]	*Individual Annual Risk of Latent Fatal Cancer for Maximally Exposed Off-Site Individual from Normal Operation*	*An Individual's Annual Risk of Dying from all Cancers* [6]
NASNI	2.4 (2.4×10^{0})	1 in 830 (1.2×10^{-3})	2,481,069	1 in 2 billion (4.8×10^{-10})	1 in 19 million (5.1×10^{-8})	1 in 360 (2.8×10^{-3})
PSNS	0.41 (4.1×10^{-1})	1 in 4,700 (2.1×10^{-4})	2,975,810	1 in 14 billion (6.9×10^{-11})	1 in 7 million (1.4×10^{-7})	1 in 360 (2.8×10^{-3})
PHNSY	0.41 (4.1×10^{-1})	1 in 4,700 (2.1×10^{-4})	817,385	1 in 4 billion (2.5×10^{-10})	1 in 45 million (2.2×10^{-8})	1 in 360 (2.8×10^{-3})
NAVSTA Everett	0.51 (5.1×10^{-1})	1 in 3,800 (2.6×10^{-4})	2,328,554	1 in 9 billion (1.1×10^{-10})	1 in 3 million (3.3×10^{-7})	1 in 360 (2.8×10^{-3})

Notes
1. Total exposure to general population within a 50-mile radius of the facility due to normal operation (person-rem).
2. Annual risk of a single latent cancer fatality in the entire population within a 50-mile radius of the facility from radiation exposure due to normal operation, calculated by multiplying the total radiation exposure to affected population (rem) by 0.0005 latent fatal cancers estimated to be caused by each rem (risk/rem; see Table F-3 in Appendix F).
3. Estimated number of people within a 50-mile radius of the facility from census data in Table F-4.
4. Average annual risk of latent fatal cancer for an average individual within a 50-mile radius of the facility from radiation exposure due to normal operation, calculated by dividing the total population cancer risk by the number of people within a 50-mile radius of the home port location. Risk of cancer is noted in parentheses.
5. The MOI is a theoretical individual living at the base boundary receiving maximum exposure, calculated by multiplying the total radiation exposure to the MOI (rem; see Table F-7 of Appendix F) by 0.0005 latent fatal cancers estimated to be caused by each rem (risk/rem; see Table F-3 in Appendix F).
6. Annual risk of an individual dying from all sources of cancer. Risk of cancer is noted in parentheses.

7.6.1.2 Hypothetical Accidents

Accident Selection and Scope

All accidents (natural and human initiated) were considered but only those accidents expected to contribute substantially to risk (defined as the product of the probability of occurrence of the accident multiplied by the consequence of the accident) were included for detailed analysis. Also, before an accident was considered for detailed analysis, radioactive material associated with the accident had to be in a dispersable form and there had to be a way to release and disperse the material.

Categories of accidents, which are described in Appendix F and include industrial and catastrophic accidents, are characterized by their probability of occurrence. The probability of an accident's occurrence contributed significantly to whether the accident was included for detailed analysis. Accidents with minimal consequences, such as small-volume releases, procedural violations, and other human errors, occur more frequently than accidents with severe consequences. Accidents with low probability of occurrence but more severe consequences, such as acts of terrorism, plane crashes, and natural disasters (like earthquakes), are expected to result in risks that are bounded by the results of facility accidents that were evaluated in detail. The facility accidents found to have the highest risk were a fire in a radiological support facility and a release of radiological liquid (spill) from a support facility. Both accidents are analyzed in detail in Appendix F.

Although the probability of occurrence is very small, a wide range of postulated reactor accidents have been analyzed and are discussed in Appendix D. Consistent with independent reviews by the NRC and ACRS, the analyses have shown that NIMITZ-class aircraft carrier reactors can be safely operated.

For both postulated facility accidents, the scope of radiological impact as related to the size of the area contaminated was determined at each location. The spread of contamination was calculated using average meteorological conditions (note that 95 percent worst case meteorology was used when calculating exposure and risk to workers and the general population). For the fire accident at any of the locations being considered, the area of potential contamination (footprint) was limited to approximately 3 acres within the boundaries of the base or shipyard. For the spill accident, the footprint was not calculated due to the immediate dilution below detectability of radioactive material after entering surrounding waters. Any radiological impact on the contaminated area would be temporary while the area was isolated and remediation efforts were completed.

Summary of Accidents Selected for Detailed Analysis

FIRE

The accident with the most risk is a fire in a radiological support facility that results in the airborne release of radioactivity. The amount of radioactivity released during this accident scenario was conservatively established at 1 curie of cobalt-60. This represents a conservative amount of radioactivity that might be released in a fire, as compared to the typical amount that might accumulate within a support facility due to normal operations. For the analysis, several conservative assumptions were used, as follows:

- The meteorological conditions are considered to be 95 percent worst case (with no credit given that the likelihood of these conditions is only 1 chance in 20).
- No evacuation of the public or cleanup of contaminated areas is assumed.
- No cleanup of the contaminated area is assumed to occur.

Note that these assumptions are conservative since radioactive material storage facilities are specifically constructed to inhibit the spread of fire and have automatic sprinkler systems installed. Moreover, emergency response measures include provisions for immediate response to any emergency, identification of the accident conditions, and communications with state and local authorities.

This section summarizes the detailed pathways analyses, performed in Appendix F, which determined the radiological impact of a fire at radiological support facilities. Table 7-2 presents the estimated risk of cancer to the general population and individuals due to radiological releases resulting from a fire at support facilities. The risks presented in this section result from extremely conservative assumptions and analyses. A fire is the highest risk, most severe hypothetical accident, but its risk is still considered low when compared to other risks. Latent cancer fatalities are not expected in the general public. The average annual individual risk of latent fatal cancer to the general public living within a 50-mile radius of the home port locations is very low, less than 1 chance in 580 million.

Table 7-2. Radiological Health Effects from a Fire Accident						
Possible Home Port Location	Total Radiation Exposure to Affected Population from a Radiological Support Facility Fire, Assuming Fire Occurs [1]	Annual Risk of Single Latent Fatal Cancer in Entire Affected Population from a Radiological Support Facility Fire, Including Probability of Fire Occurring [2]	Population Estimate Within 50 Miles of Home Port Location [3]	Average Annual Risk of Latent Fatal Cancer to a Member of the General Population from a Radiological Support Facility Fire, Including Probability of a Fire Occurring [4]	Individual Annual Risk of Latent Fatal Cancer for Maximally Exposed Off-Site Individual from a Radiological Support Facility Fire, Including Probability of Fire Occurring [5]	An Individual's Annual Risk of Dying from all Cancers [6]
NASNI	1,400 (1.4×10^{3})	1 in 285 (3.5×10^{-3})	2,481,069	1 in 700 million (1.4×10^{-9})	1 in 2 million (5.0×10^{-7})	1 in 360 (2.8×10^{-3})
PSNS	340 (3.4×10^{2})	1 in 1200 (8.5×10^{-4})	2,975,810	1 in 3.5 billion (2.9×10^{-10})	1 in 833,000 (1.2×10^{-6})	1 in 360 (2.8×10^{-3})
PHNSY	560 (5.6×10^{2})	1 in 700 (1.4×10^{-3})	817,385	1 in 580 million (1.7×10^{-9})	1 in 2 million (4.4×10^{-7})	1 in 360 (2.8×10^{-3})
NAVSTA Everett [7]	350 (5.5×10^{2})	1 in 700 (1.4×10^{-3})	2,328,584	1 in 1.7 billion (6.0×10^{-10})	1 in 470,000 (2.2×10^{-6})	1 in 360 (2.0×10^{-3})

Note:
1. Total exposure to general population within a 50-mile radius of the facility due to a fire (person-rem).
2. Annual risk of a single latent cancer fatality in the entire population within a 50-mile radius of the facility from radiation exposure due to a fire. Calculated by multiplying the total radiation exposure to affected population (rem) by 0.0005 latent fatal cancers estimated to be caused by each rem (risk/rem; see Table F-3 in Appendix F) by a 1 in 200 (0.005) probability of a fire.
3. Estimated number of people within a 50-mile radius of the facility from census data from Table F-4.
4. Average annual risk of latent fatal cancer for an average individual within a 50-mile radius of the facility from radiation exposure due to a fire, calculated by dividing the total population cancer risk by the number of people within a 50 mile radius of the home port location. Risk of cancer is noted in parentheses.
5. The MOI is a theoretical individual living at the base boundary receiving maximum exposure. Risk is calculated by multiplying the total radiation exposure to the MOI (rem; see Table F-9 of Appendix F) by 0.0005 latent fatal cancers estimated to be caused by each rem (risk/rem; see Table F-3 in Appendix F) by a 1 in 200 (0.005) probability of a fire.
6. Annual risk of an individual dying from all sources of cancer. Risk of cancer is noted in parentheses.
7. Analysis included even though no radiological support facility is planned for NAVSTA Everett.

SPILL

The next accident with the most risk is a spill into surrounding waters of radioactive liquid from a collection facility. The released radioactivity is evaluated for transfer from the location of release to the general public through tidal movements, ingestion by fish and crustaceans, and possible release into area aquifers with subsequent contamination of wells and water supplies. The amount of water release was assumed to contain 1 curie of cobalt 60 and the associated proportioned amounts of other radioactive elements expected. These assumptions are conservative since it would require a spill of over 26 million gallons of radioactive liquid (discharged primary coolant) at levels normally contained in collection facilities, which are tanks no larger than 10,000 gallons. Furthermore, the total capacity to store radioactive liquid at support facilities typically would be less than 100,000 gallons.

This section summarizes the detailed pathways analyses performed in Appendix F, which determined the radiological impact of a release of radiological liquid from support facilities. Table 7-3 presents the estimated risk of cancer to the general population and individuals due to radiological releases resulting from a release of radiological liquid from a support facilities. The risks presented in this section result from extremely conservative assumptions and analyses. The risk from a spill is less than a fire and is also considered low when compared to other risks. Latent cancer fatalities are not expected in the general public. The average annual individual risk of latent fatal cancer to the general public living within a 50-mile radius of the home port locations is very low, less than 1 chance in 38.5 billion.

7.6.1.3 *Accident Response*

Although the risk of a radiological accident of significant consequence is small, emergency plans are in place at all nuclear Naval facilities to mitigate the impacts of a facility or transportation accident. These plans include activation of emergency control organizations throughout the NNPP to provide on-scene response as well as support for the on-scene response team. Realistic training exercises are conducted periodically to ensure that the response organizations maintain a high level of readiness and to ensure that coordination and communication lines with local authorities and other federal and state agencies are effective. Emergency response measures include provisions for immediate response to any emergency at any Naval site, identification of the accident conditions, and communication with civil authorities providing radiological data and recommendations for any appropriate protective action. In the event of an accident involving

Table 7-3. Radiological Health Effects from a Spill Accident

Possible Home Port Location	*Total Radiation Exposure to Affected Population from a Radiological Support Facility Spill, Assuming Spill Occurs* [1]	*Annual Risk of Single Latent Fatal Cancer in Entire Affected Population from a Radiological Support Facility Spill, Including Probability of Spill Occurring* [2]	*Population Estimate Within 50 Miles of Home Port Location* [3]	*Average Annual Risk of Latent Fatal Cancer to a Member of the General Population from a Radiological Support Facility Spill, Including Probability of Spill Occurring* [4]	*Individual Annual Risk of Latent Fatal Cancer for Maximally Exposed Off-Site Individual from a Radiological Support Facility Spill, Including Probability of Spill Occurring* [5]	*An Individual's Annual Risk of Dying from all Cancers* [6]
NASNI	1,300	1 in 15,000 (6.5×10^{-5})	2,481,069	1 in 38.5 billion (2.6×10^{-11})	1 in 360 million (2.8×10^{-9})	1 in 360 (2.8×10^{-3})
PSNS	260	1 in 77,000 (1.3×10^{-5})	2,975,810	1 in 227 billion (4.4×10^{-12})	1 in 2 billion (4.8×10^{-10})	1 in 360 (2.8×10^{-3})
PHNSY	73	1 in 278,000 (3.6×10^{-6})	817,385	1 in 227 billion (4.4×10^{-12})	1 in 2 billion (4.8×10^{-10})	1 in 360 (2.8×10^{-3})
NAVSTA Everett [7]	210	1 in 100,000 (1.0×10^{-5})	2,328,554	1 in 232 billion (4.3×10^{-12})	1 in 2 billion (4.8×10^{-10})	1 in 360 (2.8×10^{-3})

Note:
1. Total exposure to general population within a 50-mile radius of the facility due to a spill (person-rem).
2. Annual risk of a single latent cancer fatality in the entire population within a 50-mile radius of the facility from radiation exposure due to a spill. Calculated by multiplying the total radiation exposure to affected population (rem) by 0.0005 latent fatal cancers estimated to be caused by each rem (risk/rem; see Table F-5 in Appendix F) by a 1 in 10,000 (0.0001) probability of a spill.
3. Estimated number of people within a 50-mile radius of the facility from census data from Table F-4.
4. Average annual risk of latent fatal cancer for an average individual within a 50-mile radius of the facility from radiation exposure due to a spill, calculated by dividing the total population cancer risk by the number of people within a 50 mile radius of the home port location. Risk of cancer is noted in parentheses.
5. The MOI is a theoretical individual living at the base boundary receiving maximum exposure. Risk is calculated by multiplying the total radiation exposure to the MOI (rem; see Table F-13 of Appendix F) by 0.0005 latent fatal cancers estimated to be caused by each rem (risk/rem; see Table F-5 in Appendix F) by a 1 in 10,000 (0.0001) probability of a spill.
6. Annual chance of an individual dying from all sources of cancer. Risk of cancer is noted in parentheses.
7. Analysis included even though no radiological support facility is planned for NAVSTA Everett.

radioactive or mixed-waste materials, workers in the vicinity of the accident would promptly evacuate the immediate area. This evacuation can typically be accomplished within minutes of the accident and reduce the hazard to workers.

For members of the general public residing at the site boundary and beyond, action would be taken to prevent the public from exceeding certain limits on exposure to radiation or other hazards if needed. Individuals that reside or work on site, or those that may be traversing the site in a vehicle would be evacuated from the affected area within 2 hours. Security personnel and appropriate local officials at all locations would oversee the removal of residents, workers, and travelers, if necessary. Periodic training and evaluation of the emergency response personnel is conducted to ensure that correct actions are taken during an actual casualty. Therefore, exposure to residents, workers, and travelers to any hazard, including the potential for ingestion and inhalation of radioactive contamination, would be limited. Upon stabilization of the situation, recovery and remediation actions would be implemented as soon as practicable.

7.6.2 Impact on Specific Populations

7.6.2.1 Impact on Close-in Workers

An evaluation has been made of the impact to close-in workers involved in NIMITZ-class operations and support that might occur due to the various radiological accidents postulated. This evaluation focused on the radiological consequences of the fire accident. Clearly, a limited number of fatalities may occur that are related to operations and support only in a secondary manner; i.e., the worker who happened to be in the facility may be killed due to a fire. These secondary effects are not discussed in the evaluation. Rather, only radiological consequences are considered. It is not likely that any fatalities would occur to nearby workers due to the radiological consequences of this fire accident. At most, a few workers might receive some radiation exposure from inhalation of airborne radioactivity during the initial stages of the fire; however, the involved workers would likely move to a position upwind of the fire, put on breathing apparatus, or evacuate the area in accordance with emergency procedures and training.

For the spill accident, the water would drain from the tank and rapidly enter the water pathway. In addition, wet spills result in very small amounts of airborne activity. No fatalities to workers close to the scene of either accident would be expected due to radiological consequences.

7.6.2.2 Impact on Environmental Justice in Minority and Low Income Populations

As discussed in the preceding sections, the impacts on human health or the environment resulting from normal operations associated with support facility operations for NIMITZ-class aircraft carriers would be small. For example, it is unlikely that a single additional fatal cancer would occur as a result of these activities. Since the potential impacts due to normal operations or accident conditions present no significant risk and do not constitute a credible adverse impact on the surrounding population, no adverse effects would be expected for any particular segment of the population, minorities and low-income groups included.

The conclusion that there would be no disproportionately high and adverse impacts on human health or the environment is not affected by the prevailing winds or direction of surface and subsurface water flow. This is true for normal operations because the effects of routine operations are so small. It is also true for accident conditions because the consequences of any accident would depend on the random conditions at the time it occurred and the wind directions do not display any strongly dominant directions. Similarly, the conclusion is not affected by concerns related to subsistence consumption of fish and game since the sites are not located in areas that serve as a major source of food for any specific groups.

To place the impacts on environmental justice in perspective, the risk would be less than one additional fatality per year for the entire population from NIMITZ-class aircraft carrier support operations. For example, there would be approximately 5,100 cancer deaths predicted each year in the Naval Air Station North Island area for the entire population of U.S. citizens and there would be about 1,800 cancer deaths per year predicted for people of color in the same area based on 1990 data on national average cancer rates. Even if all of the additional impacts were assumed to occur solely among people of color, no additional latent cancer fatalities are expected to occur in the population from carrier support operations. Thus, the cancer risk would not constitute disproportionately high and adverse impacts on human health or the environment. The same conclusion can be drawn for low-income groups and minorities at all of the locations evaluated in this EIS.

7.7 SUMMARY

The NNPP provides comprehensive technical management of all aspects of Naval nuclear propulsion plant design, construction, and operation including careful consideration of reactor safety, radiological, environmental, and emergency planning concerns. The record of the NNPP's environmental and radiological performance at the operating bases and shipyards presently used by nuclear-powered warships demonstrates the continued effectiveness of this management philosophy. This effectiveness is demonstrated by the fact that Naval reactors have accumulated over 4,900 reactor years of operation without a reactor accident or any other problem having a significant effect on the environment. It further demonstrates that application of the environmental practices that are standard throughout the NNPP would assure the absence of any adverse radiological environmental effect at any home port site.

8.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The Navy's preferred action is to homeport two additional (for a total of three) CVNs at NASNI and homeport two CVNs in the Pacific Northwest (either one at PSNS and one at NAVSTA Everett, or two CVNs at PSNS). No CVN would be located at PHNSY. The irreversible and irretrievable commitment of resources resulting from this proposed action is discussed below

8.1 PROPOSED ACTION AT NASNI

The proposed homeporting of two NIMITZ-class aircraft carriers at NASNI and related dredging operations would result in the replacement of the existing Pier J/K with a new pier, relocation of a ferry/flag landing, and electrical upgrades. Intertidal and shallow subtidal habitat that supports eelgrass would be permanently replaced by the fill area. A mitigation program to replace the lost habitat is proposed as part of the proposed action. The proposed action would result in the consumptive use of certain nonrenewable energy resources required to operate dredge support systems, barges, tugs, trucks, pumps, and equipment as well as energy expended during the construction and operation of support facilities. There would also be a commitment of time and money to accomplish the disposal of dredged material and construction of associated facilities. Both time and money would be spent in the planning, testing, permitting, and performing of the preferred alternative. The dredged material disposed as backfill for construction of a new pier at the in-bay disposal site at NAB to create shallow water habitat, at the LA-5 designated ocean disposal site, or used to enhance endangered bird habitat at NASNI would be irreversibly and irretrievably committed to the disposal process.

8.2 PROPOSED ACTION AT PSNS

The proposed dredging and pier construction in support of the existing home port of a NIMITZ-class carrier would result in the permanent replacement of the existing Pier D. The proposed action would result in the consumptive use of certain nonrenewable energy resources required to operate dredge support systems, barges, tugs, trucks, pumps, and equipment as well as energy expanded during the construction and operation of support facilities. There would also be a commitment of time and money to accomplish the disposal of dredged material and construction of associated facilities. Both time and money would be spent in the planning, testing, permitting, and performing of the preferred alternative. The dredged material suitable for disposal would be disposed of at either a designated PSDDA disposal site in Elliott Bay near Seattle or contained in a nearshore disposal site (a confined disposal facility or confined aquatic disposal site) as landfill material and would be irreversibly and irretrievably committed to the disposal process. Disposal of the sediment not suitable for ocean disposal in an upland landfill or CDF/CAD would be irreversible and irretrievably committed to that area. Supporting a second NIMITZ-class aircraft carrier would not require any additional dredging and would require the same quantities of energy, time, and money needed to support one NIMITZ-class aircraft carrier.

8.3 PROPOSED ACTION AT NAVSTA EVERETT

If a NIMITZ-class aircraft carrier continues to be homeported at NAVSTA Everett, no additional dredging would be required at the CVN home port berth (Alternative Two).

If the CVN were removed and AOEs were moved from PSNS, however, additional dredging and utility connections would be required at the North Wharf to support the FFGs relocated from the west side of Pier A (Alternative One). In this case, the proposed action would result in the consumptive use of certain nonrenewable energy resources required to operate dredge support systems, barges, tugs, trucks, pumps, and equipment as well as energy expanded during the construction and operation of support facilities. There would also be a commitment of time and money to accomplish the disposal of dredged material and construction of associated facilities. Both time and money would be spent in the planning, testing, permitting, and performing of the preferred alternative. The dredged material would be disposed of at the designated Port Gardner PSDDA open-water disposal site, 2.2 miles west of NAVSTA Everett. The dredged material disposed would be irreversibly and irretrievably committed to the disposal process.

8.4 PROPOSED ACTION AT PHNSY

Under the proposed action, no CVN would be homeported at PHNSY. No dredging or facility development would occur. Therefore, no irreversible or irretrievable commitment of resources would result.

9.0 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The Navy's mission is to maintain and operate facilities and provide services and material to support operations of aviation activities, units of the operating forces of the Navy, and other activities and units designated by the CNO. The short-term uses of the environment related to the proposed action would increase the overall operational efficiency of NASNI, PSNS, and NAVSTA Everett if they are selected as a home port site for one or more of the NIMITZ-class aircraft carriers. The operational efficiency of PHNSY would remain unchanged. The long-term environmental consequences of the proposed action on a local level would be minimal.

If NASNI were selected as a home port for an additional CVN (for a total of two CVNs), dredging operations there would provide required berth water depths that would support the Navy's mission. The long-term productivity of NASNI would increase as a result of the proposed action and related dredging activities. No additional dredging would be required to home port a second additional CVN (for a total of three CVNs), and required minimal additional utility improvements would represent only minor short-term uses of the environment (construction noise, traffic, air quality impacts). The long-term productivity of the San Diego Bay has suffered as a result of historical dredged material disposal and projects that have in-filled wetland and estuarine areas. The proposed action would not contribute to a further degradation of the productivity of the bay because it would include measures to protect fish and wildlife habitat areas from potential adverse effects of construction, dredging, and dredged material disposal activities, and create mitigation eelgrass habitat. Therefore, the long-term environmental consequences would be minimal.

Dredging at PSNS is needed for the adequate support of the existing CVN homeported there, and would support the Navy's mission by enhancing the productivity of shipyard maintenance. No additional dredging would be required to home port a second CVN, and additional utility improvements for a second CVN would represent only minor short-term uses of the environment (construction noise, traffic, air quality impacts). The proposed action may affect Sinclair Inlet adjacent to PSNS. The dredging effects would be short term. However, this action would not degrade the long-term productivity of the Sinclair Inlet because it would include measures to protect fish and wildlife habitat areas from potential adverse effects of construction, dredging, and dredged material disposal activities, and create mitigation eelgrass habitat.

The continued presence of a CVN at NAVSTA Everett would require conducting PIA maintenance at PSNS. The transportation of approximately 900 crew by bus and ferry from NAVSTA Everett to PSNS during the 6-month PIA maintenance period every 2 years would result in periodic short-term impacts on ground transportation, vessel transportation, and air quality. The short-term uses of the environment related to this proposed action and long-term environmental consequences of the proposed action on a local level would be minimal.

No improvements would occur at PHNSY under the proposed action. Therefore, no short-term use of the environment and no long-term consequences on a local level would result.

10.0 GROWTH INDUCEMENT

Growth-inducing impacts are actions or circumstances that produce growth in excess of projections by local jurisdictions or regional associations of governments. Growth-inducing impacts are generally related to the availability of public services, the potential for increased development densities, and increased development pressures on adjacent properties. The extension of public facilities through an area lacking those facilities could encourage development between the newly served area and the community providing the service. These extensions of public facilities would include roads, sewer trunk lines, water transmission lines, etc. These public facilities would have an additional capacity to serve new development or they can eliminate an impediment to growth. Development of property for residential uses could raise the value of surrounding undeveloped land and increase economic pressures on those property owners to convert their land to a more intensive land use.

For this EIS, the potential economic growth associated with those alternative components that would produce a net future increase in employment would be less than significant, except at NAVSTA Everett for the one Additional CVN (Alternative Four) and at PHNSY with one CVN (Alternatives Three and Five). The preferred CVN homeporting alternative (Alternative Two) would not result in this growth inducement potential.

Utility upgrades needed to support homeporting facility and infrastructure requirements would not remove a constraint on surrounding undeveloped areas at any of the locations for any of the alternatives. The expansion of utilities to serve the proposed action would not require extension of public utilities in undeveloped areas and would not allow for the possibility of major land expansion because the areas surrounding NASNI, PSNS, NAVSTA Everett, and PHNSY are already developed areas.

In conclusion, there would be no growth-inducing impacts associated with implementation of the Preferred Alternative (Alternative Two). There would be growth-inducing impacts associated with the implementation of Alternative Four at NAVSTA Everett with two CVNs and at PHNSY if either Alternative Three or Five is selected.

1 **Homeport Capacity Alternatives for CVNs and AOEs within the U.S. Pacific Fleet**

	CAPACITY ALTERNATIVES (NUMBERS OF SHIPS)					
	One	*Two*	*Three*	*Four*	*Five*	*Six (No Action)*
Home Port Locations						
NASNI	3	3	3	2	1	2
PSNS	2	$1_{(4)}$	$1_{(4)}$	$1_{(4)}$	$2_{(2)}$	$2_{(4)}$
NAVSTA Everett	$0_{(4)}$	1	0	2	$1_{(2)}$	1
PHNSY	0	0	1	0	1	0

Alternative One	
NASNI	Facilities for Two Additional CVNs: Capacity for Total of Three CVNs
PSNS	Facilities for One Additional CVN and Relocation of Four AOEs: Capacity for Total of Two CVNs
NAVSTA Everett	Facilities for Removal of Existing CVN and Addition of Four AOEs: Capacity for No CVNs
PHNSY	Facilities for No CVN: No Change
Alternative Two	
NASNI	Facilities for Two Additional CVNs: Capacity for Total of Three CVNs
PSNS	Facilities for No Additional CVN: No Change — Capacity for Total of One CVN
NAVSTA Everett	Facilities for No Additional CVN: No Change — Capacity for Total of One CVN
PHNSY	Facilities for No CVN: No Change
Alternative Three	
NASNI	Facilities for Two Additional CVNs: Capacity for Total of Three CVNs
PSNS	Facilities for No Additional CVN: No Change — Capacity for Total of One CVN
NAVSTA Everett	Facilities for Removal of Existing CVN: Capacity for Total of No CVNs
PHNSY	Facilities for One CVN: Capacity for Total of One CVN
Alternative Four	
NASNI	Facilities for One Additional CVN: Capacity for Total of Two CVNs
PSNS	Facilities for No Additional CVN: No Change — Capacity for Total of One CVN
NAVSTA Everett	Facilities for One Additional CVN: Capacity for Total of Two CVNs
PHNSY	Facilities for No CVN: No Change
Alternative Five	
NASNI	Facilities for No Additional CVN: Capacity for Total of One CVN
PSNS	Facilities for One Additional CVN and Relocation of Two AOEs: Capacity for Total of Two CVNs
NAVSTA Everett	Facilities for No Additional CVN and Addition of Two AOEs: Capacity for Total of One CVN
PHNSY	Facilities for One CVN: Capacity for Total of One CVN
Alternative Six	**(No Action Alternative)**
NASNI	No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs
PSNS	No Additional Facilities for One Additional CVN: No Additional Capacity for Total of Two CVNs
NAVSTA Everett	No Additional CVN: No Change —Total of One CVN
PHNSY	No CVN: No Change

Notes: Numbers given are total number of CVNs for which capacity would be available at a site. NASNI and PSNS each have one CVN assigned and they are not addressed by this EIS action.
(2) — Location of Two AOEs
(4)— Location of four AOEs