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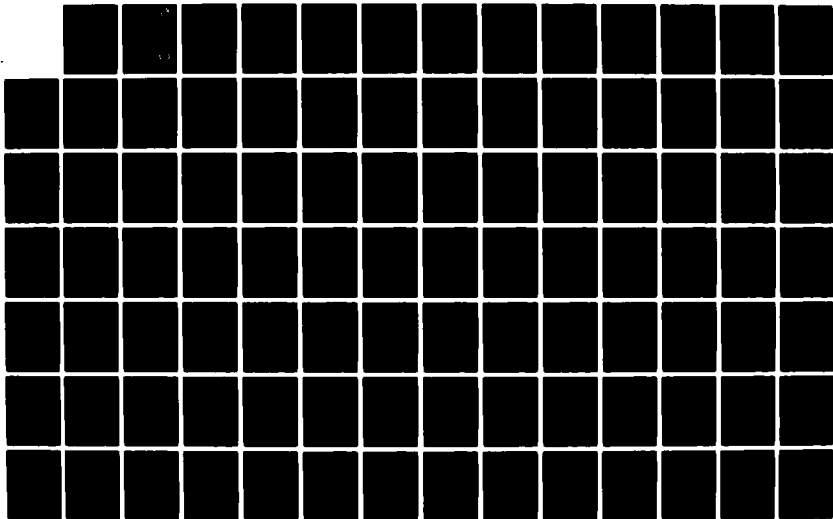
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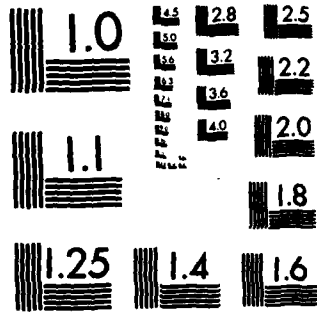
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FINAL ENVIRONMENTAL STATEMENT

LOS ANGELES-LONG BEACH HARBORS
Los Angeles County, California

DTIC FILE COPY

Office of the Chief of Engineers
Department of the Army
Washington, D.C. 20314

October 1974

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|--|---|--|
| 1. REPORT NUMBER | 2. GOVT ACCESSION NO. AD A136 716 | 3. RECIPIENT'S CATALOG NUMBER |
| 4. TITLE (and Subtitle) FINAL ENVIRONMENTAL STATEMENT LOS ANGELES- LONG BEACH HARBORS LOS ANGELES COUNTY, CALIFORNIA | | 5. TYPE OF REPORT & PERIOD COVERED |
| 7. AUTHOR(s) Office of the Chief of Engineers Department of the Army Washington, DC 20314 | | 6. PERFORMING ORG. REPORT NUMBER |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Corps of Engineers Los Angeles District P.O. Box 2711, Los Angeles, CA 90053 | | 8. CONTRACT OR GRANT NUMBER(s) |
| 11. CONTROLLING OFFICE NAME AND ADDRESS US Army Corps of Engineers Los Angeles District P.O. Box 2711, Los Angeles, CA 90053 | | 10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS |
| 14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) | | 12. REPORT DATE October 1974 |
| | | 13. NUMBER OF PAGES |
| | | 15. SECURITY CLASS. (of this report) UNCLASSIFIED |
| | | 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE |
| 16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited. | | |
| 17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) | | |
| 18. SUPPLEMENTARY NOTES Copies are obtainable from the National Technical Information Services, Springfield, VA 22151 | | |
| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number) | | |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The Los Angeles and Long Beach Harbors constitute a single geographic entity, politically divided into jurisdictions governed by the Cities of Los Angeles and Long Beach, California. The two harbors occupy a part of San Pedro Bay and adjacent land areas that form the western margin of the City of Long Beach and the southern margin of the City of Los Angeles. This report presents (a) an environmental inventory of the harbor area, and (b) a prediction of the impacts of the envir- onment that will result from dredging several ship channels and | | |

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FINAL ENVIRONMENTAL STATEMENT

LOS ANGELES-LONG BEACH HARBORS
Los Angeles County, California

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Office of the Chief of Engineers
Department of the Army
Washington, D.C. 20314

October 1974



LOS ANGELES-LONG BEACH HARBORS
LOS ANGELES COUNTY, CALIFORNIA

() Draft (X) Final Environmental Statement

RESPONSIBLE OFFICE: U.S. Army Engineer District, Los Angeles, Calif.

1. NAME OF ACTION: () Administrative (X) Legislative

2. DESCRIPTION OF ACTION: Deepen areas in the Los Angeles part of Los Angeles-Long Beach Harbors and use the fill to create new lands for terminals. The Federal part of the proposed project involves the deepening of existing Federal project channels and turning basins to the proposed project depths and deposition of the dredged sediments in areas provided and diked by local interests. The overall project would involve excavation exterior to the existing Federal project boundaries, diking of the margins of landfill areas, and improvement of the newly created lands by local interests.

3a. ENVIRONMENTAL IMPACTS: The most important environmental impacts include: (1) a wide range of socio-economic impacts resulting from expected increases in trade and accompanying primary and secondary effects on employment; (2) a reduction in the number of commercial vessels using the harbor due to the expected use of larger ships and a corollary reduction in the discharge of pollutants into the harbor waters; (3) increased availability in the harbor of docking and loading facilities, which should alleviate some of the pressure for general cargo facilities elsewhere along the California coastline; (4) destruction of parts of the harbor bottom habitat by dredging and landfill; and (5) the loss of open harbor space to the proposed landfill.

3b. ADVERSE ENVIRONMENTAL EFFECTS: The more important adverse impacts include: (1) the loss of marine habitats (including a part of the present catch areas for a large part of the southern California live bait anchovy fishery), (2) the possible dispersion of pollutants from the sediments dredged, and (3) a slight reduction in the rates of tidal flushing in certain parts of the outer harbor.

4a. ALTERNATIVES TO RECOMMENDED DREDGING: (1) Nonstructural - "No Action", (2) Structural - dredge the channels and turning basins shallower than proposed; dredge as smaller area than proposed.

4b. ALTERNATIVES TO RECOMMENDED USE OF DREDGE SPOILS: (All structural alternatives), (1) dispose of dredged sediments in open sea, (2) dispose of dredged sediments on landside dumping areas, and (3) combinations of land and sea disposal.

5a. COMMENTS RECEIVED (Field Level Review):

Bureau of Reclamation, USDI,
Southern California Planning Office
Bureau of Reclamation, USDI,
Regional Office, Region 3
Bureau of Outdoor Recreation, USDI,
Pacific Southwest Regional Office
Geological Survey, USDI,
Water Resources Division

National Park Service, USDI
Geological Survey, USDI
Bureau of Sport Fisheries
and Wildlife, USDI
Agricultural Research Service, USDA
Soil Conservation Service, USDA
Federal Aviation Administration, USDT
Federal Highway Administration, USDT

National Oceanic and Atmospheric
Administration, USDC
The Assistant Secretary of
Commerce, USDC
Defense Supply Agency, USDD
Commandant, Eleventh Naval
District, USN
Western Division Naval Facilities
Engineering Command, USN
Environmental Protection Agency
Eleventh Coast Guard District, USCG
Secretary for Resources and
Development, State of California
Division of Highways, State of California
Department of Small Craft Harbors,
County of Los Angeles

Regional Planning Commission,
County of Los Angeles
Los Angeles County Flood
Control District
Dept. of City Planning,
City of Los Angeles
Dept. of Public Works,
City of Los Angeles
Dept. of Water and Power,
City of Los Angeles
Port of Los Angeles
California Regional Water Quality
Control Board, Los Angeles Region
Metropolitan Water District of
Southern California
Pomona Valley Audubon Society

5b. COMMENTS RECEIVED (Departmental Review):

Department of Commerce
Department of Health, Education, and Welfare
Department of Housing and Urban
Development

Department of the Interior
Department of Transportation
Environmental Protection Agency
State of California

6. Draft statement to CEO 19 July 1973.
Final statement to CEO _____.

**FINAL
ENVIRONMENTAL STATEMENT
LOS ANGELES-LONG BEACH HARBORS, CALIFORNIA**

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1. PROJECT DESCRIPTION

1.1 The Los Angeles and Long Beach Harbors constitute a single geographic entity, politically divided into jurisdictions governed by the Cities of Los Angeles and Long Beach, California. The two harbors occupy a part of San Pedro Bay and adjacent land areas that form the western margin of the City of Long Beach and the southern margin of the City of Los Angeles. This report presents (a) an environmental inventory of the harbor area, and (b) a prediction of the impacts on the environment that will result from dredging several ship channels and turning basins within Los Angeles Harbor and deposition of the dredged sediments in designated areas to create new waterfront lands.

1.2 Plans have been made by the Corps of Engineers to construct a physical model of the harbor to determine as precisely as possible the changes in wave propagation and water circulation that would be induced by the proposed project. If the model should indicate that serious consequences would result, the plans for the project could be altered. The proposed Federal project considered here includes dredging ship channels and turning basins in Los Angeles Harbor and deposition of the dredged material in those parts of the harbor where new land areas are planned (fig. 1). The Corps of Engineers plan to dredge the main entrance channel and much of the inner harbor to a depth of 45 feet below mean lower low water (MLLW). Local interests would provide the diking required to retain dredged sediments. The project involves only Los Angeles Harbor and does not involve Long Beach Harbor in any way. The plans for the proposed project have not been finalized, but the recommended dimensions of waterways are as follows:

| | Project Dimensions | | |
|------------------------------|--------------------|--------------------------|-------------------------|
| | Width (Feet) | Length (Feet) MLLW | Depth (Feet) MLLW |
| LOS ANGELES HARBOR | | | |
| Entrance channel | 1,000 | 5,500 | 45 |
| Los Angeles Channel | 750 | 12,500 | 45 |
| Turning basin (inner harbor) | 1,350 | 1,650 | 45 |
| East basin channel | 350 | 6,000 | 45 |
| West Basin | 350-1,350 | 3,800 | 45 |
| East Basin | 350-1,350 | | 45 |

1.3 Investigation of the Los Angeles-Long Beach Harbors area with a view toward determining the need for navigation improvements was authorized by:

a. Resolutions adopted by the Senate Committee on Public Works dated 28 July 1956 and 11 May 1967;

b. Two Committee Resolutions adopted by the House of Representatives on 27 June 1956; and

c. The Public Works Appropriations Act of 1965.

1.4 Deeper channels and basins are needed in Los Angeles Harbors to permit use of the port by larger general cargo bulk and container vessels now being built. Also, newly created lands are needed for modernized facilities for rapid handling of container cargos, dry and liquid bulk cargos, and imported energy sources. The use of deeper draft vessels and automated loading systems will substantially reduce unit costs for transported general cargos (refs. 1 and 2).

1.5 The proposed Federal project will require dredging of about 10,000,000 cubic yards, at an estimated cost of \$7.5 million. The dredged material obtained from the channels will provide about 187 acres of landfill; this will reduce the present harbor water area by about 1.0 percent. The benefit cost ratio for the proposed Federal project has been determined to be about 10.4:1. The total cost to all agencies for the completion of the proposed project, including dredging and planned landfill and landside facilities, is estimated to range from \$100 million to \$150 million (ref. 1).

1.6 The proposed project is concerned solely with meeting the immediate needs for improvement of Los Angeles Harbor. Further investigation of the Los Angeles-Long Beach Harbors area is authorized. These investigations are on-going at the present time, and will determine if there is a need for and a Federal interest in future navigation improvements. The authorized investigations of future needs will not be completed for several years; and the results of these investigations cannot be predicted at this time. The presently proposed project is not dependent upon nor contributory to further navigation development in the Los Angeles-Long Beach Harbors area.

2. ENVIRONMENTAL SETTING WITHOUT THE PROJECT

2.1 Los Angeles and Long Beach Harbors are manmade facilities produced by the construction of three rock breakwaters (the San Pedro breakwater, the Middle breakwater, and the Long Beach breakwater) in San Pedro Bay. These breakwaters have a combined length of nearly 43,000 feet and generally lie 1-1/2 to 3 miles offshore (ref. 1). Other harbor improvements have included dredging of channels through a coastal salt marsh (once the estuary of the Los Angeles River), filling of adjacent marshland areas, and both dredging and filling of the sea floor between the breakwaters and the original shoreline. The water area of the harbors occupies about 14,000 acres (fig. 2). Ships enter the harbors through two 600-to 700-yard-wide entrances between the breakwaters and through a mile-wide opening at the east end of the breakwaters. The breakwaters provide adequate protection for anchored and docked vessels, even during the most severe weather.

2.2 A report by the Los Angeles Regional Water Quality Control Board (LAR-WQCB) states that about 1,200 acres of marshland have been dredged in the past to create the inner harbors, which consist of a number of channels and basins located to the west, north, and east of Terminal Island (ref. 3). The outer harbors, which lie between the breakwater and Terminal Island, occupy an area of San Pedro Bay that was once open ocean.

2.3 The harbors are in two political divisions--the City of Los Angeles and the City of Long Beach. Considerable areas are occupied by Navy Department facilities, which include the Los Angeles Naval Base, the Long Beach Naval Station, the Long Beach Naval Shipyard, and the Long Beach Naval Supply Center-- all located on Terminal Island. The Los Angeles and Long Beach Harbors each accommodate major world ports for foreign and domestic traffic. In 1968 these two ports handled a combined trade carried by 5,800 ships, and exceeding 37 million tons, from which \$222,433,587 were collected in U.S. Customs (ref. 1 and U.S. District Collector of Customs).

2.4 CLIMATE. The area is characterized by a subtropic Mediterranean-type climate. The seasonal rainfall averages 13 inches per year. Precipitation occurs predominantly from November through April. Daytime sea breezes commonly blow from the southwest with speeds not exceeding 6 knots; during summer afternoons, however, velocities sometimes reach 15 to 20 knots (ref. 4). Fogs occur throughout the year and are most frequent at night. Clearing usually takes place by 9 a.m., although according to the U.S. Coast and Geodetic Survey (USC&GS), thick fogs may occasionally persist in the inner channel for several days (ref. 4).

2.5 BATHYMETRY. The breakwaters, which form the southern boundary of the harbors, were originally constructed approximately along the 50-foot (MLLW) contour. Thus, all depths in the harbors were initially less than 50 feet. Originally, the bottom shoaled gradually from the breakwaters northward toward the shore. Since harbor construction began in 1871, much of the bottom has been modified by:

- a. The dredging of ship channels and turning basins,
- b. The construction of four 10-acre petroleum production islands in the eastern part of the outer harbor,
- c. Dredging to obtain fill for new waterfront areas, and
- d. Subsidence caused by the extraction of petroleum from the Wilmington Oil Field.

At present the maximum MLLW depths in the outer harbors are about 51 feet in the Los Angeles part and 70 to 85 feet in the Long Beach part. Charts prepared by the USC&GS and other agencies show that only very small areas in the harbor have depths less than 18 feet (ref. 5).

2.6 FRESH WATER HYDROLOGY. The principal drainage into the harbor area comes from: (a) the Los Angeles River, which drains an 832-square-mile basin, and (b) Dominguez Channel, an 8.5-mile-long structure, which collects runoff from an 80-square-mile area west of the Los Angeles River basin (ref. 3). The Los Angeles River watershed is controlled by several dams and an improved river channel with a design capacity of 146,000 cubic feet per second. The maximum rate of discharge was 110,000 cfs, recorded on 25 January 1969 on a gage located at the mouth of the Los Angeles River and operated by the U.S. Army Engineer District, Los Angeles. During recent years large volumes of the sediments deposited at the mouth of the Los Angeles River have been used by the City of Long Beach for landfill projects in the outer harbor.

2.7 The Dominguez Channel does not contribute significant amounts of sediment to the harbor because about half of its upstream length is concrete lined and its downstream half is tidal. The area that it drains is largely urbanized (ref. 3). Most of the 16,000-acre-foot average annual runoff (excluding aqueous waste discharges) that passes through the channel occurs during relatively short intermittent periods during the winter months. For many years the wastes dumped into the Dominguez Channel were a major cause of harbor pollution. The effects of this pollution and the success of efforts to reduce it are discussed in a subsequent section of this report.

2.8 GEOLOGY. The Los Angeles-Long Beach Harbor is located at the southern edge of the Los Angeles Basin, in San Pedro Bay. The Palos Verdes Hills form a continuous uplift at the western border of the harbor and the sediments of the coastal plain sloping gently seaward from Los Angeles form the northern and eastern borders respectively. The Palos Verdes Hills have a width of 4 to 5 miles and a maximum length of 9.5 miles. The west and south coasts of these hills are bordered by a sea cliff with a height of 100 to 150 feet. The sea cliff along the east coast at the City of San Pedro has a height of 50 feet. The rock types encountered in these hills are Tertiary sediments and pre-Tertiary igneous basement rock. The sediments outcrop at random in the western portion of the Los Angeles Harbor, near San Pedro. The central and eastern portions of the harbor are underlain by (1) a veneer of Recent sediments overlying (2) Tertiary marine sediments which lie on (3) pre-Tertiary igneous basement rock. The Recent sediments are described as silts, sands and clays. The Tertiary rocks are described as sandstones, shales and siltstones. The pre-Tertiary basement rock is schist, and underlies both the Palos Verdes Hills and the harbor.

2.9 Excavation in the inner harbors has exposed extensive bottom areas covered with clay, silt, and sand. During the last 50 years the deposition of silt and clay, together with a variety of wastes discharged into the harbor, has created a layer of organic mud or sludge which covers considerable parts of the harbor floor (ref. 9). In 1954 this layer ranged up to 8 feet in thickness (fig. 3). Additional information on the texture and content of pollutants in the harbor sediments is given in a following section. Almost all of the sediment which enters the improved Los Angeles River channel is discharged at the mouth of the river into the eastern half of the Long Beach outer harbor. The silts and clays may be partially dispersed throughout the harbor by tidal currents. However, the sands transported by the flood waters are deposited very close to the river mouth. Prior to the construction of the breakwater, this alluvial load was carried away by wave-induced littoral currents. The cost of removal is now being borne by the City of Long Beach (ref. 10).

2.10 SEISMICITY. The Los Angeles-Long Beach Harbor is in an area of high seismicity. During historic time numerous earthquakes have occurred on the major faults in southern California. In 1952 an earthquake with magnitude 7.7 occurred on the White Wolf fault in Kern County. In 1933, a magnitude 6.3 earthquake centered several miles off the coast of Newport Beach on the Newport-Inglewood fault, caused \$50 million damage to structures with damage heaviest in the City of Long Beach and resulted in the loss of 120 lives (ref. 7). Other major faults on which significant earthquakes have occurred include the San Andreas, San Jacinto, Whittier-Elsinore, and San Fernando-Sierra Madre faults. As many as 13 earthquakes with magnitude ranging from 6.0 to 7.7 have occurred within 100 miles of the project area. The Palos Verde fault zone extends through the project area and the Cabrillo fault passes approximately 2 miles seaward of the project. Both of these would be considered minor faults. Surface rupture has occurred in several areas of southern California, the most recent occurring during the 1971 San Fernando earthquake. The deformations which accompany earthquakes are integral parts of an established regional pattern of tectonic deformation. It is estimated that the maximum earthquake that could be expected to occur nearest the site would be located on the Newport-Inglewood fault which lies approximately 6 miles to the northeast of the site. This earthquake would be expected to have a Richter magnitude of 7.0 and would be accompanied by ground motions having an estimated peak rock acceleration of $0.5g$. As reported by Knuppel (ref. 47), the Long Beach earthquake of March 10, 1933 is the largest earthquake to effect the harbor complex within historic time. The Richter magnitude was 6.3, and the epicenter was located off Newport Beach approximately 3 to 4 miles southwest of the surface trace of the Newport-Inglewood Fault. Rupture did not extend to the surface, however, subsurface movement of the fault is estimated to have extended from Newport Beach to Signal Hill. The maximum Modified

Mercalli intensity for this earthquake was IX at locations exhibiting poor soil conditions such as Long Beach and Compton. The Los Angeles Harbor probably exhibited similar intensities ranging from VII to IX depending on the soil conditions. Horizontal and vertical accelerations were measured at several locations, at various distances from the epicenter, on rock and deep alluvium. A summary of the peak surface accelerations is presented in the following table. The horizontal accelerations for the Long Beach area were not accurately established but the peak values have been estimated, from the Long Beach Public Utilities Building record, to be 0.23_g on deep alluvium. Evidence which indicates that higher horizontal accelerations may have occurred is the well documented peak vertical acceleration, at the above site, of 0.25_g. It should be noted that horizontal accelerations are often of the order of about 50 percent greater than vertical accelerations.

Recorded Surface Accelerations for the
Long Beach Earthquake

| Location | Site geology | Distance to nearest point of fault movement (miles) | Distance to the epicenter (miles) | Peak horizontal acceleration (g) | Peak vertical acceleration (g) |
|-------------|---------------|---|-----------------------------------|----------------------------------|--------------------------------|
| Long Beach | Deep alluvium | 3 | 17 | 0.23 | 0.25 |
| Vernon | Deep alluvium | 16 | 33 | 0.15 | 0.05 |
| Los Angeles | Rock | 20 | 37 | 0.06 | 0.02 |

Written accounts of the Long Beach earthquake indicate that liquefaction occurred at various locations in the Los Angeles basin, particularly west of Santa Ana and north and northwest of Newport Beach and Huntington Beach. The Compton area also exhibited this effect. However, there are no available records from the harbor area of any extensive damage or loss of life. The San Pedro area was reported to have suffered damage. cursory examination of a hydraulic fill (Pier A) under construction at Long Beach Harbor was made by the resident engineer soon after the earthquake and indicated lowering of the grade by a negligible amount. (The fill included a 32-foot hydraulic fill retained by steel and wooden bulkheads and a rock breakwater in water about 20 feet deep.)

2.11 GROUND WATER. The shallow aquifers in the harbor area have been, in the past, a source of potable water. However, saltwater intrusion has already contaminated these shallow aquifers. The saltwater intrusion problems may be caused by adverse head conditions combined with a source of seawater. The proposed project will not have any significant effect on the saltwater intrusion of the aquifers in areas near the harbor. The water quality in these aquifers is dependent upon the rates of recharge and extraction (natural and otherwise). The Dominguez Gap Barrier Project, operated by the Los Angeles County Flood Control District, has been constructed in the project area and is operated as a freshwater injection system to halt saltwater intrusion. This system began operation in the spring of 1971; it is not yet known if the present system is adequate to stop further intrusion.

2.12 MINERAL RESOURCES. The Department of Oil Properties of the City of Long Beach believes that the Wilmington Oil Field is the number one producing oil field in the United States, yielding over 230,000 barrels per day. During the past 14 years the State of California received revenue exceeding \$319 million from that part of the field that lies within the City of Long Beach.

2.13 Extensive oil production from the Wilmington Oil Field has resulted in the subsidence of the land surface in the harbor area. Since oil production began in 1928, the eastern end of Terminal Island has subsided as much as 29 feet. Subsidence of 2 feet or more has taken place over an elongated area more than 6 miles long and 3 miles wide. The depressed zone includes extensive water areas in both the inner and outer harbors. Some of the bottom areas at the east end of the inner harbor have subsided as much as 28 feet. A \$30 million water pumping program designed to replace the oil removed has virtually terminated the subsidence throughout the area (ref. 6).

2.14 OCEANOGRAPHY. The breakwaters protect most of the harbor from high-energy waves which are sometimes encountered in San Pedro Bay. Winter storm waves and high summer swells are largely reflected or dissipated by the breakwaters, but some energy from 10- to 20-second waves does pass through the harbor entrance and the porous rock structures. Very small waves and wind chop with periods of 1 to 3 seconds are occasionally generated in the harbor by strong local winds. Corps of Engineers personnel and engineers from Science Engineering Associates have observed the occurrence of infrequent, low, long-period (0.5 to 45 minute) waves which generate seiche or surge which, in turn, causes alternating currents that hamper loading operations and damage ships and wharfs (refs. 2 and 11). Harbor pilots advise taut lines to reduce the effect of surge.

2.15 The tides in the harbor are the mixed type, with the higher high always preceding the lower low. The USC&GS reports that the mean range is 3.8 feet, and the diurnal range is 5.5 feet; the maximum range is about 10.2 feet (refs. 4 and 12). Mean lower low water, the tidal datum plane, is 2.7 feet below mean sea level. Tidal currents play an important role in flushing the harbors (fig. 4). In the absence of these currents the effects of waste discharge into the harbor would be greatly magnified and the variety of life forms that could survive would be severely restricted.

2.16 The tidal prism is the volume of water between two designated tidal levels which may be contained in any area or segment of a harbor. The rate and effectiveness of the flushing is partially dependent upon the ratio of the prism volume to the volume of water below the tidal prism within the segment considered. In general, high rates of flushing occur where tidal ranges are high and depths are small. Conversely, lower rates of flushing are expected where ranges are low or where depths are great, relative to the tidal excursion. The LAR-WQCB estimated that the daily exchanges induced by tidal action in the Los Angeles and Long Beach portions of the inner harbor are 22 percent and 17 percent, respectively, of the total water volume (ref. 3). If the average depth of the outer harbors is assumed to be 38 feet, then the average exchange rate per tidal cycle (12-1/2 hours) is about 10 percent of the total volume of the outer harbor. The USC&GS states that the tidal currents follow the axes of the channels and rarely exceed one knot (ref. 4).

2.17 Average monthly sea surface temperatures range from a minimum of about 55 degrees Fahrenheit in the winter to a maximum of 68 degrees to 72 degrees Fahrenheit in the summer, except in the vicinity of thermal discharges, where surface temperatures may be higher (ref. 3). A definite vertical gradient frequently develops in the less turbulent harbor areas; bottom temperatures are often several degrees below surface values. Salinities are similar to those found in the nearby open ocean during most of the year (33.5 to 34.5 parts/thousand).

2.18 According to the LAR-WQCB and other concerned agencies the dissolved oxygen concentrations in the outer harbor usually range from 3 to 12 milligrams per liter (mg/l) on the surface, and in the Los Angeles inner harbor values are usually higher than 4.0 mg/l.

Values of 2.0 mg/l are infrequently found and appear to be associated with red tide and similar occurrences of micro-organisms. Prior to the substantial cleanup efforts, which began several years ago, zero oxygen values commonly occurred throughout the water column in the Inner Harbor (see fig. 5).

2.19 The concentration of fine particles in harbor waters is a useful indicator of water quality. High concentrations of suspended particles may be caused by (a) discharged wastes, (b) the stirring of bottom sediments, or (c) phytoplankton blooms (the rapid growth and multiplication of microscopic one-celled plants). The oxidation of suspended particles and decomposing plankton, as well as the metabolism of dense concentrations of living plankton, may result in the depletion of dissolved oxygen necessary for the support of marine animal life. Growing plants provide food for marine animals and give off oxygen into the water. Turbid waters prevent the passage of sunlight necessary for the growth of those marine plants located below the surface. Although turbidity is not necessarily the opposite of transparency, high turbidity in sea water usually causes low transparency. Measurements during the last 19 years indicate low transparency in the inner harbor and somewhat more transparent waters in the outer harbors (fig. 6 and ref. 13). Recent observations indicate that the transparency of the harbor waters has substantially increased during the last 2 years (fig. 11) (refs. 14 and 15). This statement is largely based on personal observations made by divers, yachtsmen, port personnel, and water quality engineers (ref. 15). Example of the changes, which have been measured in dissolved oxygen concentrations and transparency, are illustrated in figures 7 and 8.

2.20 WATER POLLUTION. During the last 3 or 4 decades the pollution of the harbor waters has had an impact greater than any other factor on the ecology of marine organisms inhabiting the harbor. For this reason, the history of the disposal of wastes into the harbor is considered here in detail. According to the LAR-WQCB, complaints of pollution of the harbor waters were first recorded in 1926; by 1940 it became apparent that the polluted waters posed a real hazard to health. In 1947, the corrosion and paint damage to ships and pleasure craft caused by the polluted waters exceeded \$2 million per year. Pollution was primarily traced to the direct disposal of sewage and industrial wastes into harbor waters, but a number of other waste sources also contributed to the deterioration in water quality (ref. 3).

2.21 As a result of the waste discharges, a thick layer of sludge accumulated on the floor of the inner harbors, particularly in Los Angeles Harbor. The decay of organic matter absorbed all the oxygen in these sediments and the overlying waters within the inner harbor (fig. 5). Substantial quantities of obnoxious hydrogen sulfide gas were generated in the deposits accumulated on the harbor floor. The depletion of the dissolved oxygen resulted in the elimination of most forms of life from the affected areas in the harbor (refs. 3 and 9). Pollutants in the harbor waters often caused fish kills.

2.22 In 1967 about 7,000 barrels of oil were spilled into the harbor during 250 accidents that resulted from ship loading operations. Another 3,000 barrels of oil entered the harbor with discharged oil field brines, (by-products of some producing oil wells) (ref. 3). At present the discharge of these brines is being discouraged by the LAR-WQCB. Although the occurrence of oil in the harbor waters has an adverse impact on marine life, the impact of the oils presently entering the harbor waters is believed to be much less than that resulting from the discharge of other pollutants. The control of oil spills in navigable waters is the responsibility of the U.S. Coast Guard (ref. 16). The Coast Guard reports that oil spills from 1962 to 1969 totalled 13,042 barrels, with one spill being 4,500 barrels.

2.23 As a result of complaints by various parties and an increasing recognition by pertinent government agencies of the beneficial values of maintaining high water quality, efforts were made to correct the harbor pollution situation. Most municipal sewage has been diverted to treatment plants and outfalls that discharge elsewhere, and the release of industrial and other wastes into the harbors has been greatly reduced. Some primary-treated sewage effluent is still being discharged from the Terminal Island outfall into the outer harbor. Because of the reduction of waste discharged into the harbor during the last few years, the quality of the harbor waters has greatly improved. Only moderate dissolved-oxygen concentrations are now found in all harbor waters and the generation of hydrogen sulfide has virtually ceased. Fish kills are less common and marine life is now common in most parts of the harbors (refs. 3, 17 and 18). The locations of water sampling stations within the harbor are shown in figures 3, 9 and 13.

2.24 The improvements in water quality which have taken place since 1968 have been widely observed by waterfront personnel. These observations have been frequently described in newspapers and popular magazines (ref. 15). The improvements in water quality have not been extensively documented in technical papers, although substantial information is available from water quality monitoring programs of the Los Angeles Harbor Department. This information includes water transparency, dissolved oxygen, temperature, color and presence or absence of oil and grease, odor, and suspended matter. Table I summarizes the increases in dissolved oxygen concentrations that have taken place at several stations.

2.25 Dominguez Channel enters the Consolidated Slip of the Los Angeles Inner Harbor at Henry Ford Avenue. Fresh water enters the channel only during storms, but until very recently 17 industries discharged wastewater into the channel. Several years ago the flow of polluted fluids into the channel averaged about 11 million gallons per day (gpd); in 1969 the maximum flow was reported to be about 17 million gpd (ref. 3). The history of water pollution in the Dominguez Channel has been extensively described in reports prepared by the Los Angeles County Sanitation Districts (ref. 19) and the Los Angeles Regional Water Quality Control Board.

2.26 Dominguez Channel historically was a natural channel that carried surface runoff from an area south and west of Los Angeles to a large slough lying between what is now the City of Torrance on the west and the Dominguez Hills on the east. The channel drains an area extending as far north as the Los Angeles International Airport in Inglewood. The slough originally acted as a natural reservoir that drained into the upper end of the Los Angeles inner harbor. As the area drained by the channel became increasingly more urbanized the volume of storm water carried by the channel increased proportionately, and the capacity of the channel became inadequate to prevent periodic flooding of the surrounding lowlands. Consequently, the lower part of the Dominguez Channel was improved. The newly constructed trapezoidal channel with riprap sides and a compacted clay bottom was completed in November 1966. This channel now ranges in depth from about 8 feet (below mean sea level) at Vermont Avenue to more than 15 feet at the lower end near the harbor. The cost of improvement exceeded \$13.5 million (ref. 3).

2.27 In the channel an upper layer of water about 6 feet deep overrides a colder, more saline layer. Most of the waste waters discharged into the channel are carried in the upper layer. The average residence time for pollutants discharged into the lower 6 miles of the channel has been estimated variously between 0.8 and 9 days (ref. 19).

2.28 In the 1930's the local sanitation districts were discharging treated effluent into the channel, and whenever the nearby sewage treatment plant became overloaded raw sewage was discharged into the channel, this practice was terminated in the late 1930's when other facilities became available. However, waste discharges were dramatically increased during World War II as a result of the rapid residential, industrial, and military expansion of the lands surrounding the channel. Industrial wastes and sewage from the new developments and sewage overflows from overloaded facilities in the surrounding region flowed into the channel. Consequently the water quality in the channel and adjacent areas of the inner harbor became so poor that numerous complaints were received of (a) damage to ships, and port and yachting facilities, and (b) odors emanating from the harbor waters. At that time the channel waters were characterized by the absence of oxygen, dissolved sulfide concentrations frequently ranging from 2 to 10 parts per million (ppm) and biological oxygen demand (BOD) values as high as 250 ppm (ref. 3).

2.29 The discharges of waste into the channel as reported in 1969 (ref. 3) are listed in table II. The locations of the discharges are shown in figure 10. All discharges were being made in accordance with permits issued by the LAR-WQCB. The use of inner harbor waters to off-load fishing vessels by fluming was also approved by the LAR-WQCB.

2.30 Efforts to control the discharge of wastes into the Dominguez channel have a considerable history. In 1944 the City of Los Angeles placed controls on wastes discharged into storm drains. In 1946 the County of Los Angeles adopted a policy statement that (a) recognized the menace to public health and safety posed by industrial waste discharges, and (b) called for regulation of such discharges. By 1948 a Los Angeles Harbor Department subcommittee had documented a decrease in the sulfide concentrations that occurred in the channel. Still the sewage and industrial wastes from the Dominguez Channel were considered to be one of the three principal sources of wastes that were causing extreme pollution in the inner harbor.

2.31 In January 1951 the LAR-WQCB set up a permanent committee of interested government agencies to investigate and monitor water quality in the Dominguez Channel and the adjacent harbors. In 1952 it was found that one of the two areas in the Los Angeles Harbor where oxygen was most depleted was at the mouth of the Dominguez Channel; the other was in Fish Harbor. It was also noted that oil well brines and refining wastes discharged into the channel created visible oil and grease scums that extended into the harbor. In 1954 the LAR-WQCB adopted plans for periodic sampling of the waters of the Dominguez Channel. After the first year of sampling it was reported that grease, oil, and other visible solids were frequently discharged into the channel and that the concentration of dissolved sulfides exceeded the specified 1.0 ppm 25 percent of the time. Following completion of the Dominguez Channel improvements in 1966, it was found that dissolved oxygen levels decreased in the inner harbor.

2.32 In 1960 the LAR-WQCB adopted Long Range Waste Disposal and Water Quality Objectives for the Dominguez Flood Control Channel. The same Board modified these objectives in 1967, and in 1968 it prescribed discharge requirements, including detailed monitoring programs for the 18 plants discharging into the channel.

2.33 Early in 1969 the LAR-WQCB attempted to upgrade the channel waters to a level characterized by a minimum oxygen concentration of 2 ppm. In 1970 the Board recognized the propagation and sustenance of fish as one of the beneficial uses for the Los Angeles and Long Beach Harbors. At that time, this recognition required minimum dissolved oxygen concentrations of 5.0 ppm.

2.34 The LAR-WQCB has specified that all industrial waste discharges into the Los Angeles Harbor be terminated by the end of 1972. Facilities for the retention, treatment, or dockside discharge of human wastes are expected to be provided for all naval vessels by 1976. Also, pending legislation suggests that regulations for the control of sewage discharges from small craft will be available by that date. The LAR-WQCB has specified that the dissolved oxygen concentration in all of the harbor waters be maintained at levels not dropping below 5.0 ppm, the minimum concentration which the California Department of Fish and Game believes is necessary for propagation and sustenance of desirable species of fish (ref. 20).

2.35 Although a large number of sediment samples have been collected from the floor of the Los Angeles Harbor, only very recently have these samples been analyzed for chemicals which may have toxic effects on organisms even when present only in trace concentrations. The available data are (a) information obtained from a reconnaissance sample of five harbor bottom cores collected by the Corps of Engineers during the fall of 1971, and (b) information obtained from small dredging projects, and (c) data on 19 cores collected from the Los Angeles Harbor by Engineering-Science, Inc. in 1970. It is also pertinent to consider studies of (a) trace metals and pesticides from other harbors, (b) known or predicted impacts of other dredging projects on water quality and aquatic habitats, and (c) the effects of toxicants on marine life and waterfowl. The locations of the five core stations are shown in figure 11. The cores were taken in water depths of 34.0 to 35.9 feet below MLLW and ranged from 2.5 to 9.0 feet in length. The five cores were sent to the Corps of Engineers laboratory in Sausalito, California, where they were divided into 11 segments and analyzed for particle size, pesticides, settleability, heavy metals, and a number of other chemical characteristics. The findings of this analysis are presented in part in tables III and IV.

2.36 Samples from all five of the cores taken from the Los Angeles Harbor contain zinc concentrations in excess of the 1971 EPA limits. The limit for mercury was exceeded by one sample from core No. 1; the limit for oil and grease was exceeded by samples from cores Nos. 1 and 2; the limit for Kjeldahl nitrogen was exceeded by cores Nos. 1 and 4; the limit for chemical oxygen demand (COD) was exceeded in cores Nos. 1, 4, and 5; and the limit for volatile solids was exceeded in core No. 4. The analysis of core No. 3 showed no violations of the EPA criteria except for zinc.

2.37 Only two of the cores (Nos. 2 and 5) penetrated beyond 4 feet into the harbor floor. None of the contaminants in the three samples analyzed from below the 4 foot depth exceeded the 1971 EPA limits except for zinc. The zinc concentrations appeared to be equally distributed throughout the cores. Cores Nos. 2 and 5 showed a general decrease in pollutants with depth; however, a few of the pollutants increased with depth in core No. 5. Many of the pollutants increased with depth in cores Nos. 1 and 4.

2.38 Most of the cores were visually classified as clay or sandy clay; two samples from cores Nos. 1 and 5 were classed as silty sand or clayey sand. A sieve analysis of the samples indicated a substantial fine sand fraction in most of the samples. Although the sand content dropped as low as 7 percent in one sample from core No. 4, eight of the 11 samples analyzed contained 25 percent to 55 percent sand; the remaining material was mostly silt and clay.

2.39 Eleven samples were analyzed to determine the time of settling of the contained particles; valid quantitative results were obtained from seven of these samples. The fraction which required more than 2 hours to settle ranged from 19 percent to 52 percent. Probably the corresponding fraction for the other four samples would be greater than 50 percent.

2.40 In September 1970, Engineering-Science, Inc., collected 19 cores, 12 to 54 inches in length, from the floor of the Los Angeles Harbor. These were analyzed for grain size distribution, COD, phosphorous, organic nitrogen, total sulfur, and hexane extractable material (fatty acids, oils, and greases). None of these characteristics showed a consistent correlation with depth.

2.41 The analysis of the cores collected from the harbor indicated that the pollutant concentrations do not diminish with depth in all areas. In some locations the concentration of some pollutants in the top 4 feet of sediment increases with depth. These concentrations correlated more closely with the grain size than with the depth of the sediment. The grain size distribution of the sediment has often been presumed to increase with depth, but the analysis of cores collected indicates that this is not so.

2.42 AIR POLLUTION. The Los Angeles and Long Beach Harbors lie along the southern margin of the Los Angeles basin, a meteorological province infamous for its polluted air. Air pollution problems in the Los Angeles basin have been studied extensively by the Los Angeles County Air Pollution Control District (ref. 21) since it was activated in 1947. According to the LAC-APCD 13,000 tons of pollutants are discharged into the air above Los Angeles County each day. A somewhat lesser amount of wastes is also discharged into the air basin from heavily populated parts of Orange County. Almost 90 percent of the wastes dumped into the air are derived from mobile sources, primarily motor vehicles.

2.43 High concentrations of air pollutants are known to be harmful to people, animals, and vegetation as well as to certain non-living materials. It is recognized that air pollution in other cities has been responsible for a considerable number of fatalities. However, a precise correlation between air pollution and human mortality in the Los Angeles basin has not been demonstrated. Because the composition of the air pollutants in the Los Angeles region is somewhat different from other areas where high mortality rates have been correlated with poor air quality, the conclusions drawn from distant areas regarding the effect of air pollutants on human health may not be strictly applicable to the Los Angeles basin. According to the National Tuberculosis and Respiratory Disease Association (ref. 2) air pollutants damage the human respiratory system and place an extra burden on the heart. A report prepared by the Air Resources Board of the California State Department of Public Health (ref. 23) concludes that high concentrations of smog may contribute to the number of asthma attacks, aggravate emphysema and other respiratory diseases, and may be a small factor in automobile accidents.

2.44 The LAC-APCD has divided major sources of air pollutants into the six major categories: industrial, power plants, commercial, residential, motor vehicles, and aircraft. Air pollutants discharged from boats and ships are not of sufficient importance to warrant separate tabulation. The major emissions have been divided into five categories: hydrocarbons, oxides of nitrogen, oxides of sulfur, carbon monoxide, and particulates. The amounts and percentages of the various types of pollutants discharged into the air from major sources are shown in table V and figure 12. The concentration of the major air contaminants is continuously monitored at 12 stations in Los Angeles County. Additional data is collected from mobile monitoring stations.

2.45 The concentration of air pollutants in the air above the basin is dependent upon the amount and rate of discharge of wastes into the air, and upon the rate of dispersion and mixing of the contaminants with clean air brought into the basin. Mixing is greatly inhibited by calm air conditions and the presence of temperature inversions that restrict vertical circulation. Adverse meteorological conditions occur most frequently during the summer and early fall. Polluted particles and dust settle out and fall to the ground. Rain storms wash the polluted dust down drainage channels to the harbor, where the particles add to harbor bottom sediments.

2.46 Afternoon sea breezes that build up along the coast in summer months are particularly effective in dispersing air pollutants. For this reason, and because the sea breezes blowing off the ocean supply the basin with comparatively clean air, air pollution in the harbor areas is less serious than in the more inland portions of the Los Angeles basin. During the months of August and September of 1969 and 1970 eye irritation in the harbor area was reported on only 1 percent of the days, compared with reports of eye irritation ranging from 30 percent to 91 percent in various inland areas of Los Angeles County during the same periods (ref. 21). However, most of the power plants in the basin which burn sulfur-rich fuels are located along the shoreline. For this reason the concentration of oxides of sulfur in the air in the harbor area during these same summer months was significantly higher than in inland areas of the basin.

2.47 To protect the health of the public the LAC-APCD has formulated plans to prevent any catastrophe caused by toxic concentrations of air contaminants. In 1955 a 3-stage system of emergency situations or alerts was defined in order to prevent excessive buildup of atmospheric contaminants. Since then 80, first stage alerts have been called, but no second or third stage alerts. All of the alerts prior to January, 1971 were called because of high concentrations of ozone. Since January 1971 (following the lowering of alert levels for carbon monoxide), three alerts were declared on the basis of carbon monoxide. More than 98 percent of the carbon monoxide emitted into the atmosphere is discharged from motor vehicles (ref. 21).

2.48 Control measures instituted by the LAC-APCD appear to have reduced total emissions from stationary sources by about 83 percent. However, control measures have been considerably less effective in reducing emissions from mobile sources. Part of the problem results from the rapidly increased usage of vehicles in the basin during the last two decades. As a result the emission of carbon monoxide into the atmosphere has increased from 5,390 tons per day in 1950 to 8,945 tons per day in 1970; without controls the estimated 1970 emission of carbon monoxide would exceed 12,000 tons per day. During 1965 and 1966 the concentration of carbon monoxide in the air in the Los Angeles basin exceeded the State standard for carbon monoxide (as revised in November 1970) on 365 days during each year. Fortunately as the result of control measures the violation of State standard for carbon monoxide was reduced to 203 days in 1971. The LAC-APCD states that (ref. 21): (a) the reduction of air pollution to the point where it no longer will be a critical problem depends almost entirely upon the control of emissions from motor vehicles, and (b) stationary sources, which are the responsibility of the Air Pollution Control District, are already, with few exceptions, well controlled today, and will be even more stringently controlled under additional regulations that are now in preparation. The LAC-APCD states that Los Angeles can have clean air as specified either by California Air Quality Standards or by the Federal Air Quality Standards for oxidant and NO_2 . The only requirement is that after the auto industry actually meets the State's 1975 Standards for exhaust emissions it will take 5 to 6 years to get this cleaner air.

2.49 **BIOLOGY.** The harbors include a variety of marine habitats. The salt flats and estuarine marshes, or wetland habitats, which originally existed in the inner harbor area, have been destroyed, but new habitats have been created along the mud sides and bottoms of the channels in the inner harbor and by the installation of pilings, and concrete and rock dikes. These new habitats in no way replace the high-quality wetlands that were lost. The organisms existing in the new habitats are of different varieties than those which originally existed in the wetlands. In the outer harbor some sand bottom parts of the original San Pedro Bay sea floor (near Cabrillo Beach, Belmont Pier, and inside the breakwater near its eastern end) may still remain in their natural state.

2.50 Several of the newly dredged areas in the outer harbors may also be characterized by sand bottom. Much of the floor of the outer harbor, however, is covered with layers of organic and non-organic silts and clays, which form less desirable habitats. The harbor bottom habitats may be particularly poor wherever the bottom sediments contain appreciable quantities of waste materials (fig. 13).

2.51 The main breakwaters and the rock dikes which have been constructed within the harbors form extensive areas of artificial habitats that support a large variety of rock bottom organisms not formerly found in abundance in the bay. The highest quality habitats are in the area of the outer breakwaters where wave action is most vigorous and pollution is least. The lack of wave action inside the harbors prevent some species from utilizing these sheltered rock and sand bottom areas. The outer breakwaters support a great variety of marine plants and animals not found in abundance elsewhere in the harbor. The number of species utilizing these artificial habitats is no doubt less than that expected from similar habitats where the sea water is less polluted. A thick cover of marine algae provides food and shelter for a great diversity of fish and invertebrates. Los Angeles City lifeguards report that commercial and sport fishermen fish extensively in the vicinity of the breakwaters for spiny lobster.

2.52 The outer harbors presently contains a large pelagic (free swimming) habitat occupied by a variety of fish and other organisms. Similar, but less attractive, habitats extend into the inner harbors. Lists of the larger organisms believed to inhabit the harbor waters have been prepared from the collections which have been made and from a knowledge of the organisms found in similar habitats. Field studies have provided verification of the lists prepared. The list of fishes inhabiting harbor waters (table VIII) was prepared from data collected and reported by Chamberlain (ref. 24). Because of recent marked improvements in the quality of the harbor waters, species not found in the harbor a decade ago are known to be migrating into the area (ref. 18).

2.53 The birds that inhabit the harbor waters are known from counts made by the local Audubon Society (ref. 25). A considerable variety of birds utilize the waters off Cabrillo Beach and the water area between Fish Harbor, the navy mole, and the abandoned Naval Air Station for feeding and resting. The latter area is attractive because of abundant schooling fish and fish cannery wastes discharged into the area and because the waters are sheltered and the marine traffic in the area is very light. The shallow waters off Cabrillo Beach and the beach itself constitute a popular feeding area. Forty-three species of water-associated birds are known to visit the harbor at one time of year or another; during the winter months 30,000 to 60,000 birds, mostly gulls, sometimes occupy the harbor. At present the harbor area does not provide a significant number of nesting sites for marine birds (ref. 26).

2.54 A list of the marine mammals inhabiting or visiting the harbor area is given in table VI. The water-associated birds that utilize the harbor waters are listed in table VII. Tables VIII, IX, and X list the fish and larger, or more important, invertebrates that inhabit the harbor waters and bottom sediments.

2.55 Marine algae form one of the most important links in the food chain for marine fish living in our nearshore waters. The various species of marine algae range in size from less than an inch to over 100 feet in length (refs. 27 and 28). However, it is unlikely that the fronds of any species in the harbor grow to a length exceeding 10 or 15 feet. Large algae also form an essential habitat for a great multitude of fauna that hide in the cover they provide. All species of algae require sunlight, and most large species require a firm substrate such as that offered by large pieces of rock, concrete, or wood. Algae are abundant on the outer breakwater and some forms of algae and other marine plants are now commonly found along the rock dikes and on the wood and concrete pilings and boat docks in the inner and outer harbors. Prior to 1968 there were areas in the inner harbor that supported very little, if any, algae.

2.56 Five main classes of algae are found in the sea: blue-green; green; brown; red; and yellow-green (ref. 27). The color of the individual forms does not necessarily indicate the class to which it belongs. Usually the blue-green and yellow-green algae are small (or microscopic) free floating forms. Although the blue-green and yellow-green algae may constitute a significant source of food for filter feeding animals (clams, mussels, barnacles, etc.) they are not of direct importance to the carnivores (fish, crabs, starfish, octopus, etc.) and the herbivores that feed on the larger plants.

2.57 The brown algae are the most abundant and most advanced forms found in shallow waters. Also, they exhibit a great range in size and structure. Forms of brown algae constitute the offshore kelp beds, which are made up of fronds sometimes exceeding 100 feet in length. Brown algae species probably are the most abundant plant group found on the outer breakwater. Brown algae show a definite preference for cooler waters. Some species grow at the highest tide level where they obtain maximum light and must withstand extreme wave shock. Others are found at deeper depths where both light and wave motion are diminished.

2.58 In the harbor area, species of red algae are generally smaller and less common. As a group, they tend to prefer subtidal depths where the sunlight is more subdued.

2.59 *Geledium*, an important source of agar, is a typical example common in local waters. It is found in depths of 0 to 40 feet growing on turbulent reefs; it is abundant on the outer breakwater. Green algae are generally small attached forms that are found in well lighted, near-surface habitats. At present they are becoming more and more abundant on the boat docks and ships hulls in the inner harbor where they constitute an important food for marine animals; they also are important as a fouling organism (ref. 18).

2.60 The harbors have not been considered an attractive area for biologic collections because of the ship traffic, pollution, and low transparency of the harbor waters. Therefore, there are relatively few records of the organisms which have been collected from the harbor. During the last two decades, however, extensive investigations of the ecological effects of pollution in the Los Angeles and Long Beach Harbors have been carried out by Dr. Donald Reish of Long Beach State College (refs. 9, and 18). Both the water mass and the bottom

materials were studied to quantitatively characterize the degree of pollution present in various parts of the harbor. These investigations involved determinations of dissolved oxygen, biological oxygen demand (BOD), dissolved sulfides, pH, organic carbon content of bottom sediments, texture and odor of bottom sediments, temperature and turbidity of harbor waters, and identification and/or enumeration of coliform bacteria and bottom-dwelling animals. The procedures for studying the water masses were generally much easier than those required for analyzing the harbor floor habitats. However, the results of the water mass studies indicated only the degree of pollution present at the instant of sampling. It was found that the water quality varied greatly with the tides and with variations in the rate and character of waste discharges. Therefore, water quality data gave very little information on the past history of pollution in the sampling location. The analysis of bottom materials and benthic organisms provide a more accurate description of recently prevailing conditions. Sampling of the bottom indicates not only the conditions at the time of sampling, but also conditions that existed for some time prior to the time of sampling.

2.61 Dr. Reish concluded that the two most useful indicators of pollution in the harbor waters were: (a) the dissolved oxygen content of the water, and (b) a knowledge of bottom-dwelling animals. Figure 5 illustrates the average dissolved oxygen concentrations during various periods of time from 1961 to 1968. Dissolved oxygen can be easily and rapidly determined. Dissolved oxygen is required for aquatic animals to live; it is also necessary for the oxidation of pollutants. If the pollutants are sufficiently abundant to absorb all of the dissolved oxygen, then there is none left to support animal life. A knowledge of the faunal assemblages may provide information on the degree of pollution previously present. In 1954, Dr. Reish found that 15 species of animals dominated the harbor bottom assemblages. These included three species of pelecypods (Chione undatellum, Macoma nasuta, and Tellina buttoni) and 12 species of polychaetes (segmented worms).

2.62 The distribution of the polychaete species was correlated with bottom conditions. Dr. Reish divided the harbor bottom into five ecological areas characterized by different degrees of pollution. These were, in decreasing order of quality: healthy bottoms; semi-healthy bottoms (two types); polluted bottoms; and very polluted bottoms (see fig. 12). The healthy bottoms were characterized by a diversity of marine organisms and three polychaete species, Tharyx parvus, Cossura candida, and Nereis procera. The semi healthy bottoms were characterized by either (a) Polydora paucibranchiata and Dorvillea articulata, or (b) Cirriformia luxuriosa. Polluted bottoms were characterized by the presence of the polychaete Capitella capitata, which was generally found to be present in areas receiving waste waters of biological origin (domestic sewage or fish cannery wastes). Very polluted bottoms were characterized by black sludge beds that had a sulfide odor and were unable to support any animal life at all.

2.63 As a result of the great reduction in discharges of waste into the harbor, the quality of the waters greatly improved in 1970 and 1971. Table I compares the dissolved oxygen concentrations recently found in the inner harbor with lower values that prevailed for at least two decades (ref. 18). In October 1970, Dr. Reish resampled four of the benthic stations in the inner harbor and made additional collections from the floating boat docks. Table XI compares the number of organisms with the number recently found at the same stations. In 1970 four to 11 species were found at each benthic station where no species at all were found in 1954. A comparison of the fouling organisms found on docks with those observed in 1966-67 on the same habitats indicated striking changes in the community structure. Several of the previously prominent organisms that thrived in the low oxygen levels are now missing. These species have been replaced by a large variety of plants and invertebrates. The most prominent organisms are:

| | |
|------------|-----------------------------|
| algae | <u>Enteromorpha crinita</u> |
| algae | <u>Ulva lobata</u> |
| mussels | <u>Mytilus edulis</u> |
| polychaete | <u>Hydroides pacificus</u> |
| isopod | <u>Limnoria tripunctata</u> |

2.64 According to Dr. Reish the bluegreen algae-oligochaete and green algae (Enteromorpha crinita) oligochaete associations that thrived in the oxygen depleted waters are no longer abundant (ref. 17). E. crinita is still present in the inner harbor stations, but elsewhere these associations have been replaced by the green algae Ulva lobata and by communities dominated by the mussel Mytilus edulis. Dr. Reish concluded that the mussel Mytilus edulis will become the dominant organism on the boat docks.

2.65 On the basis of feeding habits, the larger marine animals can be divided into five types: herbivores (plant eaters); carnivores (animal eaters); scavengers (dead animal eaters); filter feeders (those that sift particulate matter from the water); and detritus feeders (that filter organic matter from the bottom sediment). Some organisms (omnivores) may feed by two or more methods. Pollution affects the food supply in several ways (ref. 9). Pollutants may kill plant life: (a) by the introduction of toxic chemicals, (b) by burial of favorable substrates, or (c) by the reduction in light as the result of decreased transparency. Prior to 1968 there were very few plants, and very few herbivores in the inner harbor. Any reduction or elimination of plants will have an immediate adverse effect on the herbivores in the vicinity. Carnivores may be eliminated from a habitat as a direct result of toxic chemicals or decreased transparency, or indirectly, due to the reduction in supply of other animals. A further increase in the amount of pollutants will eliminate first the filter feeders, and finally the detritus feeders. The only remaining forms of life are microscopic organisms. Such a situation existed in certain parts of the inner harbor during the 1950's and early 1960's.

2.66 ENDANGERED SPECIES. According to local ornithologists the only endangered species known to utilize the area are the brown pelican (Pelecanus occidentalis californicus) and the least tern (Sterna albifrons) (ref. 26). The brown pelican was placed on the U.S. Fish and Wildlife list of endangered species because they are unable to reproduce. Reproduction failure has been attributed to the DDT that the birds have absorbed from the fish upon which they feed. The brown pelican's feeding grounds extend hundreds of miles along the California and Mexican coasts and well out to sea.

2.67 In the past, the California least tern has nested in the Terminal Island area. In 1973 (ref. 46) a group of 20 to 25 least terns were observed in flight at Terminal Island. These birds were exhibiting a feeding-courting behavior indicating that they were in search of a suitable nesting site. At that same time however, the last parcel of potential nesting area was being graded for the initial stages of a construction project. The terns were forced to go elsewhere. During the spring of 1974 (ref. 46), a few terns were again sighted near the same location, but soon left to find other more suitable nesting conditions. A group of from 50 to 70 pairs of least terns nest near the mouth of the San Gabriel River, which is about 8 miles from the proposed project.

2.68 FISHING. The harbor waters are used extensively for sport fishing. Usage is particularly heavy on a fishing pier. Also, a considerable number of sportsmen fish from wharfs, dikes, the San Pedro Breakwater, and from private craft and rental boats available in the harbor. Species taken in Los Angeles Harbor are white croaker, queenfish, shiner perch, walleye, surf perch, pile perch, bonito, white seabass, California halibut, barracuda, Pacific jack mackerel, sardines and corbina.

2.69 The Port of Los Angeles is extensively used as a base for both sport and commercial boats that carry out their fishing activities some distance outside of the harbor. The only significant commercial endeavor which utilizes the harbor as a catch area is the anchovy live-bait fishery. Because of the great importance of live bait to the southern California sports fishing industry, the anchovy fishery warrants detailed treatment here.

2.70 According to California Department of Fish and Game personnel about 50 percent of all the anchovies caught for live bait in southern California are netted in the outer harbors. At one time the harbors may have provided up to 95 percent of southern California's live bait needs (ref. 30). The anchovy schools shift about the harbor from season to season, from day to day, and even from hour to hour. There are no fixed areas where one can depend upon finding them. Figure 14, indicates some of the areas where the anchovies are often caught. Interviews with bait fishermen indicate that a large portion, perhaps one-half of the total catch within the harbor, is taken within 1 or 2 miles of the area where the landfill is planned. Anchovies are also taken within the proposed fill area. The reasons for the more frequent concentration of the filter feeding anchovies in this area is not known.

2.71 Because the live bait fishery forms the basis for a large part of the southern California marine sports fishery, valued at nearly \$1.5 million per year, the impact of the project on the outer harbor bait fishery is of considerable importance (ref. 30). According to the California Department of Fish and Game, the part of the southern California sports fishery dependent on live bait amounts to several million man hours per year and produces a catch of nearly 5 million sport fish annually (refs. 29 and 30).

2.72 There is considerable evidence indicating that waste discharges into marine and fresh waters adversely affect the health and life span of fish and other forms of aquatic life. In a report prepared for the LAR-WQCB (ref. 31), Jay Stock has identified eight types of morphological deviations from the normal that have been reported concerning marine fish species from southern California waters. These include:

- a. papilloma - a benign tumor with a cauliflower-like appearance
- b. exophthalmia - bulging or protruding eyeballs
- c. parasitic infestations
- d. external deformities
- e. skeletal deformities
- f. fin or tail erosion (fin rot)
- g. lesions - deterioration of the skin
- h. abnormal coloration

2.73 Although many, and perhaps all, of these abnormalities may be found in fish living in unpolluted water, there is a strong suspicion among biologists that their frequency of occurrence and other symptoms of poor health may be much greater among fish caught in polluted waters.

2.74 The difficulty in proving or disproving the correlation between polluted waters and fish abnormalities and the occurrence of diseases in marine organisms results from the paucity of information available on the large number of species that inhabit both polluted and clean waters. In general, there are no good answers to such questions as:

a. What are the natural frequencies of the several types of abnormalities in various species? How do these frequencies vary from time to time and from one region to another?

b. Which chemical, biological, and physical pollutants (including heated waters) are most likely to adversely affect the various species?

c. Which species are most sensitive to deteriorating water quality?

d. Does an increase in abnormalities in a particular species always indicate an adverse change in the environment? Or might the increase indicate that the environment had improved sufficiently to permit unhealthy individuals to survive longer than was previously possible?

2.75 In a 1971 review of available information covering abnormalities in fish collected from five segments of the California coast, including the Los Angeles and Long Beach Harbor areas (ref. 31), Stock concluded that: "Although the possibility exists that various constituents of industrial and domestic wastes directly induce abnormal growth of certain tissues and malformation of calcified structures in marine fish, the limited information available in southern California at this time does not support this conclusion." Presumably the available information was also insufficient to support the opposite conclusion - that water pollution did not cause abnormalities in fish. Stock's finding may be in partial disagreement with several others who have investigated the problem. At an emergency Congressional hearing on "Cancerous Fish Caught Off the Coast of Orange County" held on April 30, 1970, Congressman Richard T. Hanna stated that: "All evidence points to the conclusion that the malformation and malignancies (in marine fish) are related to the pollution being released into the Pacific from the Santa Ana River."

2.76 There have not been any recent studies made of the health of the marine life in the Los Angeles and Long Beach Harbors. However, observations made from 1956 to 1963 by Parks H. Young, California Department of Fish and Game, of fish and marine invertebrates collected from the harbor and other nearby polluted waters suggest that the pollution of the harbor at that time was adversely affecting marine life (ref. 32). It should be noted that during the described period of observation the harbor waters were polluted much more severely than they are now.

2.77 Young found that thousands of halibut caught in trawl nets near Long Beach were dull-colored, listless and soft to the touch; several were dead. Spotted turbot from the same area were not as heavy as other turbot of the same length that had been collected outside of the harbor. Spotfin croakers and white seabass suffered from exophthalmia; the white seabass exhibited large lesions about the body. White croaker and other species taken in Long Beach Harbor had tumor-like sores about the mouth. Young concluded that the lesions found on the white seabass and tumors found on the croaker appeared to be associated with pollution.

2.78 RECREATION. A 4-mile-long bathing beach is located near the east end of Long Beach harbor, adjacent to the City of Long Beach. Cabrillo Beach, located at the west end of the San Pedro Breakwater within Los Angeles harbor, actually consists of two 1/2-mile-long beaches—one inside and the other outside of the breakwater. Staff members from the Department of Recreation, City of Los Angeles state that these two small beaches have handled holiday crowds estimated to exceed 20,000 persons. The northern half of the inner portion of Cabrillo Beach is utilized for boat launching, water skiing, and the training of Explorer Scouts, Boy Scouts, and Girl Scouts. The public is prohibited from swimming in this area because of the hazard to swimmers from ski boats and other small craft. A 4-acre Explorer Scout base is located adjacent to the beach. Dale Miller, a director of the Explorer Scout unit, states that this base serves 6,000 scouts per year and is utilized by 100 to 150 scouts per day during the summer months.

2.79 The LAR-WQCB has designated the beneficial uses for the waters in and adjacent to Los Angeles County. One of the uses of the Nearshore Zone (within 1,000 feet of the shore) is for ocean water contact sports (swimming, surfing, skiing, and diving). Water-contact sports are not included in the beneficial uses of the Offshore Zone. The WQCB has designated the entire Los Angeles-Long Beach outer harbor as a ocean water-contact sports area. Uses of the inner harbor include the propagation and sustenance of marine life and esthetic enjoyment; however, water-contact sports have not been included. The beneficial uses for the Los Angeles River tidal prism downstream from Ocean Boulevard include water skiing, sport fishing, and the propagation and sustenance of marine life, but not other water-contact sports. According to the staff of the Health Department of the City of Long Beach, high coliform bacteria counts in the waters of the Los Angeles River tidal prism sometimes become a problem after periods of greater than normal runoff. The bacteriological characteristics of the remaining part of the Long Beach harbor are adequate to meet water-contact sport requirements.

2.80 California law (ref. 33) requires that suitable bacterial standards for water-contact sports shall be specified by the State or Regional Water Pollution Control Boards. Also, the law states that the waters utilized for water-contact sports must be free of visible evidence of sewage and so free of sewage bacteria that the public may with assurance use the waters without the possibility of contracting disease. No sewage, sludge, grease, or physical evidence of sewage discharge shall be visible at any time in any area designated for water-contact sports. The most probable coliform bacteria count shall be less than 10 per milliliter at least 80 percent of the time.

2.81 Other recreational facilities in the harbors include about 20 small craft anchorages, that have a combined capacity exceeding 3,700 vessels (ref. 3). In addition, there are extensive facilities for sport fishermen and several areas where a number of restaurants and shops have been established to accommodate tourists.

2.82 CULTURAL, ARCHEOLOGICAL, AND HISTORICAL FEATURES. The cultural features in the harbor area include the Cabrillo Beach Museum, the Queen Mary (a retired passenger liner converted to a museum, restaurant, and hotel), the Long Beach Municipal Auditorium, and Ports of Call Village and Whaler's Wharf (a San Pedro recreational and entertainment area, which occasionally sponsors cultural events). Historical attractions include the Civil War Drum Barracks in Wilmington, Fort MacArthur in San Pedro, and the bluffs north of Point Fermin where the early Spanish settlers once threw hides over the cliff for loading on vessels waiting offshore. Also, several rich marine fossil localities are found in the San Pedro area.

3. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

3.1 Within the Los Angeles Harbor area planning responsibilities are divided among several agencies; the Los Angeles Harbor Department for department owned lands, the City of Los Angeles for city lands other than those owned by the Harbor Department, and the U.S. Navy for harbor lands owned by them. The recommended plan is entirely within the jurisdiction of the Los Angeles Harbor Department and is fully consistent with their master plan. The projected progressive development of the master plan is shown in Appendix C, plate 19.

4. THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

4.1 The probable impact of the proposed project on the environment is discussed in terms of direct effects and indirect effects. The direct effects are defined as those that are expected to result from the proposed dredging and filling. The indirect effects are those that are anticipated to result from the improvement and use of the deepened channels and newly-created land areas.

4.2 DIRECT IMPACTS OF PROPOSED DREDGING. The direct impacts of the proposed dredging are:

- a. The improvement of the quality of harbor bottom-habitat by removing polluted bottom sediments.
- b. The destruction of nonmobile species and the temporary displacement of mobile organisms inhabiting the areas to be dredged.
- c. The possible temporary pollution of the harbor waters during the dredging operations.
- d. The local disruption of marine traffic in the areas of construction.
- e. Minor changes in those hydraulic parameters that control current flow, tidal flushing and wave propagation in the harbor.

4.3 DIRECT IMPACTS OF REDUCTION IN OPEN WATER AREA. The direct impacts of reduction in open water area resulting from the proposed landfill will be:

- a. The total destruction of nonmobile species (sessile invertebrates--i.e., clams, snails, starfish) and wildlife habitats in the areas of proposed landfill.
- b. The displacement of highly mobile organisms that inhabit the areas of proposed fill; the landfill would occupy about 187 acres, near a water area within which anchovies are usually fished for bait, as shown in figure 14.
- c. Changes in those hydraulic characteristics of the harbor that control current flow, tidal flushing and wave propagation.

- d. A slight decrease in tidal flushing.
- e. The creation of new wildlife habitats along the rock structures that would be provided to protect the newly-created lands.
- f. A small reduction in the outer harbor areas presently used for the transit of small craft.
- g. A minor alteration in the appearance of the harbor as seen from elevated positions (tall buildings, bridges, the San Pedro hills, and aircraft).
- h. The possible temporary pollution of the air near the dredging site by the release of hydrogen sulfide from the bottom sediments.
- i. The use of about \$7.5 million of Federal funds for the proposed project; presumably these funds would be available for other needs if the project was not implemented.

4.4 All but one or two of the direct impacts of the project are adverse or possibly adverse and unavoidable or probably unavoidable. These impacts are discussed in the next chapter, "Any Probably Adverse Environmental Effects Which Cannot Be Avoided".

4.5 The placement of rock structures around the margins of the fill areas will create new marine life habitats within the harbor. The quality of the new habitats will depend upon the amount of pollution in the waters in which they are bathed, the extent of circulation resulting from wave and current action, the character of the habitat surface (i.e., wood, rock, or concrete), and the depth. Near-surface wood habitats may be utilized by many of the organisms listed in table X. Rock and concrete surfaces may attract a somewhat different association of organisms. However, the dominant species are not likely to include many of the benthic animals (listed in table IX) living on the mud and sand bottoms. High turbidity and high concentrations of other pollutants and low dissolved oxygen concentrations will limit the number of species and individuals that may be present in any one single habitat. The lack of wave action may also limit the number of animals attracted to the new habitats. For these reasons the new habitats would attract fewer macro-organisms than are found on the outer breakwater.

4.6 The proposed project will not have any significant effect on the saltwater intrusion of aquifers in areas near the harbor. The water quality in these aquifers is dependent on the rates of recharge and extraction (natural and otherwise). Saltwater intrusion problems may be caused by adverse head conditions combined with a source of seawater. Saltwater intrusion has already ruined shallow aquifers in the harbor area as sources of potable water. The Dominguez Gap Barrier Project has been constructed in the project area and is operated as a fresh water injection system to halt saltwater intrusion. This system began operation in the spring of 1971; it is not yet known if the system is adequate to stop further intrusion.

4.7 It is reasonable to expect that the project area will experience significant earthquake effects in the foreseeable future. As previously mentioned in the statement, the proposed project is near several major faults which are known to be capable of movement. The closest of the major active faults is the Newport-Inglewood fault which lies about 6.5 miles northeast of the harbor area and along which the magnitude 6.3 Long Beach earthquake of 1933 occurred. Strong ground movements which would accompany a major seismic event in the project area could damage the proposed channel and cause instability of the landfill

created by the dredged spoil. One of the most serious consequences of the strong ground shaking associated with a major earthquake is the liquefaction of soils. Knuppel (ref. 47) has developed necessary engineering parameters for both the native materials and the dredged fill and has conducted seismic analyses which show that the proposed fill and even some of the natural soil deposits would be highly susceptible to liquefaction if subjected to strong seismic excitation. The impact of liquefaction of the soils in the project area on the proposed channel and on structures which would be founded on the dredged fill could be severe. The likely effect on the channel would be a partial filling due to flow slides of the channel banks into the dredged areas. Removal of these materials to restore the channel to design depths would require further dredging. Liquefaction of the proposed dredged fill could have more serious consequences which would depend largely on the characteristics of the soil failure and on the specific type of design and construction of the structures which would be founded on the fill. Local interests are being advised of this liquefaction potential. Knuppel discusses under "Recommendations" some concepts that may lead to minimizing or eliminating the liquefaction potential. A copy of Knuppel's report is available upon request from the District Engineer, U.S. Army Engineer District, Los Angeles, California 90012.

4.8 The dispersion of pollutants from the dredged spoil might be one of the most serious environmental hazards created by the project. For this reason a brief discussion is presented of (a) the hazards posed by heavy metals in the marine environment, (b) government policies regarding dredging and water quality, and (c) tentative plans for preventing the contamination of marine waters.

4.9 Only within the last few years have scientists and others concerned with environmental problems become aware of the potential hazard to marine life resulting from the presence of trace concentrations of some heavy metals (and other chemicals) in some harbor bottom sediments. A report published in October 1970 by the Council on Environmental Quality (ref. 34) titled, "Ocean Dumping - A National Policy," tabulates (a) the natural concentrations of cadmium, chromium, lead, and nickel and other metals found in seawater, (b) the concentrations of these heavy metals found in some harbor sediments, and (c) the minimum concentration levels of these heavy metals that are believed to be toxic to various forms of marine life (see table XII). Many other publications have discussed the occurrence and toxic effects resulting from trace concentrations of heavy metals, pesticides, and other chemicals found in the marine and terrestrial environments (refs. 35 and 36). Although concentrations of these heavy metals ranging from a few parts per billion (ppb) to perhaps 100 parts per million (ppm) appear to be extremely low, such concentrations may be as much as a thousand or even a million times the concentration found in the pristine environment. Because certain heavy metal concentrations in the ppm and ppb range are thought to be (a) toxic, and (b) greater than concentrations frequently found in nature, they are considered to be relatively high.

4.10 A very careful analysis of the hazards posed by such trace pollutants must be based upon a detailed knowledge of:

- a. The natural concentrations of the constituents in a variety of environments or habitats.
- b. The behavior or the pathway followed by any potentially toxic constituent that enters a particular environment.

c. Synergistic reactions resulting from the combination of two or more potentially toxic chemicals.

d. The tolerances of a wide variety of organisms to very dilute concentrations of one or more toxicants.

4.11 To gain an idea of the waste discharge requirements that may be established by the LAR-WQCB, it is pertinent to review several other dredging projects that are completed or are underway in Los Angeles Harbor (fig. 11). These include:

Continued on next page.

a. The excavation of 4,000 cubic yards of material from the West Basin of the inner harbor in order to construct a temporary barge slip; the spoil would be stockpiled on land.

b. The removal of about 25,000 cubic yards of material from the harbor bottom to prepare a trench in which to lay two parallel pipelines across the East Basin Channel. The materials removed would be used as fill for port construction.

c. The removal of about 9,500 cubic yards from the shoreline of the outer harbor to construct a boat launching ramp. The excavated material would be deposited on shore or in waters adjacent to the nearby public fishing pier.

d. The dredging of several hundred thousand cubic yards of material from Fish Harbor to deepen the harbor waters. The final method of spoil disposal has not yet been decided.

4.12 The LAR-WQCB, has set waste discharge requirements for the first four plans in Order Numbers 71-6, 71-21, 71-31, and 71-32, respectively. Waste discharge requirements have not yet been set for the disposal of spoils from Fish Harbor or from the material to be dredged from the project being considered here. It appears reasonable that the requirements that will be set for the disposal of sediments obtained from deepening the harbor channels would be somewhat similar to those set for other recent projects. However, because the harbor deepening project is of much greater magnitude, the extent of any adverse effects that may result from the disposal of polluted sediments might be somewhat greater than the adverse impacts resulting from the much smaller projects. Consequently, it would not be surprising if the LAR-WQCB sets more severe requirements for this larger project. The plan for waste disposal is our best estimate of measures to comply with the State of California requirements and future EPA directives to be issued under the Clean Water Act.

4.13 For the smaller dredging projects listed above, the LAR-WQCB has specified that the project operations will not impair the beneficial uses of the harbor waters. The storage or disposal of spoils shall not cause: (a) excessive turbidity; (b) the discoloration of harbor waters; (c) visible floating material or deposits on shores or structures; (d) objectionable odors; (e) the depression of dissolved oxygen concentrations; or (f) formation of sludge banks or deposits that will adversely affect harbor habitats. The Board further specified that "Solid wastes may be utilized for fill purposes in harbor water areas only if adequate facilities are provided to retain these solids in the fill areas and prevent their escape into adjacent harbor water areas in concentrations (as settleable solids) greater than 1.0 mg per liter".

4.14 The LAR-WQCB has frequently specified two monitoring stations near the dredging area and two in the disposal area. These stations are generally located 50 to 200 feet from the point where bottom materials are being dredged or dumped. Sampling at these stations has been required at 1 or 2 week intervals. Monitoring includes determination of water clarity at the surface and dissolved oxygen 3 feet below the surface. Other requirements or observations include acquisition of information on weather, currents, and appearance of and odors from surface waters.

4.15 In November 1973, Region IX of the U.S. Environmental Protection Agency (EPA) issued a draft of their interim criteria for determining the acceptability of dredged materials for ocean disposal. These interim criteria represent Region IX's interpretation of the EPA

National criteria published in the Federal Register in October 1973, pursuant to Section 102 (a) of the Marine Protection, Research and Sanctuaries Act of 1972 (PL 92-532) for the territorial sea, contiguous zone, and ocean waters. Region IX, EPA, will use these interim criteria to evaluate Corps of Engineers new work and maintenance dredging projects as well as applications for Corps of Engineers permits. These interim criteria will also be applied to projects in inland navigable waters until guidelines are published pursuant to Section 404 (b) of the Federal Water Pollution Control Act of 1972 (PL 92-500). The Region IX interim criteria are presented in table XIII.

4.16 The Region IX interim criteria also designate ocean disposal sites where non-polluted and polluted dredged sediments may be dumped. The site nearest the Los Angeles Harbor is 5.8 nautical miles seaward of the Harbor entrance. The exact location and site guidelines are also presented in table XIII.

4.17 Tables III(a) and (b) present the results of the chemical analyses of 11 sediment samples from five cores taken within the project area (fig. 11). These analyses were performed in 1972 in compliance with the previous (1971) EPA criteria. With the recent revision of the criteria these data are now somewhat incomplete. The analyses for trace metals are in compliance with Region IX Interim Criteria of 1973, however, the requirements of the elutriate analysis have not, as yet, been completed. On the basis of the trace metal values alone, only one parameter (zinc) fails the Region IX Site Usage Criteria (table XIII) for the designated disposal site. Additional analyses will be performed to fully comply with the EPA criteria during the design phase of the project.

4.18 A knowledge of the behavior of the pollutants when the sediment is mixed with water is important in predicting the impact of alternative methods of disposal. Laboratory analyses of bottom samples taken at San Diego Bay indicated that the polluting elements did not go into solution in the wash water, but remained attached to the fine sediment particles. This conclusion is supported by chemical theory and the unpublished findings of chemists who are studying the heavy metal pollution in the marine environment off the coast of southern California. It is also in agreement with the results of bioassays carried out on Los Angeles Harbor sediments collected from areas where small dredging projects have been proposed. Therefore, it is expected that the return wash water will meet State of California discharge criteria.

4.19 If most of the pollutants are concentrated with the silt and clay fractions of the sediment, then it is apparent that every effort must be made to confine the spread of the silts and clays encountered during the proposed dredging operation. It is believed that in an area where sediment is to be removed, a hydraulic dredge will entrap more of the fines than any other type of dredge. However, very large quantities of silt and clay are often lost with the wash water from disposal areas where sediments are deposited by hydraulic dredges. It is believed that the amount of silt and clay normally lost from such an operation can be greatly reduced by the use of settling ponds, dikes, and treatment with flocculants.

4.20 If large quantities of silt and clay are allowed to escape from the planned fill area then the adverse impacts on wildlife and marine habitats may be considerable; this situation will be particularly true if the sediments are highly polluted. If most of the fines can be separated from the overflow waters, then it is probable that the environmental effects on water quality would not be significant.

4.21 Various measures can be used to control the quality of waste water return flow from diked disposal areas. The overflow weir can be located as far as possible from the point where dredged sediments are introduced into the disposal area to permit a sufficient time for sediments to settle out. The disposal area can be subdivided by interior dikes, permitting even longer retention and more effective settling. Chemical flocculants can be introduced to effect more rapid settling. Aeration and mechanical mixing can also be used to speed up the settling process. The return flow can be filtered to remove fine sediments. These measures vary in the degree of control over waste water quality and in the expense of the measures. The method selected in formulation of the proposed project was to deposit the dredged material in the disposal area at a point sufficiently distant from the overflow weir to permit settling.

4.22 During the duration of the project, hydrogen sulfide contained in the sediments will undoubtedly be released in the fill areas, creating air pollution (unpleasant odors) downwind of the fill area. The Corps plans to determine what can be done to abate this pollution. Construction of the proposed fill area will create a hazard to small boats operating in the area. All Federal and California State regulations concerning the posting of marker buoys and warning lights will be adhered to.

4.23 **INDIRECT IMPACTS.** The indirect impacts are those that will result from the improvement and use of newly created lands and the increased usage of the harbor by deep-draft vessels. Such improvements would include the installation of the most modern equipment for handling container cargos, as well as dry bulk cargos and imported energy sources (liquefied natural gas). In addition, warehouses and freight and passenger transportation facilities must be constructed. The expansion of a wide variety of support services adjacent to the harbor area would be necessary.

4.24 The indirect effects of the proposed project are so numerous and far reaching that it is possible to discuss only a few of them, and in some cases these must be treated in the most general terms. The indirect effects resulting from the proposed project include:

- a. Stimulation of the economy as a result of (1) the expenditure of large sums of money for the project, and (2) a temporary increase in employment of personnel required for the project.
- b. Decreased unit costs for handling cargo passing through the port and increased revenues expected by the port.
- c. An alteration of water and air pollution patterns, potential water pollution hazards, and fire and explosion hazards in the harbor.
- d. An alteration of the appearance of the area.
- e. Further disturbances of wildlife and wildlife habitats.
- f. Destruction of aquatic habitat and temporary disturbance to aquatic populations.
- g. The possible expansion of the harbor industrial area, accompanied by changes in land values.

h. Loss of commercial and sports fishing opportunities.

i. Possible adverse effects on air quality resulting from increased traffic generated by industrial uses of the land created by the proposed disposal of dredged material. The effects on air quality are presented in Appendix C: Traffic Generation Study.

j. If further fill is placed by local interests in the harbor adjacent to the proposed fill, then the project represents an incremental contribution to harbor filling. A permit for filling in navigable waters would be required from the Corps of Engineers; as part of the permit procedures, an evaluation of environment impacts would be made.

4.25 The increased harbor depths and the creation of new lands will increase the capability of Los Angeles Harbor. The expected decrease in unit costs for shipping and for the transit of cargos through the port should have an impact on trade. Container terminals are expected to reduce terminal and berthing costs from present rates of \$8 to \$12 per ton to \$3.50 per ton (ref. 3). It is expected that the savings in transport costs will result in increases in the export and import trade, greater profits for shippers, greater revenues for the port, and lower prices for consumers.

4.26 Port authorities claim that the benefits to the region from handling cargo amount to \$19 to \$20 per ton. If the loading facilities desired by local interests are developed, the 1980 trade volume in container cargo is expected to equal two or three times the 1967 volume. The growth of the container trade, however, will be retarded unless new facilities are made available. The economical use of containers for shipping requires large areas of unobstructed waterfront. Because the noncontainer trade (break bulk cargos) is still increasing, it is not feasible to develop container terminals at the expense of conventional waterfront loading facilities.

4.27 The temporary employment of personnel engaged in the project is at least temporarily beneficial; job turbulence over long periods may be undesirable. The stimulation of the economy during the life of the project (and associated or follow-on developments) is also beneficial. However, several studies of other areas suggest that, at least in some cases, very rapid growth rates, poorly planned growth, or growth beyond some optimum limit may have adverse consequences.

4.28 The proposed project will result in economic stimulation and will accelerate the rate of urban development to some extent. Growth as projected is consistent with the projection used in the Air Implementation Plan. If the Federal navigation project were not constructed, urban development based on commodity transport by land carriers would be likely to continue. This would result in an increase in surface traffic and a potential for increased air pollution in the Los Angeles basin. An increase in the use of cars and trucks on the wharfs, together with industrial and commercial activities resulting indirectly from the proposed project, could result in a short-term increase in air pollution.

4.29 Empty tankers and ships loaded with lumber, nitrates, and other combustibles constitute a definite fire and explosion hazard. The construction of docking facilities for such ships in areas more distant from nearby population centers (San Pedro and Wilmington) will reduce the hazard to persons not engaged in waterfront activities. The implementation of the total project would permit docking in areas more distant from existing residential and business districts.

5. ANY PROBABLY ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

5.1 There will be a permanent loss of 187 acres of marine habitat required for the creation of new lands. The habitats scheduled for destruction are utilized by a considerable variety of bottom-dwelling and free-swimming organisms that no doubt play an important part in the food chain of the marine life inhabiting San Pedro Bay. However, similar habitats with lower levels of pollution are abundant in other areas of the bay. The habitat areas that will be permanently lost amount to about 2 or 3 percent of the outer harbor area and consist of less than 2 percent of that part of the San Pedro Bay shelf lying shoreward of the 50-foot contour. These remaining habitat areas appear to be less polluted than those that would be lost to the proposed landfill.

5.2 The destruction of non-mobile species that inhabit the fill area is also an adverse impact. In general, the organisms living within the harbor belong to the hardiest species that are most able to tolerate polluted waters. These same species are likely to have (a) a great tolerance for temperature and salinity changes and (b) a wide distribution range. For this reason there is an abundance of all such species in adjacent areas inside and outside the harbor. However, biologists emphasize the scarcity of protected waters along the California coastline. These biologists believe that because of the sparsity of this type of habitat, the loss of a few hundred acres within the harbor will be significant.

5.3 Many of the water-associated birds, fish, and other organisms that inhabit the harbor waters will be able to flee any areas that might become excessively polluted; frequently, but not always, these animals will be able to survive in other areas. The survival of the mobile organism displaced by harbor construction activities will depend partially upon the availability and character of other habitats in the vicinity. If other suitable habitats are available, then it is unlikely that there would be a mass mortality, such as would result from a sudden marked decrease in the concentration of dissolved oxygen, or from the rapid introduction of a highly toxic pollutant. It would appear that there is an abundance of sandy bottom and muddy bottom habitats in the vicinity that might initially support any marine life displaced from similar habitats. However, it is probable that these adjacent habitats would be fully occupied with their own inhabitants. Thus the introduction of the displaced species would create intense competition for food and living space. Many of the displaced organisms and some of the established inhabitants would be eaten by carnivores. The herbivores, filter feeders, and detritus feeders in adjacent habitats might suffer from overcrowding and malnutrition.

5.4 If new habitats become available upon completion of the project, then the regional population might be expected to increase again. The similarity between the organisms lost and those gained would depend somewhat on the similarity of the habitats lost and gained. If habitats characterized by polluted benthic sediments are replaced by equal areas of unpolluted sediments or by rock dikes or concrete pilings, the long-term impact should be beneficial.

5.5 Except for the anchovies and water-associated birds, including brown pelican and least terns, (which have used the area to feed), there are no important, unique, or endangered organisms or any great variety or diversity of organisms which continually inhabit the areas where the dredging and filling are planned. Habitat and nesting areas for the least tern are non-existent in proximity to the harbor areas, therefore, the destruction of some feeding

area is not significant to the survival of the species. The brown pelican was ubiquitous in southern California prior to reduction in its numbers, whatever the cause of this reduction. Suitable habitat and feeding areas for this bird are plentiful in proximity to the harbor area that would be affected by the proposed project.

5.6 The marine habitats in the areas to be deepened will be temporarily destroyed by dredging. In addition, they might be altered due to a change in the character of the sediments exposed on the channel floor. The temporary destruction of about 600 acres of habitat and of the non-mobile organisms in the dredged areas is certainly an adverse impact. The studies that have been made and similar investigations elsewhere have often shown the *ecological effects of dredging to be unfavorable* (refs. 38, 39, 40 and 41). In several cases the number of species that have been found to inhabit a particular area after dredging is much fewer than the number living in the area before dredging.

5.7 However, the long-term reduction in the number of benthic species because of dredging is not necessarily a certain occurrence. If the habitat characteristics of the substrate are improved, then the number of species and individuals living in the area might increase. The long-term improvement of bottom habitats in the inner harbor and in some portions of the outer harbor is a real possibility. Because of the contained waste materials, the sludge or mud layers that cover the inner harbor form very poor habitats. The removal of this undesirable sediment from the harbor floor might considerably improve the life-supporting properties of the dredged areas. This favorable impact appears likely and has been predicted by Engineering Science, Inc. (ref. 42). The newly exposed sediments on the sea floor are expected to be coarser and relatively free of pollutants. Because of the sparsity of long cores (10 feet or more in length) from the harbor floor the character of the material to be exposed cannot be predicted with certainty. If very fine, organically rich sediments are exposed by the dredging, then one may expect the bottom sediments to absorb oxygen from the bottom waters and give off a hydrogen sulfide odor.

5.8 Because of the potential impact of the project on the anchovy fishery, it is important to consider (a) why the anchovies are caught in the project area, (b) how the fishery would be affected by displacement of the bait schools, and (c) what reserves are available in other areas. Although several papers are available on the anchovy catch (refs. 43 and 44), this fishery is not sufficiently well known to provide precise answers to the questions above. The information presented below is believed to be useful, but much of it is based on undocumented opinions and observations and therefore should be considered subjectively. Such data are presented because of the importance of the fishery, the possible hazard to the fishery posed by the project, and because no better information is available.

5.9 About 98 percent of the fish caught for live bait off the southern California coast are anchovies (ref. 43). Although these are caught all the way from San Diego to Point Conception, the greatest concentrations are netted in the Los Angeles-Long Beach outer harbors (ref. 30). *During the summer when the demand for anchovies is greatest, the bait fishery is often most highly concentrated in the harbor area.* In the Los Angeles-Long Beach outer harbor anchovies are netted at night by small boats using lights to attract the bait schools (ref. 45). In other areas the bait schools are usually fished during the daylight hours.

5.10 Large schools of anchovies are found in the waters off the California coast. A regulated amount (100,000 tons/year) of catch, equivalent to 10 to 20 times the annual live bait catch, is taken each year for reduction to fish meal. This reduction catch is only a small

part of the 4 to 5 million tons that the Department of Fish and Game estimate might be available for harvesting each year. The reduction fishery operates with larger vessels and larger nets, working fishing grounds as much as 300 miles off the coast. The unit value of the fish caught for reduction is much less than that for the anchovies netted for bait. The live bait schools are frequently composed of younger and smaller fish than are found in the schools fished for the reduction catch (ref. 43).

5.11 Anchovies for live bait are caught in the open ocean along the southern California coast at Malibu Pier, Paradise Cove, Santa Monica Pier, and at other locations where sports fishermen and fishing boats operate. Suppliers of live bait at these locations typically net their live bait in the open ocean.

5.12 The reasons for the congregation of the live bait schools in the outer harbors are not known. However, some fishermen and biologists speculate that the younger fish are attracted by the calm and shoal waters, and some observers believe the anchovy are attracted by the discharge of sewage and other pollutants or by an abundance of plankton, which feed upon these. One of the heavy catch areas within the harbor is the area within 2,000 to 3,000 feet of the Terminal Island sewer outfall. However, the correlation between anchovy bait schools and polluted waters is tenuous and reasons for the preference of the bait schools for the harbor waters is still in doubt.

5.13 The proposed project will affect only a very small area of the anchovy fishing grounds. It seems most likely that if the project were implemented the anchovy live bait schools would merely shift to unaffected areas of the harbor. However, California Department of Fish and Game biologists believe that the anchovies will not school in abundance within 2000 feet of land (excluding the outer breakwater). If this is true then it may be more difficult for the anchovies to find satisfactory schooling areas within the harbor.

5.14 No good evidence exists to indicate that the anchovies would survive, or would not survive in another part of the harbor. Areas not affected by the present project which might constitute a suitable replacement habitat may eventually be utilized for future harbor developments.

5.15 The planned fill would destroy the habitats in the harbor that are most heavily populated with water-associated birds. These habitats appear to be attractive largely because of (a) an abundance of fish and fish cannery wastes available for food, (b) the absence of marine traffic, and (c) the sheltered character of the area. The discharge of fish cannery wastes and primary treated sewage effluent is expected to be terminated within the next few years, regardless of whether or not the project is implemented (ref. 42). Therefore, the Fish Harbor-navy mole resting and feeding area might become a less attractive habitat, even before the project is begun. The birds utilizing this area might be able to find other satisfactory habitats in the eastern end of the harbor or in nearby estuaries and bays. Sheltered waters are found throughout the harbor, but the maintenance of large areas of little traffic within a heavily-used port is not compatible with the efficient development of the harbor.

5.16 The impact of the displacement of water-associated birds from their present habitats may depend on whether the threatened habitat is used mainly for feeding or resting. Those species that feed well offshore but prefer the harbor waters for resting are not likely to be severely affected. It is probable that they can find other suitable resting areas somewhere

within the shelter of the harbor. The impact on those birds that feed in the planned fill area may be more severe. They would have to compete with predators already occupying any other feeding area they might find. Consequently, the survival of those individuals that feed almost exclusively in the areas to be filled might be doubtful.

5.17 The disruption of marine traffic would not seriously affect the larger vessels. Detours through the two entrances in the breakwater and around Terminal Island might sometimes be necessary. However, the dredging can be carried out in such a way that it would almost always be possible for any vessel to reach any destination within the harbor that is not actually occupied by the dredging equipment. The proposed project might be very hazardous to inexperienced personnel handling small craft in the vicinity of the dredge pipes and other construction equipment. During the construction of Pier J in Long Beach Harbor (a similar project completed several years ago) collisions with construction equipment resulted in two fatalities and extensive damage to an estimated 100 small craft. Every effort would be made to mark the dredging and fill sites with buoys and lights.

5.18 The proposed dredging and filling will affect the hydraulic properties of the harbor in several ways. Deepening of the channels will reduce bottom and side friction, thus permitting increased flow. However, a decrease in the flushing would result from the increase in the channel-volume: tidal-prism ratio in the inner harbor. The dredging project will not change the tidal prism within the inner harbor, but it will increase the volume of the inner harbor waters within the Federal project boundaries by almost 29 percent. Considerable areas along the margins of the channel, and particularly in the West Basin and Consolidated Slip are beyond the Federal project boundaries; presumably these areas would not be dredged. Consequently, the total volume of the inner harbor waters below the tidal prism will be increased somewhat less than 29 percent; the exact amount of the increase has not been determined. If the increase in volume was 29 percent, then the average daily exchange within the Los Angeles Inner Harbor would be reduced from about 22 percent to about 17 percent; because the harbor volume increase would be less than 29 percent, the rate of flushing after completion of the project would be somewhat greater than 17 percent. Flushing will also be slightly decreased in the outer harbor, but the decrease is not likely to be of great importance. In no case would the exchange rate in the outer harbor drop below that which occurs in the inner harbor. Because the predicted changes in the rate of flushing are small, the adverse effects on the organisms are also expected to be limited.

5.19 Rapid rates of flushing are necessary only if the waters are being rapidly polluted. If pollution is minimized, the necessity for flushing would also be diminished. Many of the major sources of pollution have been terminated during the last decade. Future improvements in water quality are expected to result from the termination of primary treated sewage effluent discharge through the Terminal Island outfall and the elimination of waste discharges from Navy and commercial ships and small craft.

5.20 The accurate determination of the changes in character of flow within the harbor that would result from the proposed project is a complex and difficult problem well beyond the scope of this report. However, the following crude predictions may be worthy of mention here. The project would result in a small reduction in the rate of flushing in the inner harbor and in the dead-end basins and slips planned for the outer harbor. The resulting deterioration in water quality would be much less than the improvement in water quality that has been experienced during the last few years due to the curtailment of waste discharges. The future improvement in water quality that can be expected to result from the termination of existing discharges would be greater than any permanent detrimental effect caused by the altered current patterns resulting from the project.

5.21 The construction of new land areas and the deepening of the harbor will alter the dimensions of the channels and turning basins. The alteration may result in a change in the natural period of oscillation of the individual basins. The change in depth may also result in an alteration in the rates of wave propagation within the harbor, which would result in corresponding changes in refraction and diffraction patterns. The prediction of the character of these changes is also a complex task. Crude predictions based on a knowledge of the principles of hydraulics suggest that the impacts of the proposed changes will be minor. However, some seiche and surge problems might be consequential. For this reason, plans have been made by the Corps of Engineers to construct a physical model of the harbor to determine as precisely as possible the changes in wave propagation and water circulation that would be induced by the proposed project (refs. 1 and 3). If the model should indicate that serious consequences would result, the plans for the project can be altered to reduce the adverse effects. The expected impacts would be reviewed after results of the model studies become available.

5.22 A considerable number of small craft (both sailing vessels and power boats) are known to use the outer harbor on summer weekends. Principal usage is in the eastern end of the harbor, east of Pier J. Some sailing vessels, however, sail the entire length of the outer harbor, and power boats often use the outer harbor while in transit between Alamitos Bay and points to the west and south. The impact of the loss of the outer harbor areas for these uses is not considered to be significant.

5.23 There will be a change in the appearance of the harbor, particularly as seen from the bluffs of San Pedro, from the Vincent Thomas bridge and from other elevated places in the area. An area that is presently open water will be changed to land upon which structures were built. The proposed land fill area will be visible from residential and commercial buildings in San Pedro during most climatic conditions, but will be in the background rather than in the foreground. Residents of the area would, however, be likely to consider the esthetic effects of the proposed project as adverse. The appearance of the area to persons in commercial and private vessels and land vehicles will depend greatly upon the measures taken to control architecture of structures and to landscape and beautify the area.

5.24 The expenditure of public funds to the proposed Federal project will be limited to \$7.5 million required for the Federal portion. According to the 10.4:1 benefit cost ratio, the revenue and other economic benefits expected would exceed the Federal project costs. The non-Federal part of the total project costs is expected to be paid from the revenues derived from the usage of the planned facilities.

5.25 In summary, the direct impacts of the total project on the ecology of the marine waters include the following adverse effects:

- a. The permanent loss of marine bottom habitats in the areas of planned fill;
- b. The temporary loss of habitats in the areas to be dredged;
- c. The permanent loss of nonmobile organisms living in the dredge and fill areas;
- d. The temporary and permanent displacement of mobile organisms living in the dredge and fill areas, respectively (the impacts on the anchovies and waterfowl are considered most important);

- e. The possible pollution of marine waters by the dredging operations;
- f. Changes in circulation and tidal flushing.

6. ALTERNATIVES TO THE PROPOSED ACTION

6.1 The objective of the proposed project is to deepen the harbor to permit use by larger, deeper draft container, general cargo and bulk carrying vessels; the disposal of the dredged sediment is of primary concern, however. Basically, there are three ways to dispose of portions, or all, of the dredged materials: (a) the recommended method (landfill in the harbor), (b) disposal in the EPA authorized disposal site, and (c) disposal on land.

6.2 OFFSHORE DISPOSAL. All or part of the dredged sediments could be dumped at the offshore disposal site designated by Region IX, EPA. The site is 5.8 nautical miles from the entrance of Los Angeles Harbor, 1,000 yards in radius, and located at Lat. 33-37-06-N, Long. 118-17-24-W. Water depth at the site is 100 fathoms. The EPA, Region IX, has stipulated that 30 bottom sediment cores be taken throughout the project area, penetrating the sediment to project depth. The analyses of these samples for mercury, cadmium, lead, zinc, and oil and grease were also stipulated. These stipulations will be met during the design of the proposed project. Additional specifications for site usage are listed in table XIII.

6.3 Offshore disposal would require sediment removal by hopper dredge. A hopper dredge is very similar to an ordinary 300 to 400 foot ship with large pipes (drags) trailing into the water on each side. Sediment is hydraulically removed from the bottom as the ship passes along the navigation channel with the slurry being stored in the ship's hold (bins). When the bins are filled, the ship pulls up the drags and proceeds to the disposal area. Disposal takes place as the dredge makes a turn over the disposal area and heads back to the dredging site. The bottoms of the bins are opened and the sediment-water slurry is released.

6.4 The impacts of hopper dredging can be greater than hydraulic pipeline dredging. With the hydraulic dredge, sediment and water entering the line are permanently removed from the dredge area. Hopper dredges generally practice overflowing. As the bins of the hopper dredge fill, the larger sediment particles settle to the bottom. To take on a larger pay load, the dredge continues to pump past the capacity of the bins so that the water at the top of the bins, with a low solids content, flows over and back into the waterway. This overflow water carries with it silt and clay size particles which can have various pollutants absorbed to particle surfaces. However, in several recent cases polluted fine-grained sediments have been dredged economically without overflowing the bins. It thus appears that in areas of restricted circulation, such as in the inner harbor, it would be feasible to dredge fine-grained polluted sediments without overflowing the bins. The impacts of the dredging process itself, in this case, would be similar to dredging with a pipeline dredge.

6.5 There is speculation about potential impacts on water quality and aquatic organisms resulting from ocean disposal of dredged sediments. Few definitive field or laboratory studies have been conducted; and, due to the varied nature of sediments from one harbor to another, it is very difficult to extrapolate from other studies. Research efforts are currently being conducted by the University of Southern California, under contract to the Corps of Engineers, Waterways Experiment Station, Office of Dredged Material Research, on the chemical and physical nature of the sediments to be dredged in Los Angeles Harbor. This research effort is aimed at simulating and predicting both the short- and long-term effects on water quality due to ocean dumping. This research will be completed before design of the proposed project and the possible effects on water quality due to ocean dumping will be compared closely to the harbor fill disposal plan.

6.6 Potential impacts on aquatic organisms due to ocean dumping can be divided into short- and long-term effects. Short-term impacts will affect the lowest members of the food web. This is the planktonic community. The generally more mobile members of the higher trophic levels will be able to move away from an area found to be temporarily unsuitable. The nature and magnitude of any impacts on the planktonic community is closely related to the short-term water quality effects, which are not known at this time.

6.7 The major long-term impacts on the biological community are the effects on the benthic organisms. Many bottom-dwelling organisms will be smothered; however, some may be able to dig their way up to the sediment surface again. The exact nature of the benthic community within the disposal area is not known. The site is, however, an EPA-designated dump site and has been used in the past. It is therefore likely that the community is relatively limited already.

6.8 Disposal of the dredged sediments at sea would have several advantages. They include:

- a. No reduction of harbor volume.
- b. The disturbance of a previously disturbed benthic habitat as opposed to the previously undisturbed benthic environment within the proposed landfill site.
- c. The elimination of impacts associated with the development of new land.
- d. The disturbance of a relatively less productive biological community.
- e. The savings to the local interests of the cost of diking (estimated at \$4.4 million).

6.9 The disadvantages of ocean disposal include:

- a. Long-term impact on the benthic environment in the disposal area.
- b. The loss of control over sediment pollutants due to direct placement in water.
- c. The loss of the dredged sediment resource.

6.10 Although the primary purpose of the proposed project is to improve navigation, the ocean disposal alternative is not recommended at this time because the sediment resource removed from the channel bottom will be lost. The recommended disposal method (harbor fill) will make use of the sediment resource in accordance with the desires of local interests. If the proposed project is authorized, the alternative of ocean disposal will be considered further during the detailed design of the project.

6.11 LAND DISPOSAL. Through discussions with Port of Los Angeles personnel, several alternative disposal sites were identified. These are (a) slip 228, (b) slip 5, (c) the seaplane base at Terminal Island, (d) two land sites on Terminal Island, and (e) a land site near Anchorage Road. These sites are shown in figure 15.

6.12 By filling both slips 5 and 228, a total of 42 acres of new land could be created, at an elevation of +12 feet above MLLW, behind rock retaining dikes constructed by the Port of Los Angeles across the entrance to each slip. Approximately 4 million cubic yards of dredged material could be placed in the two slips. Both slips are currently in use with income to the port exceeding \$660,000 annually. Slip 228 is currently occupied by overseas

shipping lines, San Pedro Tugboat, and several small boat moorings. Slip 5 is occupied by Williams-Diamond General Cargo, Quaker Oats, Department of Water and Power Marine Oil Terminal, Catalina Freight Lines, University of Southern California, Wilmington Liquid Bulk Terminal, Coos Head Lumber Company, and some additional small boat dockage. Two mooring spaces are vacant. Elimination of slips 5 and 228 would reduce the net berthing space of the harbor by 6,400 feet. The existing biological community in these slips would be completely destroyed. Land created by the fill could be used for container cargo handling facilities.

6.13 Along Anchorage Road, 35 acres of subsided lands could be raised with a portion of the dredged material to +12 feet above MLLW behind existing earth dikes and new earth dikes. Currently there are 34 producing oil wells in this area, as well as an access road to 9 marinas providing 1,480 slips. The cost of raising the oil wells to allow the complete filling of the area would be excessive. A petroleum industry source has estimated the cost at \$100,000 per well.

6.14 Two separate sites are available for stockpiling material at Terminal Island; across from the Customs House and at Reeves Field. The stockpiled material could ultimately be hauled away and placed elsewhere in the harbor area over a period of years. Of these two sites, which total 67 acres, the 57 acre Reeves Field area is the only one in use. The area is the site of the Los Angeles Police Department driver training course and is used for storing imported automobiles. It could be possible to stockpile up to a maximum of about 4 and 1/2 million cubic yards of dredged material at these two sites. The material would be deposited behind earth dikes constructed by bulldozers and other heavy equipment. No natural biological communities would be affected by this action.

6.15 *The 86 acre seaplane base is not currently in use. This area could be used as an additional landfill site by sealing the existing breakwater and constructing a closing rock dike. Up to 103 acres could be filled, depending on the alinement of the closing dike. A maximum of 3.6 million cubic yards of material could be deposited here permanently. All members of the biological communities that use this area directly or indirectly would be destroyed or displaced.*

6.16 As previously stated, the above disposal sites represent several possible alternatives that, together or combined with ocean disposal, are able to handle the entire quantity of dredged material. The Interim Review Report presents additional information on these sites. With approximately 67 acres of possible land disposal sites on Terminal Island, which could accommodate nearly 8.8 million cubic yards of dredged material, approximately 6 million cubic yards of dredged material would have to be placed in the water; either offshore or as new land in the harbor. Since the terrestrial environment of the industrialized harbor area is of very low value as natural habitat, a disposal plan which minimizes the quantity of dredged material placed in the water would have the least adverse environmental impact. With 3.8 million cubic yards of dredged material disposed on land the remaining 6 million cubic yards could be placed entirely offshore or in the seaplane site. Also, approximately half of the material could be placed within slips 5 and 228.

6.17 The alteration of the project depth would have few advantages. The project, as now proposed, was formulated to maximize net benefits. The net average annual benefits from increasing channel depths by only 2 feet, or even 4 feet, would be very small. Large volumes of polluted sediment would still have to be handled.

6.18 It has been suggested that piers be constructed to provide additional desired wharf space as an alternative to creating new land. This might be environmentally feasible if some other acceptable alternative method could be found for the disposal of the spoils. The construction of piers would cost at least 10 times as much as landfill per unit area.

6.19 NO ACTION. If the project were not implemented, the biota inhabiting the harbor would be expected to remain and thrive, except where affected by pollution (chemical, particulate, thermal, and sonic). It has been previously pointed out that large strides have been made in reducing chemical and particulate pollution in the harbor during the last few years. Also, efforts are being made to control and perhaps reduce the discharge of thermal wastes. Therefore, there is every reason to believe that these forms of pollution will continue to be reduced during the next few years. The effects of noise pollution and ship traffic on marine organisms have not been thoroughly examined but are believed to have a significant impact, except on birds and mammals. Possibly a decline in wildfowl and certain fish populations would result from termination of the discharge of sewage into the outer harbor, and the resulting decrease in nutrient levels. However, no conclusive evidence or studies exist that would indicate how this would affect fish or wildlife.

6.20 Container cargos from throughout the United States and Asia would be collected and distributed through terminals that would be developed if the proposed channel depths are provided. Facilities must be provided to serve the new 1,000 container ships. Terminals with capacities of over 3,500 containers, cranes and gantries for loading and unloading ships, railway cars, and container transports also must be provided. The failure to provide additional facilities would probably inhibit growth in the surrounding region.

6.21 Lightering the container cargo from ships at anchor in deepwater was investigated but found to be impracticable because of the sensitivity of the handling equipment to ship movement. This alternative would prove very costly and would be so dangerous that fatalities may result.

6.22 The port already has considerable space allotted to container terminals. The cargo handled by these terminals could be expanded by stacking containers in onshore storage areas, but the cost of handling goes up with the height of the stacks. The existing water depths in the harbor are adequate for many ships now carrying containers. The greater depths that are proposed exist in the Long Beach part of the harbor and are probably adequate for any larger, deeper draft container vessels that are likely to be built in the near future, however, the Long Beach facilities will reach capacity at approximately the same time that the handling capacity of the facilities in Los Angeles Harbor is reached. New high-speed vertical stacking systems may increase the cargo handling capacity of existing facilities, but to what extent is unknown.

6.23 A survey of other U.S. Pacific Coast Ports revealed no ports that could accept the projected tonnages without expansion of facilities. Although the Port of Long Beach has, or will soon have, adequate depth for its share of the expansion, it could not handle all of the projected cargo increase. The diversion of the excess cargo to another port would be as

expensive as the improvements to the Port of Los Angeles and the benefits would be much lower due to the cost of land shipment of the cargos from the other port to the Los Angeles-Long Beach hinterland. Air pollution could also be aggravated by the increase in land traffic.

7. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

7.1 The cumulative and long-term impacts that the proposed Federal project will have on the environment include:

- a. The permanent loss of marine habitat areas;
- b. The permanent alteration of (1) the circulation pattern in the harbor and (2) the hydraulic characteristics of several of the harbor basins;
- c. Minor changes in the sources of pollution and the type of wastes introduced, accidentally or intentionally, into the harbor;
- d. Possible minor alterations in sources of air pollution; and
- e. Complex effects on employment, transportation, taxes, housing, and a large number of other socio-economic parameters associated with growth and increasing urbanization of the area.

7.2 The adverse impacts resulting from the loss of marine habitats have already been described. With two possible exceptions, this loss may be of minor importance because of the large areas of (a) similar habitats remaining in the shoal part of San Pedro Bay (depths less than 50 feet) and (b) the low quality of the habitat area lost. Some biologists disagree with this conclusion. They feel that the loss of habitats is of considerable importance because of their high potential. Certainly the cumulative loss of small areas is of great importance. There is a possible impact on the anchovy live bait fishery. The impact on the anchovy, as well as on bird feeding and resting areas, is difficult to determine. The expected changes in the circulation pattern may be detrimental, but the adverse impact on the quality of the harbor waters and aquatic biology is expected to be minor. If the anchovies leave the harbor as a result of the project, the termination of the sewage discharge, or for any other reason, then the anchovy live-bait fishing industry may be eliminated or relocated.

7.3 The implementation of the project will result in an increase in the size of the vessels visiting the harbor and a reduction in the number of visiting ships, compared to the present number of visiting ships. The projected number of visiting ships is also lower than the present number of visiting ships, because the proposed project will permit larger vessels, which can carry much greater amounts of cargo, to visit the port. As a result, the number of accidents can be expected to decrease, but the consequences of a single accident might increase. For this reason, it is difficult to predict with certainty how the pollution pattern will change. However, it appears probable that the expected decrease in traffic may result in a lower accident rate per vessel; and it is believed that intentional discharges of waste from large vessels can be controlled more easily than similar discharges from smaller ships. Therefore, a decrease in ship-caused pollution appears most likely.

7.4 The greatest long-term impacts will be on the economy and pattern of growth within the area. Whether all of these impacts are beneficial will depend upon the quality of planning that will be provided for the area. Presumably, if the growth patterns are carefully planned, new traffic and transportation systems can be built to handle human needs without undue congestion, delay, or pollution. New facilities can be attractively designed and landscaped, wherever possible, to improve the esthetic appearance of the area. On the other hand, if the area is developed without proper planning, a number of severe problems may be encountered. Thus, some of the long-term impacts might be either adverse or beneficial, and the outcome could be nearly independent of the Federal project itself.

7.5 The enlargement of the cargo handling capacity of Los Angeles Harbor might eliminate the need for similar facilities in other areas where heavy industrial development would have a definite adverse impact on the beneficial uses of the environment. This long-term impact is of considerable importance.

7.6 A large part of our commerce, industry, and population are concentrated in the coastal zone. The economy of the coastal region is at least partly dependent on maritime trade. If this trade were to cease, or even cease growing, growth in the local area might be seriously restrained.

8. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

8.1 All of the impacts considered in the previous section can be considered irreversible, although, in a technical sense, most are not truly so. One could always refill the dredged channels and destroy or remove the landfill areas and their associated improvements, thus recreating or restoring habitats similar to those presently in existence in the project area. However, the cost of retrieving the original environment would be so great that the proposed actions can be considered irreversible. It has been previously pointed out that the impact of the project on the ecology of the area is not considered to be of great significance. This conclusion may be subject to revision when more information becomes available concerning (a) the life history of the anchovy, (b) the post-project circulation patterns within the harbor, and (c) the concentrations of pollutants within the harbor sediments.

8.2 Although the endangered brown pelican and the least tern and schools of northern anchovy sought for bait are known to feed in the areas where construction is planned, it is believed that the implementation of the project will not significantly affect the survival of these species. Except for the loss of marine habitats to the newly-created land areas and the loss of nonmobile organisms in the dredge and fill areas, the entire project will not cause any irreversible damages to any habitats, species, or unique natural areas. The proposed project will not adversely affect any known historical, cultural, or archeological site.

8.3 The creation of new land in the outer harbor will result in an irretrievable loss of sheltered waters used for recreational boating. Small craft usage off the planned landfill area has been light. Furthermore, open areas in the outer harbor can accommodate more traffic. Some boaters do prefer sheltered waters; however, the heavy usage in the open sea by the 5,000 boats docked in Marina del Rey (about 20 miles to the northwest of Long Beach) indicates that in this region sheltered waters are not a necessary requirement for the operation of small pleasure craft.

9. COORDINATION WITH OTHERS

9.1 PUBLIC PARTICIPATION. Numerous informal meetings were held with the Port of Los Angeles; The California Regional Water Quality Control Board, Los Angeles Region; the Bureau of Sport Fisheries and Wildlife; the Environmental Protection Agency; the Bureau of Outdoor Recreation; and the National Marine Fisheries Service. A coordinating group was formed that included representatives of these agencies as well as representatives from the Eleventh U.S. Coast Guard District; the U.S. Navy; agencies of the State of California, and the county and City of Los Angeles; and numerous conservation groups, private interests and educational institutions. A public meeting was held on 15 May 1972, and was attended by a broad sector of public and private interests. All of the environmental concerns expressed at that meeting are discussed in this statement.

9.2 GOVERNMENT AGENCIES. The March 1972 Preliminary Draft Environmental Statement was sent to the following governmental agencies requesting their views and comments. The comments of the agencies are summarized in the following subparagraphs and copies of their letters are in Appendix A.

a. BUREAU OF RECLAMATION, USDI, SOUTHERN CALIFORNIA PLANNING OFFICE – REGION 3

Comment: The proposed plan to improve navigation facilities at these harbors does not conflict with existing or proposed projects of the Bureau of Reclamation. The Preliminary Draft Environmental Statement is adequate with respect to the environmental factors which relate to the Bureau of Reclamation's functional areas of responsibility and expertise.

Comment: Departmental review must be accomplished by submitting the Draft Environmental Statement and your request for its review to the Assistant Secretary Program Policy, Department of the Interior.

Response: As stated in the summary to the draft statement the Assistant Secretary's review has been requested.

b. BUREAU OF RECLAMATION, USDI, REGIONAL OFFICE – REGION 3

Comment: The proposed action will not affect existing or proposed Bureau of Reclamation activities.

c. BUREAU OF OUTDOOR RECREATION, USDI, PACIFIC SOUTHWEST REGIONAL OFFICE

Comment: The statement appears to cover adequately the possible impact on recreational use of the harbor area, however, this does not necessarily apply to recreational fishing. We defer to the Bureau of Sport Fisheries and Wildlife for comment on all of the fisheries aspects.

Comment: We suggest that you discuss the alternative of constructing the proposed container cargo facilities in another southern California or West Coast location.

Response: This project is a necessary improvement of Los Angeles Harbor to allow the port to handle large container ships. Other ports on the West Coast will probably develop container cargo facilities in addition to and not in place of the proposed Los Angeles terminal.

Comment: Were it possible, the logical order of business would be to first prepare the statement on the long term harbor development objective and then tie each separate project statement into this "master".

Response: The presently proposed project is incrementally justified and is not dependent upon nor contributory to future development. Several more years of research are needed before plans for the long range development can be evaluated. The results of this evaluation cannot be predicted at this time.

d. GEOLOGICAL SURVEY, USDI, WATER RESOURCES DIVISION

Comment: The comment that "salt-water intrusion---have been caused by excessive pumping" is misleading and should be deleted or qualified. A statement that adverse head conditions combined with a source of sea water can result in salt-water intrusion would be more appropriate.

Response: The statement has been revised according to this comment.

Comment: Conversely, it should be pointed out that intrusion has already occurred in this area to such an extent that the shallower aquifers are no longer a source of potable water.

Response: The statement has been revised to include this information.

Comment: Regarding paragraph 94, page 21, a deletion of the last sentence is suggested. The Long Beach earthquake was mentioned on page 4, paragraph 16. The statement that nearby fault zones "are believed to be inactive" is questionable.

Response: The statement has been revised according to this comment.

Comment: The foregoing comments are provided for technical assistance and are not intended to represent the position of the Department of the Interior.

e. NATIONAL PARK SERVICE, USDI

Comment: We are not aware of any significant natural values in the area, but suggest you contact the California Natural Areas Coordinating Committee.

Response: The suggested contact was not made because consultation with local scientists and conservationists and our personal observation of the area have confirmed that no significant natural values are present.

f. GEOLOGICAL SURVEY, USDI

Comment: We are inclosing copies of comments from our Geologic and Water Resources Division for your use in preparing the draft environmental statement on the deepening of areas in the Los Angeles part of the Los Angeles-Long Beach Harbors.

Response: The comment to the Water Resources Division were received and responded to separately. The comments of the Geologic Division follow.

Comment: According to the Preliminary Draft Environmental Statement, seismic hazards to the improvements are not serious and the two fault zones near or in the harbor area are inactive. It should be noted that this part of California is a tectonically active area prone to major earthquake damage. This seismic activity should be considered in the construction of the diked landfill areas. Discussion of intensities and accelerations of anticipated earthquakes should be included in the draft environmental statement.

Response: The environmental statement has been modified to reflect this comment.

g. BUREAU OF SPORT FISHERIES AND WILDLIFE, USDI

Comment: Page 1, paragraph 2: The project description is not adequate. More information on the length, width and depth of the channels and other pertinent information should be given.

Response: This information has been incorporated in the environmental statement.

Comment: Page 1, paragraph 5: It is our impression that in addition to channel dredging the first stage of this project will include the filling of Slip 230, development of marinas at Fish Harbor and Cabrillo Beach, additional marina development in the West Channel, and modification of the pierhead lines in the West Basin. If this is the case, these items should be discussed in the statement.

Response: The proposed project does not include any of the developments mentioned in this comment.

Comment: It is stated that spoil obtained would provide about 206 acres of landfill. On page 25 of your interim review report, a 307-acre diked area is mentioned. Clarification appears necessary.

Response: The environmental statement has been revised; 307 acres is the correct figure. (The acreage was revised to 187 acres after preparation of the draft environmental statement.)

Comment: Page 2, paragraph 6: According to information in this paragraph, the proposed dredge and spoil project is only the first stage in a more comprehensive harbor development. Your statement that channels would be dredged in Los Angeles and Long Beach Harbors to depths of 80 feet and that about 2,500 acres of outer harbor will be filled to provide new wharf areas, together with information we have concerning future dredging, indicates that by 1985 most of the harbor will be filled. The Bureau of Sport Fisheries and Wildlife is concerned that the proposed long range harbor development outlined in paragraph 6 could seriously affect the natural resources of the area. These resources include important sport and commercial fish, marine mammals and water-associated birds.

Response: The Corps of Engineers is also concerned. The Corps has arranged for the University of Southern California, Allan Hancock Foundation to conduct extensive studies in Los Angeles-Long Beach Harbors to determine what effects the proposed long range project would have on harbor ecology, including the anchovy. Several more years of research are needed before plans for the long range development can be evaluated. The results of this evaluation cannot be predicted at this time. The Corps will continue to coordinate closely with the Bureau of Sport Fisheries and Wildlife during this period. This environmental statement is concerned solely with the interim project, which is incrementally justified and is not dependent upon nor contributory to long range development.

Comment: Page 8, paragraph 39: If criteria for dissolved oxygen concentrations is changed, we recommend that it not be set below 5.0 ppm.

Response: This criterion is not subject to change in the foreseeable future. The environmental statement has been revised to remove the implication that this criterion may change.

Comment: Page 12, paragraph 55: This paragraph gives the impression that new habitats created along channel sides and bottoms, and by the installation of pilings and concrete and rock dikes, compensate for the destruction of salt flats and estuarine marshes. New habitat has been created but does not replace the high-value wetlands lost.

Response: The environmental statement has been revised to reflect this comment.

Comment: Page 13, paragraph 59: At a number of places in the statement, the term waterfowl is used in a very general sense. Waterfowl is ordinarily applied to members of the family Anatidae - swans, geese and ducks. You may want to refer to water-associated birds.

Response: The environmental statement has been revised to change "water-fowl" to "water-associated birds".

Comments: Page 16, paragraph 74: Species taken in Los Angeles Harbor are white croaker, queenfish, shiner perch, walleye, surf perch, pile perch, bonito, white seabass, California halibut, barracuda, Pacific jack mackerel, sardines, and corbina.

Response: With the exception of the white seabass, all the species mentioned in this comment are included in Table VIII. These species have been added to the text to the environmental statement.

Comment: Page 16, paragraph 76: Change Department of Fish and Wildlife to Bureau of Sport Fisheries and Wildlife. We do not agree that anchovies are feeding on the great volume of organic particles discharged from the Terminal Island outfall.

Response: The environmental statement has been revised to reflect these comments.

Comment: Page 21, first paragraph: There is no discussion in the statement of where the material for the rock structures around the margins of the fill areas will come from. Information on location of quarries, amount of rock material to be used, and impact on fish and wildlife at the quarry site should be given.

Response: The rock would probably come from commercial quarries on Santa Catalina Island, which have provided material for other construction in the harbor area. However, at this preliminary stage of the design, it is impossible to say with assurity what source would be used. This question will be addressed in a future environmental statement to be prepared in conjunction with the definite design studies for the proposed project.

Comment: Page 30, paragraph 140: Studies being planned by the Corps of Engineers to obtain information for accurate prediction of the impact of the project on the live bait industry should be coordinated with the California Department of Fish and Game, Bureau of Sport Fisheries and Wildlife, and National Marine Fishery Service.

Response: Studies of the anchovy will be made for the Corps of Engineers by the University of Southern California, Allan Hancock Foundation. These studies will be coordinated with the agencies listed in the comment.

Comment: Page 37, paragraph 173: The piecemeal loss of marine habitat within the harbor can be considered of great importance.

Response: The piecemeal loss of marine habitat is definitely of great importance as a cumulative loss. The environmental statement has been revised to reflect this.

Comment: Table IIIA: A study of this table lead us to believe that the extruded core samples were not taken to project depth in some cases. We have information that indicates mercury levels occurring between Holes 2 and 3 exceed EPA limits.

Response: The core samples in Table IIIA were not taken to project depth in some cases, however the data obtained from these very preliminary samples served the intended purpose of confirming that some of the material to be removed was polluted. Extensive sampling (over 400) by the Port of Los Angeles, taken prior to the Corps' sampling also confirmed that polluted material was present. During definite design studies an extensive coring and sediment analysis program will be conducted. This program will permit a more refined identification of the exact extent and nature of pollutants. At present, plans are to take about 50 cores to below project depth.

Comment: It should be stated at some appropriate place in the draft that dredging operations and disposal of spoil will be scheduled so as to reduce turbidity and siltation to the lowest level practicable. The Environmental Impact Statement should also state that the Corps of Engineers will maintain close coordination with personnel of the Bureau of Sport Fisheries and Wildlife and the California Department of Fish and Game prior to and during dredging and spoil operations to safeguard fish and wildlife resources.

Response: Dredging operations and disposal of spoil would be in full compliance with requirements of the Los Angeles Regional Water Quality Control Board. That agency coordinates with the Bureau of Sport Fisheries and Wildlife and the California Department of Fish and Game in establishing requirements. The Corps of Engineers will also continue to coordinate with these agencies during preparation of definite design studies for the proposed project.

h. AGRICULTURAL RESEARCH SERVICE, USDA

Comment: *We have no comment.*

i. SOIL CONSERVATION SERVICE, USDA

Comment: *We have no comments.*

j. FEDERAL AVIATION ADMINISTRATION, USDT

Comment: *Our findings indicate that this proposed project will not present any problem from an environmental viewpoint to any existing or presently planned FAA facilities. Please be advised that this approval does not obviate the requirements for the Corps of Engineers to file a notice with the FAA where applicable and as stipulated under Part 77 of the Federal Aviation Regulations.*

Response: *Part 77 of the Federal Aviation Regulations would not apply to the proposed work.*

k. FEDERAL HIGHWAY ADMINISTRATION, USDT

Comment: *It should be noted in the draft EIS that the admission of larger ships into the harbor may necessitate future reconstruction of some of these bridges to provide vertical clearance.*

Response: *The only bridge spanning the proposed project is the Vincent Thomas Bridge, which has adequate vertical clearance to accommodate both existing and projected vessels.*

Comment: *More emphasis should be placed on the increased land transportation which will be generated by this project, particularly truck and rail system.*

Response: *The projected increase in land transportation resulting from the project would be relatively small compared to the projected land transportation without the project. Without the project, commodities required by the region's population would have to be imported into the region entirely by land transportation from outside the region. An overall increase in land traffic would result.*

l. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, USDC

Comment: *We feel it is a thoroughly prepared, well documented work and consider it acceptable in form and content.*

m. THE ASSISTANT SECRETARY OF COMMERCE, USDC

Comment: *The dredge and fill will obsolete sections of the nautical charts covering the harbor, pending publication of a corrected edition.*

Response: *Notices would be placed in the local "Notice to Mariners" and similar publications prior to construction; and the U.S. Coast and Geodetic Survey would be advised of proposed and actual changes in harbor configuration and depths.*

Comment: As an alternative, the construction of dikes and settling ponds within which the spoil would be placed should be discussed.

Response: Dikes and settling ponds are discussed in paragraphs 4.19 through 4.22, and methods for containment of dredge spoil and reduction of solids in dredge spoil water effluent are diagrammed in figures 15 and 16.

Comment: The effect of displacement of a segment of the anchovy population in Los Angeles-Long Beach Harbor is largely unknown. In view of the uncertainties, we suggest that pre-construction and post-construction studies be undertaken to determine the size, distribution, and movements of the anchovy population in the harbor.

Response: Studies of the anchovy will be started about December 1972. The studies will be made for the Corps of Engineers by the University of Southern California, Allan Hancock Foundation.

n. DEFENSE SUPPLY AGENCY, USDD

Comment: The Environmental Statement did not reveal any impact area of concern to this command. In view of this we do not choose to comment at this time.

o. COMMANDANT, ELEVENTH NAVAL DISTRICT, USN

Comment: The subject environmental statement forwarded to this Command by reference (a) has been referred to the Western Division of the Naval Facilities Engineering Command. The review and preparation of coordinated Navy comments on the environmental statement will be reported to your office by the Western Division Office.

p. WESTERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND, USN

Comment: The proposed dredging and fill operation are expected to have minimal impact on Navy operations in the area. It is requested, however, that a minimum channel width of 150 feet be maintained during and after construction of the disposal area dike for access to Reeves Field.

Response: The requested minimum channel will be incorporated into the definite design of the project when it is developed.

Comment: The Navy's Master Plan for the Long Beach complex includes the construction of an additional 75 acres of mole area as shown in inclosure (1). It is requested that the Army Corps of Engineers take under consideration the modification of the exterior retaining dikes to include this area. If this request appears feasible further discussion between this Command, the Corps of Engineers and the cities of Los Angeles and Long Beach should be initiated.

Response: The local sponsor for the proposed project, which is entirely within the Port of Los Angeles, is the City of Los Angeles. The City of Los Angeles could not participate in construction within the Port of Long Beach; therefore, the suggested dike modification cannot be included in the proposed project. The request will, however, be considered in preparation of the long range project, which will concern both the Los Angeles and Long Beach harbors.

q. ENVIRONMENTAL PROTECTION AGENCY

Comment: One of our prime concerns with the impact statement is that it only addresses itself to the first stage dredging of the proposed Los Angeles-Long Beach Harbors Master Plan. The Corps has stated that an EIS for the entire master plan will be prepared and circulated for review in 1975. It is our position that this particular dredging action is the first major federal action associated with the ultimate harbor development plan. Therefore, we feel it would be more appropriate to deal with the entire harbor development and its associated impact first, before any particular segments of the plan are implemented.

Response: The presently proposed project is incrementally justified and is not dependent upon nor contributory to future development. Several more years of research are needed before plans for the long range development can be evaluated. The results of this evaluation cannot be predicted at this time.

Comment: It appears that there is very little information available on harbor circulation and flushing. This lack of knowledge has caused problems in prior dredging projects in the harbor area. The statement needs to be more specific in dealing with the flushing impacts which will occur in the inner and outer harbor as the harbor is dredged to its ultimate depth of 80 feet.

Response: Information upon which to base an evaluation of impacts of the proposed project on circulation and flushing, as well as the impact of future long range deepening of the harbor, is being collected. An extensive data collection and hydraulic model testing program is under way. The results of this program will be considered in preparation of the definite design of the proposed project.

Comment: In addition to the flushing problems and the disruption of marine organisms living on the channel bottom, we are concerned about the displacement of live bait fisheries from the outer harbor to areas further south. This displacement may ultimately result in the loss of this fishery altogether. The California Department of Fish and Game has stated that by filling the proposed 2,500 acres of outer harbor a significant threat to the anchovy fishery would occur. This in turn would have a major impact on southern California sport fishing.

Response: Studies of the anchovy will be started about December 1972. The studies will be made for the Corps of Engineers by the University of Southern California, Allan Hancock Foundation. The results of these studies will be fully considered in preparation of the definite design for the proposed project. It should be noted that the California Department of Fish and Game statement in respect to filling of 2,500 acres in the outer harbor pertains to the long range plan, not to the proposed project that is the concern of this environmental statement.

Comment: The impact statement recognizes the severe air quality problem which exist in the Los Angeles basin. However, the statement fails to equate growth factors and the net economic stimulation due to the project, with an increase in motor vehicle emissions. This is a serious oversight.

Response: A discussion of growth factors and economic stimulation has been added, and the effects on motor vehicle emissions clarified. See Appendix C.

Comment: Current strategies which are being implemented by the State of California and EPA call for population figures substantially less than the ones presented in these reports. Population figures which appear in the California Area Implementation Plan call for levels of growth which are consistent with the other strategies being implemented currently to reduce air pollution in the Los Angeles basin.

Response: Department of Finance (State '70 - Series D) population projections were used for the State of California component of the Los Angeles-Long Beach harbors tributary area. This population projection is the same as that which appears in the California Area Implementation Plan, therefore the levels of growth projected for California would be consistent with that plan. The domestic tributary area of Los Angeles-Long Beach harbors also includes all or a portion of the states of Nevada, Utah, Wyoming, Colorado, Arizona, New Mexico and Texas. With the exception of Arizona, OBERS (Office of Business Economics and Economic Research Service) population projections were used for these states. A modified OBERS population projection was used for the state of Arizona.

Comment: The impact statement indicates that the construction of this project will necessitate the installation of some surface improvements such as streets and utilities. Yet there is no discussion of the impact of installing the surface improvements. Although such improvements will be done by local interests, their environmental impacts should be discussed in the impact statement because their construction depends on the implementation of this project.

Response: It is agreed that the installation of utilities, streets, etc. by local interests would result as a consequence of the proposed project. It is also recognized that improvement of Los Angeles Harbor may indirectly affect, to some degree, surface transportation facilities, the location of industrial and commercial facilities and other features within the entire Pacific Southwest. However, the nature of both local and regional urban modifications resulting from the proposed project is impossible to determine or evaluate in a meaningful way. From a practical standpoint, an environmental statement on any proposed project must draw a line somewhere in considering secondary environmental impacts. Therefore, it seems appropriate in this statement to emphasize primary project effects of major significance, where the environmental impacts can be evaluated with some degree of assurance.

Comment: In keeping with the population projections which support the strategies being developed to meet the Clean Air Act Standards of 1975 it would be advisable for the statement to consider alternative project locations on the west coast.

Response: A discussion of alternative project locations has been added to the statement.

r. ELEVENTH COAST GUARD DISTRICT, USCG

Comment: The statement in paragraph 28 which reads "The Commandant of the 11th Coast Guard District reports that large amounts of oil are discharged outside the harbor when arriving and departing ships empty their bilge water into the sea (ref. 20)" is misleading in that it gives the incorrect impression that large amounts of oil are discharged just outside this harbor in violation of statutory prohibitions, and that this amount is considerably more than in adjacent coastal water. If a statement of this nature was made by a staff member of the 11th Coast Guard District as indicated in reference 20, it was made in error or was erroneously interpreted.

Response: The statement has been revised to reflect this comment.

Comment: Except for the statement "Every effort would be made to mark the dredging and fill sites with buoys and lights", there is no discussion of other measures planned to minimize these hazards. This is a matter of concern to the District Commander and additional reasonable precautions should be taken in this area. In a similar vein, the project will probably result in some disruption in aids to navigation services available to the mariner during the construction phase. Aids in the dredging areas will have to be relocated and submarine cables which supply power to the aids will be disturbed. The continuation of the excellent cooperation between our respective organizations in the past will minimize these inconveniences. New aids to navigation will probably be required at the new facilities created by the proposed fill area. Although they are not significant environmental impacts, the requirements for these aids should be kept in mind as your project progresses.

Response: The Corps of Engineers will continue close cooperation with U.S. Coast Guard as the project progresses. Detailed consideration of aids to navigation will be incorporated in the definite design of the proposed project.

Comment: In the draft statement, all references to the Commandant of the 11th Coast Guard District should be changed to Commander, Eleventh Coast Guard District.

Response: The statement has been changed to reflect this comment.

s. THE RESOURCES AGENCY OF CALIFORNIA

Comment: The State of California recognizes the fact that ports are a high priority coastal zone dependent industry. Modification and upgrading of developed ports are expected and necessary activities.

Comment: The Impact Statement declares this project to be the first stage of a much larger development for the entire harbor area. The immediate project proposes over 200 acres of harbor area to be filled along with deepening of certain channels. Ultimate development as proposed by the Ports of Los Angeles and Long Beach and the Navy Department calls for deepening of channels up to 80 feet, with 2,500 acres of the outer harbor to be filled, about 18 percent of the present water area. Reference is made to five other ongoing fill projects within the harbor. In view of the compounding effect of these additional projects, this project should be held in abeyance until a detailed long-range development plan, which assures orderly development of the harbor area and reasonable protection of fish and wildlife resources, is provided.

Response: The presently proposed project is incrementally justified and is not dependent upon nor contributory to future development. As stated in paragraph 1.6 of the environmental statement, it is believed that at least 10 years would be required to implement a long-range plan. If this project is held in abeyance for 10 years or longer, the Port of Los Angeles will not be able to serve the citizens in its tributary area. As the State has recognized, ports are a high priority coastal zone industry, and modification and upgrading of developed ports are expected as necessary activities. In view of the urgent need for the proposed project, its considerable economic justification, and the fact that it does not require any future expansion or development to realize the expected benefits, its implementation at this time is considered highly justified.

Comment: We foresee the following adverse effects to fish and wildlife from proposed and anticipated, but not specified, projects if the present piecemeal approach to development and filling of the harbor continues:

(1) The anchovy live-bait fishery may be destroyed through filling of habitat and interference with present fishing methods.

(2) Habitat for shorebirds and other water-associated birds may be eventually eliminated resulting in displacement or actual reduction in bird populations.

(3) Tidal flushing of the harbor may be substantially reduced with the result that water quality would be degraded and become unfit for desirable forms of marine life, including anchovies.

Response: The Corps has arranged for the University of Southern California, Allan Hancock Foundation, to conduct extensive studies in Los Angeles-Long Beach Harbors to determine what effects the proposed long range project would have on harbor ecology, including both the anchovy and water-associated birds. Information upon which to base an evaluation of impacts of the proposed project on circulation and flushing is also being collected. An extensive data collection and hydraulic model testing program is under way. The results of these research programs will be considered in preparation of the definite design of the proposed project.

Comment: The discussion on page 16, paragraph 76 and page 30, paragraph 139 concerning the anchovy needs to be revised. All conjecture related to the anchovy's feeding habits and possible preference or reliance upon sewage discharges should be eliminated from the report.

Response: The environmental statement has been revised to reflect this comment.

Comment: Pages 5, 6, 7, 20, Paragraphs 21, 28, 33, and 91 respectively - These sections refer to the importance of tidal flushing to water quality in the harbor. However, for the "Direct Impacts" listed in paragraph 91, the interference with tidal flushing and the resultant effect on water quality is not listed.

Response: Tidal flushing has been added to the listings in paragraphs 4.2 and 4.3. The definite design of the project will be based on the hydraulic model testing program that is under way. The configuration of the proposed landfill will be designed to preclude adverse effects on water quality.

Comment: Page 23, Paragraph 102 - With regard to the Environmental Protection Agency criteria for determining the acceptability of dredged spoil for disposal in the nation's waters, please know that the Department of Fish and Game believes the present criteria are not adequate. Limitations on materials such as additional heavy metals, poly-chlorinated biphenyl compounds and other potentially cumulative pollutants have to be added to the criteria along with control on general toxicity.

Comment: Pages 1 and 2, Paragraphs 1 through 6 - These paragraphs provide an inadequate description of the immediate project. Although a separate copy of the project report was provided, the Impact Statement should contain enough details concerning the project to allow the Statement to stand alone as a complete document of the proposed action.

Response: Paragraph 1.2 has been revised to include details of the proposed project.

Comment: Paragraph 6 refers to the proposed project as being only the first stage of a much more comprehensive development.

Often in the considerations of impact on fish and wildlife, each component of a large project, or each of a series of small projects, is insignificant when evaluated singly. However, the sum total of these may become significant. Therefore, the revised Statement should consider the total development of the harbor.

Response: Paragraph 16 has been revised to clarify the status of the investigation of the coordinated long-range plan for harbor development proposed by the Ports of Los Angeles and Long Beach and the Navy Department. The Corps has initiated various research activities to determine the effects of the long-range plan on the ecology, on tidal flushing, currents, etc. Several more years of research are needed before the long-range plan can be evaluated. Close coordination with the Department of Fish and Game will be maintained both during research activities, and subsequent evaluation based on this research. To iterate the response to a preceding comment, at least 10 years will be required to evaluate and implement a long-range plan, and there is a present urgent need for measures to permit the Port of Los Angeles to operate effectively.

t. DIVISION OF HIGHWAYS, STATE OF CALIFORNIA

Comment: We have no comments to offer other than it appears that this project will have no effect on any state highway.

u. DEPARTMENT OF SMALL CRAFT HARBORS, COUNTY OF LOS ANGELES

Comment: A minor correction is in order in paragraph 114 (page 26): The word "Commission" should be changed to read "Committee".

Response: This correction has been made.

Comment: It appears to us that the beneficial results of the proposed project far outweigh the adverse effects.

v. THE REGIONAL PLANNING COMMISSION, COUNTY OF LOS ANGELES

Comment: In our opinion the impact statement is thoroughly comprehensive in nature and analyzes the various environmental questions according to the best available information and appropriate logic. The proposed project does not conflict with basic policies set forth in the County's Interim General Plan.

Comment: The primary concern of our agency is the planning implications of the long range expansion program of the harbor districts. The contemplated long range expansion would imply a possible reevaluation of socio-economic factors (employment, transportation and housing) in relation to the County General Plan program.

w. LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

Comment: Page 3, paragraph 13, states: "The Dominguez Channel does not contribute significant amounts of sediment to the harbor because it is concrete lined...". It is "concrete-lined" for about half of its upstream length, but the tidal estuary from the harbor to Vermont Avenue is lined with loose stone on the banks over a compacted clay lining.

Response: The environmental statement has been revised to reflect its comment.

Comment: Page 22, paragraph 98a: Gaffey Street Storm Drain has been cleaned of debris and sedimentation. Therefore, the 22,000 cubic yards of material is not available from this drain.

Response: The environmental statement has been revised to incorporate this comment.

Comment: "Fresh water hydrology", items 12 and 13, page 3; "Geology", items 14 through 19, pages 3 and 4; "Direct Impacts", item 90, etc., page 20, etc; and particularly, item 93, page 21: Recognition should be given in the above items to the ground water zones which underlie the harbor area and to the condition of direct exposure of the zones in the harbor to sea water. These exposed aquifers (or stata of the major aquifers) offer avenues of intrusion for degradation of inland fresh-water producing zones. An inland ground water gradient exists due to past overpumping of these zones. Also recognition should be given to the "Dominguez Gap Barrier Project" which has been constructed and is operated by the District as a fresh-water injection system to halt the intrusion.

Response: The environmental statement has been revised to include the information given in this comment.

Comment: We suspect, but lack evidence for complete assurance, that the dredging to the depths proposed will not expose more aquifer zones or lenses to intrusion. We would be interested in examining logs of borings in the proposed dredging area, if such are available.

Response: Extensive borings will be made prior to construction and logs will be available for examination.

x. DEPARTMENT OF CITY PLANNING, CITY OF LOS ANGELES

Comment: Under the "Project Description" section clarify the fact that the report only refers to a project involving the Los Angeles Harbor and that the Long Beach Harbor is not involved in any way. Further stress the fact that the project might have an effect on the environment of the entire harbor area and the steps are being taken to determine and minimize any adverse environmental effect.

Response: The environmental statement has been revised to reflect this comment.

Comment: Under the "Project Description" section, provided a paragraph (now included in paragraph 147, page 32) explaining that a physical model would be constructed

to determine what changes in wave propagation and water circulation might be induced by the proposed project throughout the entire harbor area (i.e. Long Beach Harbor). Further, that if the model indicates that serious consequences might result, plans for the project can be altered to reduce the adverse effects.

Response: The environmental statement has been revised to reflect this comment.

Comment: Under the "Environmental Impact of the Proposed Project" section, reiterate paragraphs 90(f) and 91(c) that a model is being constructed to determine what changes in hydraulic characteristics can be expected in the entire harbor area as a consequence of the proposed project.

Response: The suggested iteration is not considered necessary.

Comment: Under the "Environmental Impact of the Proposed Project" section, include waste discharge requirements for the disposal of sediments obtained by the project in line with specified LAR-WQCB standards. These requirements should be specified prior to any approval of a final Environmental Statement (see paragraph 99).

Response: Sufficient testing and design work was done, during preparation of the studies for the interim proposed project, to determine that extremely stringent waste discharge requirements can be met. However, additional sampling, to the extent of 50-60 cores, would be made prior to requesting specific waste discharge requirements from the LAR-WQCB. The specific nature of the dredge spoil material, the disposal methods to be used, and the waste discharge requirements set by the LAR-WQCB will be addressed in a future environmental statement, which will be prepared in conjunction with the definite design studies for the proposed project.

Comment: Under the "Environmental Impact of the Proposed Project" section (see paragraph 108, page 25) state what measures are going to be taken during the dredging operation to minimize the spread of polluted spoil throughout the harbor. Further, what measures are going to be taken to minimize the spread of polluted spoil throughout the harbor during the loading, transporting and dumping of barges which will carry the fill from the dredged site to the fill site.

Response: It is most likely that the planned dredging operations would be carried out with a large hydraulic dredge. Possible measures to minimize the spread of polluted fill are discussed in paragraphs 4.19 through 4.22. The detailed measures to be taken would be developed during definite design of the project.

Comment: Under the "Adverse Environmental Effects Which Cannot Be Avoided Should The Project Be Implemented" section, more precisely defined (if possible) the ecological consequences of the proposed project in the final Environmental Statement. This should more particularly relate to the effect of the project on the anchovy fishery and the destruction of marine habitats. This would be particularly relevant in view of the current concern of biologists on the scarcity of protected waters along the California coastline.

Response: Study of the anchovy were started about December 1972. The studies are being made for the Corps of Engineers by the University of Southern California, Allan Hancock Foundation. Until these studies are completed, a more definitive discussion of impacts is impossible.

y. DEPARTMENT OF PUBLIC WORKS, CITY OF LOS ANGELES

Comment: We have no suggestions for changes or additions.

z. DEPARTMENT OF WATER AND POWER, CITY OF LOS ANGELES

Comment: The Department of Water and Power, City of Los Angeles, has two 34,500-volt submarine cables installed at a depth of -50 feet mean lower low water crossing the East Basin Channel within the area of your proposed dredging operation. The Department is also greatly concerned about three existing water mains crossing the channel within the project area. The attached letter, dated May 12, 1972, was sent to Colonel H. McK. Roper, Jr., Los Angeles District Engineer, stating that two of these main (12-inch and 20-inch) would be affected by the proposed dredging operation. A serious deficiency of water supply will exist in Terminal Island should these mains be taken out of service. Before any final action is taken by the Corps of Engineers on this proposed project, we desire to discuss in detail the channel crossings and the problems of water supply to the Terminal Island area.

Response: The submarine cables would not be affected by the proposed project (which involves dredging to -45 feet mean lower low water). Nor would these cables be affected by the long range plan, which would not involve further deepening of this channel. The relocation of the affected water mains will be incorporated in the detailed design of its proposed project. The Corps of Engineers will continue close coordination with the Department of Water and Power.

aa. PORT OF LOS ANGELES

Comment: In the summary, paragraph 3a, insert as item (3): "A reduction in the rate of growth of trade and a variety of associated adverse economic and social consequences can be expected if no action is taken on the proposed project." Make item (3) new item (4) and item (4) new item (5).

Response: This insertion would be inappropriate in the summary, which is concerned solely with the proposed plan.

Comment: In paragraph 4, delete words "general cargo container" in first sentence and insert at end "including bulk, liquid bulk and container vessels".

Response: Project formulation and assessment of project economics was based solely on general cargo vessels, both container and bulk. Liquid bulk vessels were not considered in determining channel dimensions.

Comment: Insert at end of second sentence "dry and liquid bulk cargoes and imported energy sources".

Response: The statement has been revised to reflect this comment.

Comment: In paragraph 9, add at the end of the last sentence "from which \$22,433,587 was collected in U.S. Customs. (Reference U.S. District Director of Customs)".

Response: The statement has been revised to reflect this comment.

Comment: Change first sentence in paragraph 24 to read and add new sentence "and in Los Angeles inner harbor values are usually higher than 4.0 mg/L. Values of 2.0 mg/L are infrequently found and appears to be associated with occurrences of red tide and similar microorganisms".

Response: The statement has been revised to reflect this comment.

Comment: In paragraph 28, add information taken from "Prevention and Control of Oil Spoils" sponsored by the American Petroleum Institute, the Environmental Protection Agency and U.S. Coast Guard publication of 15-17 June, 1971, pages 199-204. It is reported as follows: From 1962 to 1969 total oil spills were 13,042 barrels with one spill being 4,500 barrels. In 1967 California Department of Fish and Game reports 174 oil spills amounting to 1,423 barrels for Los Angeles-Long Beach Harbors and including U.S. Navy.

Response: The statement has been revised to include this information.

Comment: Substitute for "sewage" in third sentence of paragraph 29 "primary treated sewage effluent" and substitute same phrase at following locations for "sewage": paragraph 76, 97, 141 (now 133) and 145 (now 137).

Response: The statement has been revised to reflect this comment.

Comment: Add at end of third sentence, paragraph 3, "although substantial information is available from water quality monitoring programs of the Los Angeles Harbor Department and include water transparency, dissolved oxygen, temperature, color and presence or absence of oil and grease, odor or suspended matter".

Response: This statement has been revised to reflect this comment.

Comment: At line 10, paragraph 31, after Board, delete "32" unless this is a reference.

Response: This should have been indented as a new paragraph. The correction has been made.

Comment: In paragraph 74, delete "a fishing barge and two fishing piers" and substitute "fishing pier".

Response: This statement has been revised to reflect this comment.

Comment: In paragraph 86, change "millimeter" to "milliliter".

Response: The statement has been corrected.

Comment: In paragraph 91h, add "The value of filled land and land adjacent thereto would likely appreciate due to increased commercial activity which may off-set any possible depreciation of remote land value".

Response: Paragraph 91h was considered a misstatement of fact and has been deleted.

Comment: At the end of line 9, paragraph 99, insert "However, the removal of polluted sediments from harbor channels may off-set these adverse impacts and improve the total harbor environment."

Response: This statement appears inappropriate to the referenced paragraph, however, the sense of the comment has been included in paragraph 4.2.

Comment: In second sentence of paragraph 115, "berthing costs" should read "terminal and berthing costs".

Response: The statement has been revised to reflect this comment.

Comment: Add after last sentence of paragraph 138, "Anchovy for live bait fishery are caught outside of the breakwater in the open ocean along the southern California coast at Malibu Pier, Paradise Cove (Malibu), Santa Monica Pier and at other locations where fishing piers and sport fishing boats operate. Suppliers of live bait to these locations typically net their live bait in the open ocean."

Response: The statement has been revised to include this comment.

Comment: Change last word in paragraph 173 to "relocated".

Response: The phrase "or relocated" has been added to the end of the sentence.

Comment: Table II should be dated; Tables IIIA and B and Table IV should, if possible, indicate sources of data. Title of Table V should indicate "Air Pollution Data". In Table X change "coclenterata" to "coelenterata".

Response: The suggested changes and corrections to the tables have been made.

bb. CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION

Comment: If the dredge spoil is to be disposed as described in this project although there will be a loss of those bottom dwelling organisms in that area, I do not believe this loss would have a major impact and benefits gained by removal of poor quality sediments would far outweigh this loss.

Comment: Although there would be, of course, some alteration in the circulation pattern of the "outer harbor" I do not think its impact would be of major significance.

Comment: I believe that the dredging under consideration, paragraph 1 through 5, in your project description section would continue the upgrading of the quality of the harbors and would be a considerable plus factor. I believe that aquatic life would rather quickly be reestablished in the new bottom exposed as a result of that dredging and that controls will prevent repollution of that bottom.

Comment: This Regional Water Quality Control Board will consider requirements which would assure that no pollution would be caused by dredging and the deposition of the dredge spoil regardless of where that deposition would be.

cc. THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Comment: On page 1, the benefit cost ratio of 19 to 1 is quite a significant number. It is suggested that the manner in which this was determined be discussed in a little more detail.

Response: The benefit cost ratio has been changed to 10.4:1.

Comment: On pages 10, 11, and 12, you discuss the matter of air pollution. In view of the fact that boats and ships discharge a minimal amount of pollution into the atmosphere, it is suggested that this material be appreciably condensed in scope. As you point out, the primary contributor to air pollution in the Los Angeles area is still the automobile.

Response: Air pollution is part of the environmental setting of Los Angeles and definitely has a place in this report.

Comment: It is suggested too that possibly at the end of the report there be a page recapitulating various features of the project. This could include special emphasis on need for this dredging work as a part of a broader program by the United States to regain the position it once held among the major maritime powers of the world.

Response: It is believed that the summary sheet and the project description are an adequate recapitulation of the project. The United States' maritime objectives are not considered pertinent to this environmental statement.

Comment: Referring to your different tables, Table I contains some very important information. Is it possible to expand this, that is, obtain additional data from other sources? This comment also applies to Table XI. Suggested typographic corrections are noted on Table II as well as the second page of Table VIII.

Response: The Corps of Engineers hopes to have substantially more data as studies on Los Angeles Harbor are completed. The typographic errors have been corrected.

9.3 The March 1972 Preliminary Draft Environmental Statement was also sent to the following governmental agencies requesting their views and comments and no replies were received:

Forest Service, Region 5, USDA
Public Health Service, DHEW
Program Coordination and Services Office, DHUD
Southern California Association of Governments
Atomic Energy Commission
Office of Economic Opportunity
County Engineer, Los Angeles

Dept. of Parks and Recreation, County of Los Angeles
City Engineer, Long Beach
City Planning Director, Long Beach
Long Beach Board of Harbor Commissioners
Port of Long Beach
Recreation and Parks Dept., City of Los Angeles

9.4 CITIZENS GROUPS. Comments on the March 1972 Preliminary Draft Environmental Statement were received from the Audubon Society. These comments are summarized in the following subparagraph and a copy of the letter from the Audubon Society is in Appendix A, at the end of the environmental statement.

a. POMONA VALLEY AUDUBON SOCIETY, LARRY C. OGLESBY

Comment: Unlike some other preliminary draft environmental statements which I have recently read, I find this one to be comprehensive and one which considers many environmental aspects of the proposed project in considerable detail.

Comment: The conclusion to use the material as fill seems by far the wisest decision.

Comment: Displacement and disturbance of the anchovy bait fishery may be a serious problem, as the draft statement points out. Presumably the California Department of Fish and Game is conducting appropriate studies.

Response: Studies of the anchovy are being made for the Corps of Engineers by the University of Southern California, Allan Hancock Foundation.

Comment: Displacement of feeding grounds for various birds, even the Least Tern and Brown Pelican (both endangered species) is unlikely to be much of a problem.

Comment: The possible use of fresh fill for nesting by Least Terns seem most unlikely and should not be indicated as a possible benefit of the project. The spoil area is soon to be developed for industry and shipping and thus will be available to the tern for at best a very short time. Furthermore, even during this short time, human disturbance will surely be too great to permit undisturbed nesting of the birds.

Response: The statement implying that the newly-placed dredge spoil would provide a nesting area for the least tern has been deleted.

Comment: Visually, the new fill land may detract from the view of the harbor from the higher elevations of San Pedro and the Palos Verdes Hills. Owners of expensive homes in the higher elevations may strongly object to additional expensive fill. This is clearly not a problem to which a marine biologist can professionally address himself except to observe that the situation exists and should be considered.

Comment: The loss of open water in the outer harbor has considerable implications for sport boating. At the present time the outer harbor seems quite congested by sail and motor and fishing boats on many days. Reduction of open water area, and alterations traffic patterns may markedly increase boat congestion.

b. The March 1972 Preliminary Draft Environmental Statement was also sent to the following citizens groups requesting their views and comments and no replies were received:

Alamitos Heights
Improvement Association
American Business Women's Association
Allan Hancock Foundation, University
of Southern California
Business and Professional Women's Club
California Advisory Commission
on Marine and Coastal Resources
California Institute of Technology
*California Marine Parks and
Harbors Association*
California Water Pollution
Control Association
Council for Planning and
Conservation
Historical Society of Long Beach
Independent Businessmen's Association
Izaak Walton League of America
Junior Chamber of Commerce
League of Women Voters
Long Beach Community
Improvement League
Los Altos Business Association
Los Angeles Boat Owners Association
Los Angeles Beautiful
Los Angeles Chamber of Commerce
Maritime and Harbor Affairs
Committee, Los Angeles Area
Chamber of Commerce
Referee James E. Moriarty
National Resources Defense
Council, Inc.
North Long Beach Commercial
Club, Inc.
Ocean Fish Protective Association Inc.
*Ocean Industries Committee,
Los Angeles/Long Beach*
Outboard Boating Club
Planning and Conservation League-South
Sierra Club, Long Beach Group
Sierra Club, Los Angeles Chapter
Sierra Club, Angeles Chapter
Southern California Yachting Association

9.5 DEPARTMENTAL REVIEW. The July 1973 draft environmental statement was sent to the following governmental departments and agencies for their review and comment. Comments received during the departmental review are summarized in the following subparagraphs and copies of the letters are included in Appendix B.

a. U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION IX

Comment: This agency feels that the impact statement is not adequate because it covers only the initial phase of a long-range development.

Response: The Corps has met with EPA, Region IX, and has revised the environmental statement responsive to EPA's comments. A letter documenting specific areas of revision (DAEN-CWP-W 14 May 1974) is contained in Appendix B, following EPA's letter of comment.

b. DEPARTMENT OF INTERIOR

Comment: The action of dredging and filling in the harbor covers a geographically small area but has the potential to affect a much larger environment including Palos Verdes Peninsula. In addition to being considered as a national landmark, Palos Verdes is rich in coastal flora and fauna and natural seascapes. Page 18, paragraph 88 of the draft statement presents a quick and insufficient discussion of cultural, archeological, and historical features, including Fort MacArthur and the San Pedro bluffs which are part of Palos Verdes Peninsula. Since the draft statement recognizes these cultural values, the final statement should elaborate on their likelihood of surviving primary and secondary dredging impacts.

Response: The channel deepening will not affect in any way the Palos Verdes Peninsula. The creation of 187 acres of new land, and its future development in industrial and maritime uses will provide a minor visual alteration of the port, as it appears from the San Pedro bluffs. The fill will be over 3 miles from the bluffs, however, and its land uses will be compatible with the existing land uses in the area. The addition of 187 acres to the over 3,000 acres of industrial lands in Los Angeles Harbor is not deemed a significant impact. The possibility that ocean disposal might alter the quality of the waters adjacent to the peninsula will be investigated during detailed study of the project and disposal alternatives.

Comment: As early as possible in the planning process, steps should be taken to identify and evaluate properties listed in or eligible for nomination to the National Register of Historic Places to determine whether or not they will be affected by the project. In this particular draft statement, there is no indication that considerations required by the National Historic Preservation Act (80 Stat. 915) and Executive Order 11593 (May 13, 1971) have been made a part of project formulation.

Response: The Los Angeles-Long Beach draft environmental statement was transmitted to the State Historic Preservation officer for their review on 21 December 1973. No state historic landmarks, state points of historical interest, or sites on the National Register of Historic Places were identified that might be affected by the project. The comments of the state historic preservation officer's staff are included in Appendix B: Letters of Comment.

Comment: The entire role of cultural resources in the environment must be surveyed by professionals trained to evaluate the resource, assess project impact on the resource, develop procedures to mitigate adverse impacts, and outline unavoidable impacts and irreversible and irretrievable commitments of resources. This procedure should also extend to submerged lands affected by the project, particularly when that project is a dredge and fill operation. There is some indication in the Los Angeles Harbor area (including the dredge disposal area) that there has been no previous disruption of the submerged lands. This situation should lead an impact statement preparer to careful subsurface examination before concluding that cultural resources were non-existent. All indirect or secondary effects on both dry and submerged cultural resources should be discussed in the final environmental statement on this Federal project.

Response: The extent of previously undisturbed lands in the harbor area is being investigated and the information will be presented in the environmental statement accompanying the design stage of the project.

Comment: Although paragraph 16 (now paragraph 2.10) of the draft statement now contains a fuller discussion of seismic hazards than the preliminary draft statement, it is still recommended that the intensities and accelerations of anticipated earthquakes be discussed. We concur with the discussion and conclusion of paragraph 94 (now paragraph 4.7) regarding the respect which must be maintained when constructing large civil works projects in fault zones. The environmental impacts and related special design features should be covered in the final statement. Further, we support the extraction and analysis of core borings in the project area. Considerable data from borings have already been obtained and summarized. Based on additional borings to be taken up to the preparation of the final statement, the physical properties of the dredge sediments should be evaluated for stability in spoil banks under earthquake pressures, estimated ability to support protective dikes and subdivision dikes as illustrated in figures 15 and 16 of the draft statement, suitability for support of structures on the filled land, and approximate time to develop bearing capacity on the filled land adequate for planned uses.

Response: The statement has been revised to more fully address the intensities and accelerations of anticipated earthquakes. The district concurs that consideration should be given to the stability of the spoil banks under earthquake pressures, the suitability for support of structures on the filled land and the ability of the protective dikes and subdivision dikes to retain the disposed dredged materials. As the proposed Federal project consists solely of dredging the ship channels and turning basins to design depths and disposing of the dredged material in areas selected and furnished by local interests, matters involving the design of the protective dikes to retain the dredged spoil and the design of structures to be founded on the fill created by the dredged spoil are beyond the scope of Federal involvement and become a responsibility of local interests. The Corps is responsible for accomplishing the channel dredging and disposal of the dredged spoil in the most economical manner consistent with good engineering practice and with the water quality and pollutants standards established by EPA.

Comment: Paragraph 73 (now paragraph 2.67). It is not true that the least tern no longer nests in the harbor area. A colony of about 60 birds is nesting near the mouth of the San Gabriel River and 15-20 least terns attempted to nest on Terminal Island in 1973.

Response: This point has been investigated further and paragraph 2.67 has been revised. However, the latest information is that the least tern does not nest on Terminal Island although it does feed in the area.

Comment: Paragraph 76 (now paragraph 2.70). The draft statement fails to mention that some anchovies are caught within the proposed fill area. It does mention, however, that a substantial catch is made within 1 or 2 miles of the proposed site. This paragraph should be revised to show the importance of the fill area for netting anchovies in relation to other harbor areas.

Response: Paragraph 2.70 has been amended to indicate that some anchovies are caught within the proposed fill area. The proposed fill area does not appear to be any more important than any other area of the outer harbor because of the apparent random movements of the anchovy schools.

Comment: Paragraph 91 (now paragraph 4.3). The statement does not adequately describe the area that will be obliterated by the fill. We believe a comprehensive description of the bottom habitat, including specific information on plants and animals occupying the area should be provided. An additional direct impact should be considered in the statement; i.e., the fill could provide additional feeding and resting sites for birdlife. A portion of the area, properly managed could provide nesting habitat for the least tern and possibly other water-associated birds.

Response: A more detailed inventory will be made of the benthic fauna and flora within the proposed disposal site during the detailed design phase of the project when the environmental impacts of the recommended and alternative disposal plans are more critically assessed. Due to the planned commercial/industrial land use of the proposed landfill, it is unlikely that the area would be suitable as terrestrial wildlife habitat.

Comment: Paragraph 112 (now paragraph 4.24). Item "e" should be broadened to include fish and fish habitats. Another indirect impact is the loss of sport and commercial fishing opportunities. This loss could be mitigated by providing public access to the edge of the fill for fishing.

Response: Paragraph 4.24 has been revised to include these impacts. Possible mitigation of these impacts by providing public access to the edge of the fill for fishing will be considered during detailed design.

Comment: It is by no means certain the harbor bottom environment will be improved by the project. As the statement repeatedly points out, until more advanced studies are conducted, including experiments with the physical model of the harbor and the examination of additional bottom samples taken to project depth, conclusions of harbor bottom improvement or possible degradation are largely unsubstantiated.

Response: The hypothetical statement in paragraph 4.24 referring to harbor bottom improvement has been deleted.

Comment: Increasing the depth of the channel by as much as 10 feet will have a profound influence on the amount of light that reaches the bottom. A reduction in light will adversely influence the numbers and varieties of organisms that will be able to survive in the new environment. Increasing the volume of water below the tidal prism by as much as 29 percent could have a very detrimental effect on water quality in the inner harbor. A combination of greater depths and a reduced rate of flushing could result in dissolved oxygen concentrations well below the acceptable standard of 5.0 ppm.

Response: A 10 foot deepening of the navigation channel would not have a significant effect on the benthic community of this already disturbed environment. The prop-wash from deeper-draft vessels frequently disturbs the bottom of the channel as indicated by turbidity generated. Benthic plants would be most affected by a reduction in light levels and would not tend to repopulate the deeper channel bottom. Such plants,

however, have not been observed in the channel bottoms. Demersal fishes and planktonic organisms would not be affected. Details of the nature of flushing are not presently known. The potential impact of the reduced flushing rate will be examined closely in the design stage of this project.

Comment: Figure 13 of the draft statement shows that samples taken on and adjacent to the fill area were classified as healthy bottom. The last sentence in paragraph 119 (now paragraph 5.1), implies that the bottom sediments in the fill area are of poor quality. This apparent contradiction should be clarified.

Response: The characterized bottom area in figure 13 is adjacent to only a small portion of the proposed fill area. Judgments of the relative health of the benthic area of the proposed fill area must await further work.

Comment: The second sentence in paragraph 123 (now paragraph 5.4) is incorrect. As previously mentioned, least terns do nest in the harbor area. A reduction of feeding areas may adversely affect breeding populations in the San Gabriel River and lower the chances of these birds re-establishing a nesting colony on Terminal Island.

Response: This conclusion is undoubtedly true, however, this impact is considered to be insignificant.

Comment: Paragraph 125 (now paragraph 5.6). This entire paragraph is very speculative. It attempts to convey a promising picture of post-project conditions that cannot be supported by available data. If, as the last sentence suggests, organically rich, oxygen absorbing sediments are exposed, it is conceivable that the waters overlying these sediments would become de-oxygenated.

Response: Paragraph 5.6 merely presents a discussion of possibilities. A conclusive statement can be presented in the environmental statement prepared for the detailed design phase of the proposed project.

Comment: We cannot accept the premise that past or future improvements in the water quality of Los Angeles-Long Beach Harbors can mitigate or offset any damaging environmental effects resulting from the proposed project, re paragraph 137 and 138 (now paragraphs 5.18 and 5.19). While we know, for a fact, that harbor conditions have improved in the past 10 years, it cannot be said, with any certainty, that conditions will improve in the future.

Response: Paragraphs 5.18 and 5.19 are not intended to serve as justification for reduced flushing but are projections of possible conditions in the future.

Comment: Paragraph 143 (now paragraph 5.24). Another direct impact that should be more fully described (it is alluded to in item d.), is the permanent loss of the aquatic environment in the area of the proposed fill. Also, the 10 million cubic yards of dredge spoil will occupy approximately 6,000 acre-feet of aquatic marine habitat.

Response: Items a and d state the adverse impacts of permanent loss of marine benthic habitat and the permanent displacement of aquatic organisms respectively.

Comment: Paragraph 145-150 (of the draft environmental statement). Spoil disposal in the navigable waters or at sea is now regulated by the Federal Water Pollution Control Act Amendments of 1972 and the Marine Protection, Research, and Sanctuaries Act of 1972, P.L. 92-500 and 532, respectively. P.L. 92-532 is an outgrowth of the 1970 Council on Environmental Quality's report entitled "Ocean Dumping - A National Policy," and it regulates dredged spoil disposal by requiring the issuance of a permit by the Corps of Engineers pursuant to EPA criteria. A similar permit will be required for inland navigable waters under P.L. 92-500.

Response: The section on alternatives has been revised to more closely consider offshore disposal. This project is being closely coordinated with EPA and particular attention is being paid to P.L. 92-532.

Comment: Guidelines and interim dump sites are published for ocean dumping. However, guidelines for dredged spoil disposal in inland navigable waters are not yet available. It is assumed that the Corps intends to tailor its various dredge and fill projects to both sets of guidelines in order to comply with its permitting system.

Response: The Los Angeles District will closely follow all applicable laws in the formulation of the project.

Comment: With this new background, the alternatives of deep ocean disposal and harbor disposal should be rewritten to more fully describe the implications of P.L. 92-500 and 532. For example, the deep ocean alternative should discuss the environmental and economic considerations pointing out that the nearest interim dump site is approximately 5.8 nautical miles offshore from Los Angeles Harbor in approximately 600 feet of water.

Response: The alternative of deep ocean disposal has been closely considered, including the economics. Further consideration will be given to ocean disposal during detailed project design.

Comment: Paragraph 163 (now paragraph 7.2). As already pointed out, the statement fails to demonstrate or document evidence that supports the contention that the fill area is of poor quality. Any adverse impacts to water quality or the aquatic biology attributable to the project must be considered in light of the present situation in the harbor, not on some possible future improvements that are in no way project connected or controlled.

Response: Paragraph 7.2 has been revised to reflect this comment.

Comment: Paragraph 169 (now paragraph 8.2). The nesting colony of least terns at the mouth of the San Gabriel River and least terns that are attempting to re-establish on Terminal Island may be adversely affected by the proposed project.

Response: As stated in paragraph 8.2, the impact on the population of least terns in the harbor area is restricted to the reduction of water area due to the proposed fill. The impact of the newly-created land is considered not to be significant to the survival of the least tern population.

Comment: In summary, we believe the draft statement to be sufficient from the standpoint of covering the environmental issues. However, certain areas still appear to be deficient as detailed above. We recommend incorporation of these suggested improvements in the final environmental statement.

Response: The statement has been revised in response to many of the comments received. In addition, a more thorough knowledge of the possible impacts of the proposed project and alternatives will be gained as further investigations are concluded during the detailed design phase of the project.

c. DEPARTMENT OF COMMERCE

Comment: The third sentence of paragraph 58 (now paragraph 2.52) states: "Water pollution, however, limits the use of the harbor to the hardier species (ref. 24)." This statement is based on a reference dated 1955 that may not provide information applicable to present harbor conditions. In addition, tables VIII and IX list the fish and larger marine invertebrates that inhabit the harbor waters. The animals included in these lists are definitely not limited to the so-called "hardier species" referred to above. In fact, these lists indicate that the harbor waters support a healthy and diverse population of marine organisms.

Response: Paragraph 2.52 has been revised to reflect this comment. In addition, results from recent research, conducted in part for this report, have allowed revision of the species inventory for the harbor area. This new information supports the statement that the harbor waters contain a healthy and diverse population of marine organisms.

Comment: The first sentence of paragraph 121 (now paragraph 5.2) states: "The species that presently inhabit the harbor waters are largely those that are most able to tolerate polluted environment." Perhaps this conclusion should be reconsidered in view of the fact that the species lists in tables VIII and IX indicate that the waters support a healthy diverse population of marine organisms.

Response: Paragraph 5.2 has been revised to reflect this comment.

Comment: Paragraph 136 (now paragraph 5.17) indicates that tidal flushing of the harbor will be decreased by the project. The following paragraph states that "Rapid rates of flushing are necessary only if the waters are being rapidly polluted." Paragraph 138 then concludes that "The deterioration in water quality would be much less than the improvement in water quality that has been experienced during the last few years due to the curtailment of waste discharges." Perhaps a more objective appraisal would indicate that the efforts of others to clean the same harbor that this proposal will help to pollute cannot compensate the marine environment for the adverse effects that will be caused by this project.

Response: The statement that this proposed project will not cause significant deterioration of water quality within the harbor is not subjective or without precedent. The recent improvement in the quality of harbor water attributed to the reduction of industrial discharges has proceeded in spite of land subsidence which has increased harbor volume and reduced tidal flushing and further reduction of harbor water area, by several hundred acres, resulting from dredging and filling activity by the Port of Long Beach between 1958 and 1971.

Comment: The final sentence of paragraph 145 (of the draft environmental statement) indicates that spoil disposal at sea is ecologically hazardous. Although ocean disposal of dredge spoil is undesirable, it is certainly no more hazardous to marine biota than burying and thereby eliminating 307 acres of the remaining aquatic habitat within the harbor.

Response: The alternative of ocean disposal has been reassessed in paragraphs 6.2 through 6.10.

Comment: Paragraph 146 (of the draft environmental statement) dismisses land side disposal of some or all of the 10 million cubic yards of spoil with the assertion that "No suitable sites ... are within 20 miles of the harbors. Therefore, no further discussion of landside disposal is warranted." From the standpoint of evaluating the impact of filling 307 acres of aquatic habitat, discussion of upland disposal of the dredge is certainly warranted. The factual basis for this assertion should be discussed. Are other land sites available within, for example, 25 miles of the harbors? What should be the environmental impacts of disposal of the spoil at various alternative upland disposal sites?

Response: The land disposal alternatives have been reassessed (see paragraph 6.11 through 6.16). In addition, the harbor fill has been reduced to 187 acres.

Comment: Rather than objectively appraising the various alternatives, paragraphs 145-148 all appear to be a rationalization for the final sentence in paragraph 149, which states: "Furthermore, this method of disposal is considerably more expensive than the recommended method, and it does not provide the new lands desired by the port authorities for increased wharfing facilities." In fact, paragraph 148 candidly states: "No particular location has been considered for the dumping of spoil at sea." If there are no plans for studying any offshore dumping location, the hypothesis that "The currents might even carry the pollutants shoreward. Thus the disposal in the deep sea might cause increased pollution at the dredging site and might fail to prevent the dispersal of toxic pollutants throughout the marine environment" cannot be verified or refuted. Therefore, we suggest that the environmental impact statement (a) discuss plans for studying the impact of offshore disposal, (b) support the hypothesis with data and results of studies conducted in other areas, or (c) delete the argument regarding the environmental disadvantages of this method of disposal and retain only the argument for the economic advantages of the proposed project.

Response: Both the economic and environmental aspects of ocean and land disposal have been reassessed and will be investigated further during detailed project design. The section on alternatives to the proposed project has been revised.

Comment: We further suggest that prior to initiating the proposed project, the status and results of the following Corps contract studies be fully considered, evaluated, and discussed:

Concept development for appurtenant containment area facilities for dredged material separation, drying, and rehandling. (ID No. Y305-5C01).

Study of regional landfill and construction material needs in terms of dredged material characteristics and availability. (ID No. Y304-5C04).

Investigation of legal, policy and institutional constraints associated with dredged materials marketing and land enhancement. (ID No. Y316-5C06).

In addition, the processes that have been developed by various research groups (e.g., Tekology Corporation, Palisades Park, New Jersey) for manufacturing bricks and blocks from inorganic solid wastes should be discussed (see "Environmental Science and Technology, Vol. 6, 5 June 1972 pages 505-503).

Response: At the time of this writing only the final report "Regional Landfill and Construction Material Needs" has been published. The other two reports will be available in November 1974. These reports and results from other studies will be considered in the design phase of this project.

d. RESOURCES AGENCY OF CALIFORNIA

Comment: Paragraphs 84, 85, and 86, (now paragraphs 2.78 through 2.80) do not accurately describe the exact geographical areas within the Los Angeles-Long Beach Harbors Complex, which are presently designated as "Ocean Water Contact Sports Areas" by the California Regional Water Quality Control Board, Los Angeles Region. The water quality in such designated areas must meet the bacteriological standards established by the State Department of Health. The statement should indicate that the entire "outer harbor" is a declared ocean water-contact sports area. We call this to your attention as the proposed dredging process extends through the "outer harbor."

Response: The statement has been revised to indicate that the entire "outer harbor" is an area designated for ocean water contact sports.

Comment: The "Environmental Setting Without the Project" should include a paragraph stating that "Inner Los Angeles Harbor" waters are used for fluming of fish by the fish canneries in Fish Harbor. This use has been approved by the Regional Water Quality Control Board.

Response: This information has been added to paragraph 2.29 of the statement.

Comment: The Federal portion of the project presumably falls under the requirements of the Coastal Zone Management Act of 1972 (Section 307) as to consistency "with approved State management programs." Procedurally the related non-Federal portions of the project - dredging or other harbor work will require a permit issued by the South Coast Regional Commission. Although treating the two main segments of the project separately as far as procedures are concerned, the Commission will need to review all elements of the interrelated improvement plan simultaneously.

Response: Specific Federal and non-Federal aspects of the project are presented in the interim review report.

Comment: The statement summarizes the expected adverse environmental impact; however, more information should be presented on beneficial aspects of the proposed improvements.

Response: Project benefits are discussed in general terms in this environmental statement. This report's companion document, the interim review report, discusses project benefits specifically.

Comment: Paragraph 91 (now paragraph 4.3) should include a discussion of the project's interference with tidal flushing and the resultant adverse effect on water quality. This is especially true of the inner harbor.

Response: Paragraph 4.3 addresses the direct impacts of the reduction of open water area. The effect of reducing open water volume of the harbor would be to increase the tidal flushing rate. This generalization has been added to paragraph 4.3.

Comment: According to paragraph 93 (now paragraph 4.6) it would appear that in all probability the bottom of the proposed dredging will be above the top of the Gaspar aquifer. However, as a precaution, we recommended that the dredging be closely coordinated with the Los Angeles County Flood Control District so that any necessary adjustments in the operation of the Dominguez Gap Barrier Project can be made to control any possible further seawater intrusion.

Response: Extensive coring will be conducted during the design phase of the project to accurately determine physical and chemical characteristics of the sediments. If sediments of the Gaspar aquifer are penetrated, the Los Angeles County Flood Control District will be notified.

Comment: The predictions contained in paragraph 138 (now paragraph 5.19) should be more adequately discussed. Considering the above-mentioned predictions, the changes in water quality which may result from the project would be in conflict with State policy. The State Water Resources Control Board's Nondegradation Policy Resolution 68-16 contains a key provision as follows: "Whenever the existing quality for water is better than the quality established in policies as of the date on which policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in policies." Degradation of water quality below levels prescribed in the State policies as a result of the project would appear to violate the "Nondegradation Policy."

Response: With information presently available it is not possible to elaborate on the effect on water quality due to changes in the harbor's configuration. Information on circulation in the harbor with various harbor configurations will be forthcoming from the model study. These data will be incorporated into the design phase EIS.

Comment: Paragraph 139 (now paragraph 5.20) indicates the U.S. Army Corps of Engineers has made plans to construct a physical model of the harbor, and that if the model should indicate that serious consequences would result, the Corps plans to alter the project to reduce adverse effects. If the plans need to be altered the statement should indicate that the revised plans would not unreasonably affect present and anticipated beneficial use of harbor waters, and not result in water quality less than that prescribed in the State Water Resources Control Board policies.

Response: The purpose of this EIS is for congressional evaluation for authorization of the project. If the project is authorized the detailed project plan will be formulated along with an EIS evaluating the environmental impacts of the plan. Pertinent results of the model study will be presented in that EIS.

Comment: In response to our previous comment concerning long-range planning and orderly development, it is indicated that the implementation of the plans at this time is considered highly justified because of the "urgent need" for the project and the opinion that the project is "incrementally justified" regardless of future development. However, planning for the entire Los Angeles-Long Beach Harbors areas should be coordinated and considered with long-range objectives. Hydraulic effects should be studied with models and considered as an integral part of project planning instead of a corrective afterthought. The method of spoil and associated wash-water disposal must be determined in accordance with applicable State and Federal criteria. The proposed method does not appear likely to meet these criteria.

Response: Additional considerations of the long-range harbor development objectives have been included. The Board of Engineers for Rivers and Harbors has established model investigations of the hydraulic effects, which will be considered during detailed design of the project. Applicable State and Federal criteria will be adhered to in the disposal of the dredged material. Criteria can be met by (a) disposal in an EPA authorized ocean disposal site for polluted dredged materials or (b) by treatment, if necessary, of return effluent from a diked disposal area.

Comment: On page 48 (draft environmental statement), in response to "Comment" Pages 5, 6, 7 and 20, paragraphs 21, 28, 33 and 91 respectively, indicates that the configuration of the proposed landfill will be designed to preclude adverse effects on water quality. In addition, the dredge area should also be designed to preclude adverse effects on water quality in the dredged inner harbor area.

Response: During dredging the major impacts at the dredging site will be due to removal of benthic organisms. Removal of the sediment itself actually will have a positive impact on the water quality of the inner harbor. Sediment generally serves as a storage point for pollutants in the sediment-water system. By removing the sediments completely from the system, the pollutants are precluded from moving back into the water. These are the two main direct impacts of the actual dredging process.

e. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Comment: We defer to EPA for comments relative to pollution control and potential impact on the Los Angeles basin. No other comments are offered.

Response: No comment.

f. DEPARTMENT OF TRANSPORTATION, U.S. COAST GUARD

Comment: We have no comments to offer nor do we have any objection to the project.

Response: No comment.

g. No reply was received from the Office of Economic Opportunity.

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Table I

Surface dissolved oxygen concentrations (in mg/l.) at selected stations
in Los Angeles Harbor - 1954-1970 (ref. 18)

| Station* | Nov. 1954 | Oct. 1966 | Oct. 1967 | Oct. 1970 |
|----------|-----------|-----------|-----------|-----------|
| LA 51 | 0.0 | - | - | 3.8 |
| LA 50 | 0.0 | 0.4 | 0.2 | 4.4 |
| LA 49 | 0.5 | - | - | 4.4 |
| LA 54 | 1.0 | - | 0.9 | 5.2 |
| LA 26 | 2.3 | 2.4 | 1.7 | - |
| LA 7 | 3.7 | 4.5 | 2.7 | - |

*Station locations are shown on figure 3.

Table II

Discharges to Dominguez Channel tidal prism reported in 1969 (ref. 3)

| Discharger | Map identity | Waste type | Maximum waste quantity gal. per day |
|--|-----------------|--|---|
| American Chemical Corp. | 1 | Cooling, boiler blowdown, scrubber, deionizer | 576,000 |
| Anco Metal Improvement | 2 | Burnishing | 4,000 |
| Atlantic Richfield Co. | 3 | Cooling, brine, process, softener | 4,590,000 |
| B.F. Goodrich Chemical Co. | 4 | Boiler blowdown, cooling yard runoff | 36,000 |
| Harvey Aluminum, Inc. | 5 | Quench tank, cooling | 650,000 |
| Import Dealers Service Corp. (Auto Bubble bath) | 6 | Auto wash | 20,000 |
| Johns-Manville Products Corp. | 7A | Boiler blowdown, cooling, process | 1,150,000 |
| | 7B | Boiler blowdown, process | 920,000 |
| McDonnell Douglas Corp. | 8 | Cooling | 40,000 |
| Pepsi-Cola Bottling Co. of Los Angeles | 9 | Rinse, boiler blowdown, cooling | 108,000 |
| Phillips Petroleum Co. | 10 | Brine, truckwash | 8,000 |
| Plan Hold Corp. | 11 | Rinse, cooling | 3,000 |
| Shell Chemical Co. | 12 | Boiler blowdown, cooling, process | 2,380,000 |
| Shell Oil Co.-Dominguez Refinery | 13 | Cooling, brine, condensate, softener | 3,020,000 |
| Shell Oil Co.-Wilmington Refinery | 14 | Cooling, brine, softener, condensate | 546,000 |
| Signal Oil and Gas Co. | 15 | Brine | 1,000 |
| Signal Oil and Gas Co. | 16 | Brine | 112 |

Table IIIA
 Identification and chemical analyses
 of
 extruded core samples, Los Angeles-Long Beach Harbors, Calif. 1/

| Lab. No. | Hole No. | Coordinates | | Depth of bottom, ft. below MLLW | Depth of sample ft. | Moisture content percent dry wt. | | Volatile solids percent dry wt. | COD percent dry wt. | Total Kjeldahl nitrogen percent dry wt. | Oil and grease percent dry wt. |
|--------------|----------|--------------------|----------------------|---------------------------------|---------------------|----------------------------------|----------------|---------------------------------|---------------------|---|--------------------------------|
| | | 33 degrees N. Lat. | 118 degrees W. Long. | | | Total sample | -No. 10 sieve* | | | | |
| PC-288 | 1 | 45°47" | 16°19" | 34.0 | 0-2.5 | 40.2 | 41.6 | 2.6 | 2.13 | 0.030 | 0.091 |
| PC-289 | 1 | 45°47" | 16°19" | 34.0 | 2.5-4 | 59.4 | 61.1 | 4.3 | 6.27 | 0.199 | 0.450 |
| PC-294 | 2 | 45°54" | 15°14" | 35.2 | 0-1.5 | 77.5 | 79.1 | 5.3 | 5.53 | 0.104 | 0.378 |
| PC-296 | 2 | 45°54" | 15°14" | 35.2 | 3.5-5.5 | 49.8 | 53.1 | 3.9 | 3.64 | 0.058 | 0.111 |
| PC-297 | 2 | 45°54" | 15°14" | 35.2 | 5.5-7 | 38.8 | 42.4 | 2.5 | 1.98 | 0.030 | 0.043 |
| PC-298 | 3 | 45°5" | 16°17" | 39.5 | 0-4 | 25.8 | 26.1 | 2.8 | 1.13 | 0.042 | 0.023 |
| PC-301 | 4 | 43°7" | 15°59" | 36.9 | 0-1.5 | 55.0 | 58.7 | 6.2** | 5.26 | 0.119 | 0.038 |
| PC-302 | 4 | 43°7" | 15°59" | 36.9 | 1.5-2.5 | 53.9 | 55.5 | 11.4** | 13.11 | 0.275 | 0.011 |
| PC-306 & 307 | 5 | 43°45" | 16°14" | 36.7 | 0-4 | 59.7 | 58.4 | 5.2 | 5.65 | 0.103 | 0.031 |
| PC-308 | 5 | 43°45" | 16°14" | 36.7 | 4-5 | 32.0 | 32.4 | 2.6 | 1.45 | 0.024 | 0.021 |
| PC-311 | 5 | 43°45" | 16°14" | 36.7 | 5-9 | 48.4 | 49.2 | 4.1 | 3.06 | 0.051 | 0.041 |

EPA maximum limits (Sept. 1973)

* Chemical analyses were run on material passing No. 10 sieve.

** Exceeds EPA limits.

1/ See footnote at end of table.

0.15

Table III B
 Identification and chemical analyses
 of extruded core samples, Los Angeles-Long Beach Harbors, Calif. 1/

| Lab. No. | Hole No. | Depth ft. | Iron Fe percent dry wt. | Reported as 1×10^{-4} percent of dry weight | | | | | | | | | | | Total Phosphorous P | Sulfide S | | |
|--------------|----------|-----------|-------------------------|--|---------|---------|------------|-----------|-------------|------------|-----------|------|------|--|---------------------|-----------|--|--|
| | | | | Mercury Hg | Lead Pb | Zinc Zn | Cadmium Cd | Copper Cu | Chromium Cr | Arsenic As | Nickel Ni | | | | | | | |
| FC-288 | 1 | 0-2.5 | 3.13 | 0.40 | 16 | 64 | 0.1 | 35 | 28 | 0.411 | 7 | 1021 | 255 | | | | | |
| FC-289 | 1 | 2.5-4 | 4.11 | 1.43 | 49 | 148 | 0.5 | 122 | 53 | 0.543 | 13 | 1067 | 56 | | | | | |
| FC-294 | 2 | 0-1.5 | 4.21 | 1.00 | 40 | 222 | 0.5 | 97 | 97 | 0.877 | 10 | 1049 | 1039 | | | | | |
| FC-296 | 2 | 3.5-5.5 | 4.21 | 0.42 | 17 | 110 | 0.2 | 44 | 23 | 0.765 | 10 | 1128 | 0 | | | | | |
| FC-297 | 2 | 5.5-7 | 2.66 | 0.20 | 14 | 66 | 0.1 | 30 | 17 | 0.424 | 12 | 1060 | 7 | | | | | |
| FC-298 | 3 | 0-4 | 2.58 | 0.16 | 12 | 60 | 0.3 | 21 | 19 | 0.611 | 10 | 291 | 5 | | | | | |
| FC-301 | 4 | 0-1.5 | 3.05 | 0.26 | 29 | 95 | 0.2 | 37 | 24 | 0.813 | 13 | 827 | 6 | | | | | |
| FC-302 | 4 | 1.5-2.5 | 3.89 | 0.29 | 11 | 95 | 0.5 | 39 | 42 | 0.093 | 23 | 916 | 6 | | | | | |
| FC-306 & 307 | 5 | 0-4 | 3.02 | 0.40 | 21 | 105 | 0.2 | 60 | 32 | 0.250 | 16 | 892 | 208 | | | | | |
| FC-308 | 5 | 4-5 | 1.91 | 0.08 | 5 | 37 | 0.1 | 16 | 16 | 0.973 | 9 | 756 | 0 | | | | | |
| FC-311 | 5 | 5-9 | 4.10 | 0.36 | 7 | 69 | 0.1 | 28 | 18 | 0.728 | 12 | 1061 | 0 | | | | | |
| | | | | 1.0 | 50 | 130 | 2.0 | | | | | | | | | | | |

EPA maximum limits (Sept. 1973)

***Exceeds EPA limits.

1/ Data are from tests performed at the South Pacific Division Corps of Engineers Laboratory in Sausalito, California. Tests were performed in January 1972. The location of the 5 core sampling stations is shown on figure 11.

Table IV

Chlorinated hydrocarbon pesticides
in
extruded nx core samples, Los Angeles-Long Beach Harbors, Calif. ^{1/}

| Laboratory No. | PC-294 | PC-301 |
|--------------------------------------|--------|--------|
| Hole No. | 2 | 4 |
| Depth, ft. | 0-1.5 | 0-1.5 |
| Moisture content, percent dry weight | 79.1 | 58.7 |
| Pesticides, ppb(a) of wet weight | | |
| pp' DDE | 1.6 | 5.2 |
| pp' DDD | 3.4 | - |
| pp' DDT | 10.2 | - |
| Aroclor 1254(b) | 231 | 88 |
| Pesticides, ppb on dry weight basis | | |
| pp' DDE | 2.9 | 8.3 |
| pp' DDD | 6.1 | - |
| pp' DDT | 18.3 | - |
| Aroclor 1254(b) | 414 | 140 |

(a) ppb - parts per billion. 1 ppb = 0.001 ppm

(b) Aroclor 1254 is not a true pesticide but is a polychlorinated biphenyl (PCB).

Chemical names of pesticides -

DDE 2,2-bis-(p-chlorophenyl)-1,1-dichloro ethylene.

DDD 1,1 Dichloro-2,2-bis (p-chlorophenyl) ethane and 1,1-Dichloro-2,2-bis (o,p-chlorophenyl) ethane.

DDT 1,1,1-Trichloro-2,2-bis (p-chlorophenyl) ethane (p,p')

^{1/} Data are from tests performed at the South Pacific Division Corps of Engineers Laboratory in Sausalito, California. Tests were performed in January 1972. The location of the 5 core sampling stations is shown on figure 11.

Table V

Air Pollution Data
Emissions Contaminants, in tons per day,
from major sources within Los Angeles County — average daily emissions (ref. 21)

| Sources | Hydrocarbons | | No _x | Particulates | SO ₂ | CO |
|------------------------|--------------|--------------|-----------------|--------------|-----------------|--------------|
| | Total | Reactive | | | | |
| Industrial | 640 | 130 | 130 | 40 | 175 | 10 |
| Power plants | 5 | - | 100 | 5 | 35 | - |
| Commercial | 55 | 10 | 25 | 10 | - | - |
| Residential | 65 | 15 | 25 | 5 | - | - |
| Motor vehicles | 1,620 | 1,170 | 755 | 55 | 35 | 8,960 |
| Aircraft | 80 | 30 | 15 | 15 | 5 | 135 |
| Total (rounded) | 2,465 | 1,355 | 1,050 | 130 | 250 | 9,105 |

Contaminants, in percent, from sources within Los Angeles County

| | | | | | | |
|----------------|------|------|------|------|------|------|
| Industrial | 26.0 | 9.6 | 12.4 | 30.8 | 70.0 | 0.1 |
| Power plants | 0.2 | - | 9.5 | 3.8 | 14.0 | - |
| Commercial | 2.2 | 0.7 | 2.4 | 7.7 | - | - |
| Residential | 2.6 | 1.1 | 2.4 | 3.8 | - | - |
| Motor vehicles | 65.7 | 86.3 | 71.9 | 42.3 | 14.0 | 98.4 |
| Aircraft | 3.2 | 2.2 | 1.4 | 11.5 | 2.0 | 1.5 |

Table VI

**Marine mammals utilizing
Los Angeles-Long Beach Harbors**

| Species | Abundance |
|--|------------------|
| Common or Baird Dolphin | Abundant |
| Pacific Striped or White-Sided Dolphin | Common |
| Harbor Porpoise | Rare |
| Harbor Seal | Common |
| California Sea Lion | Rare |

*This list has been derived from a variety of published and unpublished sources.

Table VII

Birds found in Los Angeles-Long Beach Harbors*

Abbreviations:

M = migrant

R = resident

W = winter

S = summer

| | |
|----------------------|--|
| American Coot | M, WR. Common during winter, Feeds in shallow water. |
| Black-Bellied Plover | M, WR. Common in winter during migration. Feeds on mudflats. |
| Semipalmated Plover | M, WR. Feeds on mudflats. |
| Snowy Plover | R. Feeds on sandy beaches. |
| Spotted Sandpiper | M, WR. Feeds on rocky shores and along streams. |
| Solitary Sandpiper | M. Visits area during spring and fall. Feeds on sheltered beaches, streams, and lake shores. |
| Least Sandpiper | M, WR. Feeds on mudflats. |
| Knot | M, WR. Feeds on mudflats. |
| Willet | M, WR. Feeds on mudflats and sandy beaches. |
| Killdeer | R. Breeds in fill areas. Feeds on mudflats and in areas above tidal influence. |
| Whimbrel | M, WR. Feeds on sandy beaches and mudflats. |
| Glaucous-Winged Gull | M, WR. Feeds on small fish. |
| Western Gull | M, WR. Breeds locally. Feeds on small fish and garbage. |
| Herring Gull | M, WR. Feeds on small fish and garbage. |
| California Gull | M, WR. A scavenger; also feeds on small fish. |
| Ring-Billed Gull | R. Feeds along beaches and inland bodies of water; a scavenger. |
| Mew Gull | M, WR. Not common. Feeds on beaches and in bays. |
| Bonaparte's Gull | M, WR. Feeds on fish and insects. |

Table VII (Continued)

| | |
|--------------------|---|
| Heerman's Gull | M, SR. Feeds on small fish, frequently robbing catch from Brown Pelicans. |
| Ruddy Turnstone | M, WR. Feeds on mudflats and beaches. |
| Black Turnstone | M, WR. Frequents rocky beaches. |
| Sanderling | M, WR. Feeds on outer beaches and mudflats. |
| Common Tern | M. Feeds in bay and on open ocean. |
| Artic Tern | M. Uncommon spring and fall visitor. Feeds in open ocean. |
| Royal Tern | M. Feeds largely offshore. |
| Brown Pelican | R. Breeds on offshore rocks and islands. Feeds on small fish. |
| Artic Loon | M, WR. Feeds offshore diving to moderate depth to catch small fish. |
| Red-Throated Loon | M, WR. Feeds mostly in open ocean. |
| Horned Grebe | M, WR. Feeds on fish and invertebrates in shallow waters. |
| Eared Grebe | M, WR. Abundant. Feeds on fish and invertebrates in shallow and moderately deep waters. Prefers sheltered waters. |
| Western Grebe | M, WR. Feeds offshore. |
| Pied-Billed Grebe | M, WR. Feeds on invertebrates living in shallow waters. |
| Brandt's Cormorant | R. Breeds locally; most common in winter. Feeds on fish living in moderately deep water. |
| Great Blue Heron | R. Most common in winter. Feeds in shallow water areas and on mudflats. |
| Green Heron | R. Feeds in fresh and brackish water marshes. |
| Common Scoter | M, WR. Rare. Feeds on bottom fauna. |
| Surf Scoter | M, WR. Abundant. Feeds on molluscs and other benthic invertebrates. |
| White-Wing Scoter | M, WR. Rare. Feeds on bottom organisms. |

Table VII (Continued)

| | |
|------------------------|--|
| Pintail | M, WR. Prefer fresh water areas for feeding. Uses harbor mainly as a refuge. |
| Red-Breasted Merganser | M, WR. Prefers sheltered waters. Dives for food in shallow water. |
| White-Tailed Kite | R. Not common. Often feeds on rodents in riparian woodlands. |
| Marbled Godwit | M, WR. Feeds in marshes, and on mudflats and beaches. |

*This list is based upon Christmas bird counts carried out by the National Audubon Society (ref. 30) and information supplied by S. Wells of the Eldorado Chapter of the Audubon Society.

TABLE VIII

Fish Occurring in the Waters of
Los Angeles and Long Beach Harbors
Including the Outer Breakwater

| Species | Food or Feeding Habits | *Occurrence |
|-------------------------------|---------------------------|-------------|
| Pelagic (Open Water) Habitats | | |
| Pacific sardine | filter feeder | + R |
| Deepbody anchovy | filter feeder | - C |
| Anchoveta | filter feeder | R |
| Northern anchovy | filter feeder | C |
| Slough anchovy | filter feeder | C |
| Coho salmon | fish and invertebrates | R |
| Pacific tomcod | fish and crustaceans | ? |
| Topsmelt | invertebrates, algae | C |
| Jacksmelt | invertebrates and fish | C |
| California grunion | invertebrates | C |
| Jack mackerel | fish and invertebrates | ? |
| Sargo | crustaceans | C |
| Salema | ? | ? |
| Halfmoon | algae, bryozoans, sponges | ? |
| Striped mullet | plankton | ? |
| California barracuda | fish | + C |
| Slender tuna | fish | - R |
| Wavyback skipjack | fish | R |
| Pacific bonito | fish and invertebrates | C |
| Pacific mackerel | fish and euphausiids | ? |
| Monterey spanish mackerel | fish and invertebrates | R |
| Benthic (Sand and Mud) Bottom | | |
| Hornshark | invertebrates | ? |
| Soupin shark | fish | ? |
| Grey smoothhound | invertebrates, fish | C |
| Brown smoothhound | invertebrates, fish | ? |
| Leopard shark | fish and invertebrates | ? |
| Spiny dogfish | fish and invertebrates | ? |
| Pacific angel shark | invertebrates | ? |
| Thornback | fish and invertebrates | ? |
| Shovelnose guitarfish | invertebrates | ? |
| Pacific electric ray | invertebrates | C |
| California skate | invertebrates | ? |
| Diamond stingray | invertebrates | ? |
| California butterfly ray | invertebrates | ? |
| Round stingray | invertebrates | ? |
| Bat ray | molluscs | C |

*See note at end of table.

TABLE VIII (Continued)

Fish Occurring in the Waters of
Los Angeles and Long Beach Harbors
Including the Outer Breakwater

Benthic (Sand and Mud) Bottom (Continued)

| Species | Food or Feeding Habits | *Occurrence |
|-----------------------|----------------------------|-------------|
| Ratfish | ? | ? |
| Pacific herring | ? | ? |
| California lizardfish | fish and squid | C |
| Specklefin midshipman | fish and invertebrates | C |
| Plainfin midshipman | fish and invertebrates | +R |
| Spotted cusk-eel | ? | +C |
| Basketweave cusk-eel | ? | U |
| California needlefish | small fish | R |
| California killifish | invertebrates | C |
| Spotted sandbass | fish and invertebrates | C |
| Barred sandbass | fish and invertebrates | C |
| Giant seabass | fish and invertebrates | R |
| Black croaker | ? | R |
| White seabass | fish and squid | ? |
| White croaker | fish and invertebrates | C |
| California corbina | sand crabs, clams, invert. | C |
| Spotfin croaker | clams, worms, crustaceans | ? |
| Queenfish | invertebrates | C |
| Yellowfin croaker | invertebrates | ? |
| Barred surfperch | sand crabs, bean clams | ? |
| Calico surfperch | ? | ? |
| Shiner surfperch | invertebrates | C |
| White surfperch | invertebrates | C |
| Pink surfperch | ? | U |
| Yellow bobo | invertebrates | R |
| Longjaw mudsucker | fish and invertebrates | C |
| Bay goby | invertebrates | C |
| Blackeye goby | invertebrates | C |
| Arrow goby | invertebrates | C |
| Chameleon goby | invertebrates | R |
| Pacific butterfish | ? | C |
| Spotted scorpionfish | fish and invertebrates | C |
| Brown rockfish | fish and invertebrates | R |
| Calico rockfish | fish and invertebrates | ? |
| Chilipepper | fish and invertebrates | ? |
| Vermillion rockfish | fish and invertebrates | C |
| Blue rockfish | fish and invertebrates | ? |
| Boccacio | fish and invertebrates | C |
| Grass rockfish | fish and invertebrates | ? |
| Flag rockfish | fish and invertebrates | R |
| Striptail rockfish | fish and invertebrates | C |
| Olive rockfish | fish and invertebrates | C |

*See note at end of table.

TABLE VIII (Continued)

Fish Occurring in the Waters of
Los Angeles and Long Beach Harbors
Including the Outer Breakwater

Benthic (Sand and Mud) Bottom (Continued)

| Species | Food or Feeding Habits | *Occurrence |
|--------------------------|------------------------------|-------------|
| Lingcod | fish and invertebrates | ? |
| Longspine combfish | ? | ? |
| Bonyhead sculpin | ? | ? |
| Roughback sculpin | ? | ? |
| Wooly sculpin | ? | ? |
| Pacific staghorn sculpin | ? | C |
| Cabezon | crabs, molluscs, fish | ? |
| Pygmy poacher | ? | C |
| Pacific sanddab | fish and invertebrates | R |
| Speckled sanddab | invertebrates | C |
| Longfin sanddab | fish and invertebrates | R |
| Rex sole | invertebrates | ? |
| Bigmouth sole | ? | + C |
| California halibut | fish and invertebrates | C |
| Fantail sole | ? | C |
| Petrale sole | fish and invertebrates | ? |
| Diamond turbot | ? | C |
| English sole | invertebrates and small fish | C |
| C-O turbot | invertebrates | R |
| Curlfin turbot | invertebrates | C |
| Spotted turbot | invertebrates | R? |
| Hornyhead turbot | invertebrates | C |
| California tonguefish | invertebrates | C |
| Rocks and Piles | | |
| California moray | fish, shrimp and crabs | + C |
| Kelp pipfish | invertebrates | C |
| Kelp bass | crustaceans and fish | + C |
| Ocean whitefish | invertebrates and fish | ? |
| Opaleye | algae | C |
| Pile surfperch | invertebrates | C |
| Black surfperch | crustaceans, molluscs, worms | C |
| Walleye surfperch | small crustaceans | C |
| Dwarf surfperch | algae | ? |
| Rubberlip surfperch | crustaceans, stomatopods | C |
| Rainbow surfperch | ? | U |

*See note at end of table.

TABLE VIII (Continued)

Fish Occurring in the Waters of
Los Angeles and Long Beach Harbors
Including the Outer Breakwater

Rocks and Piles (Continued)

| Species | Food or Feeding Habits | *Occurrence |
|---------------------|--------------------------------|-------------|
| Spotted kelpfish | invertebrates | ? |
| Giant kelpfish | ? | ? |
| Sarcastic fringhead | ? | ? |
| Yellowfin fringhead | ? | ? |
| Onespot fringhead | ? | ? |
| Rockpool blenny | ? | ? |
| Mussel blenny | ? | ? |
| Kelp greenling | fish, polychaetes, crustaceans | ? |

* C = common

R = rare

U = uncommon

+ = more or less

? = not sufficient data on which to base a firm conclusion.

occurrence = rough estimate of fish abundance. Rare species may be occasional visitors.

Table IX

Larger marine invertebrates
known to inhabit the floor of the Los Angeles Harbor*

The pollution indicator species of the polychaete groups are denoted as follows:
HB – healthy bottom; SHB – semi-healthy bottom; and PB – polluted bottom. No
microscopic organisms live in the very polluted bottom areas.

Phylum Coelenterata

Class Anthozoa (sea anemones, sea pens, and corals)

Stylatula elongata
Diadumene leucolena

Phylum Phoronidea (worm-like organisms)

Phoronis architecta
Phoronis pallida
Phoronis psammophila
Phoronopsis harmeri

Phylum Annelida

Class Polychaeta (segmented worms)

Hesperonoe complanata
Peisidice aspera
Anaitides williamsi
Hypoeulalia bilineata
Eteone californica
Podarke pugettensis
Ancistrosyllis bassi
Neanthes caudata
Nereis procera - HB
Nereis latascens
Platynereis bicanaliculata
Nephtys caecoides
Nephtys ferruginea
Glycera americana
Goniada littorea
Diopatra ornata
Diopatra splendissima
Diopatra tridentata
Nothria iridescens
Lumbrineris erecta
Lumbrineris latreilli
Lumbrineris latreilli japonica
Lumbrineris minima
Drilonereis nuda
Dorvillea articulata - SHB
Haploscoloplos elongatus
Paraonis gracilis oculata
Spiophanes missionensis

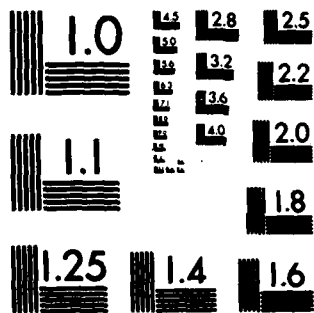
Table IX (Continued)

Spiophanes pigmentata
Laonice cirrata
Prionospio cirrifera
Prionospio pinnata
Prionospio heterobranchia newportensis
Polydora (Carazzia) paucibranchiata - SHB
Polydora brachycephala
Polydora cirrosa
Boccardia polybranchia
Cirratulus cirratus
Cirriformia luxuriosa - SHB
Cirriformia spirabranca
Cossura candida - HB
Tharyx parvus - HB
Tharyx multifilis
Chaetozone corona
Pherusa inflata
Armandia bioculata
Capitita ambiseta
Capitalla capitata - PB
Asychis disparidentata
Axiothella rubrocincta
Owenia fusiformis collaris
Scalibregma inflatum
Pectinaria californiensis
Melinna cristata
Amphicteis scaphobranchiata
Terebellides storemi
Amaea occidentalis
Streblospio crassibranchiata
Chone mollis
Chone minuta

Phylum Arthropoda

Subphylum Crustacea (crabs, lobsters, barnacles, and shrimp)

Ampelisca cristata
Elasmopus rapax
Photis californica
Corophium acherusicum
Corophium insidiosum
Podocerus brasiliensis
Callinassa californiensis
Pinnixa franciscana



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Table IX (Continued)

Phylum Mollusca

Class Pelecypoda (clams, oysters, and mussels)

Nuculana taphria
Crenella decussata
Modiolus capax
Lysonia californica
Axinopsis sericatus
Thyasira barbarenaensis
Laevicardium substriatum
Chione fluctifraga
Chione undatella
Compsomyax subdiaphana
Protothaca staminea
Saxidomus nuttalli
Psephidia ovalis
Petricola (Rupellaria) californiensis
Cooperella subdiaphana
Macoma nasuta - SHB
Macoma secta
Tellina buttoni
Tellina idae
Tagelus californianus
Solen rosaceus
Cryptomya californica
Aloidis luteola
Hiatella artica

Class Gastropoda (sea snails)

Alabina occidentalis
Crepidula onyx
Nassarius fossatus
Nassarius mendicus
Fusinus Kobetti
Acteocina magdalensis
Acteon punctocoelata
Acteon traskii

*This list has been compiled from data collected by Dr. Donald Reish (ref. 9) of Long Beach State College. The information is based upon faunal samples taken in areas of mud and sand bottoms. Thus, all of the forms listed are from benthic habitats. Very little information is available on the organisms which inhabit the wood and concrete pilings and rock dikes and seawalls within the harbor. Because of the history of extreme pollution it is expected that the variety of invertebrates and plants found in such habitats will be less extensive than would be found in similar but less polluted habitats. Also, there is no positive information on the great variety of invertebrates which live on the outer breakwater where the waters are less polluted. The following marine borers and fouling organisms have been reported by other investigators (ref. 9) studying biological damage to wooden pilings in the harbor: *Limnoria tripunctata*, *Limnoria quadripunctata*, *Toredo diegensis*, *Bankia setacea*, and *Chelura terebrans*.

Table X

Fouling organisms collected from boat docks at selected stations in
Los Angeles Harbor - 30 October 1970 (ref. 18)

| Species | Species |
|-------------------------------|-------------------------|
| Algae: | Pelecypoda: |
| Antithamion occidentale | Hiatella arctica |
| Blue-green, unident. | Mytilus edulis |
| Cladophora sp. | |
| Enteromorpha crinita | Barnacles: |
| Ulva lobata | Balanus amphitrite |
| | B. crenatus |
| Sponges, unident. | Chthalamus fissus |
| | |
| Coelenterata: | Isopoda: |
| Anthopleura elegantissima | Ciliocoela gilliana |
| Diadume leucolena | Limnoria tripunctata |
| Obelia sp. | |
| Tubularia sp. | Amphipoda: |
| | Caprella sp. |
| Turbellarian, unident. | Corophium acherisicum |
| | Elasmopus rapax |
| Nemertea: | Unident. species |
| Emplectonema gracilis | |
| | Decapoda: |
| Polychaeta: | Pachygrapsus crassipes |
| Amphiduros pacificis | |
| Cirriformia luxuriosa | Ectoprocta: |
| Eumida smaguinea | Bugula californica |
| Eupomatus gracilis | B. neritina |
| Halosydna brevisetosa | Cryptosula pallasiana |
| Hydroides pacificus | Holoporella brunnea |
| Nereis grubei | Schizoporella unicornis |
| Ophiodromus pugettensis | |
| Polyopthalmus | Tunicata: |
| Pictus | Botryllus sp. |
| Sabella media | Ciona intestinalis |
| | Styela plicata |
| Gastropoda: | |
| Acmaea limatula | |
| A. scabra | |
| Amphissa versicolor | |
| Crepidula onyx | |
| Dirona picta | |
| Hermisenda crassicornis | |

Table XI

The number of benthic animal species in the east basin-consolidated slip region of Los Angeles Harbor (ref. 18)

| Station* | November 1954 | October 1970 |
|-----------------|----------------------|---------------------|
| LA 51 | 0 | 10 |
| LA 50 | 0 | 4 |
| LA 49 | 0 | 6 |
| LA 54 | 0 | 11 |

*Station locations are shown in figure 3.

Table XII

Comparison of concentrations of heavy metals in the marine environment with concentrations believed to be toxic to marine life (ref. 34)

| Metal | Natural concentration in sea water (parts/million) | Concentration believed toxic to marine life (parts/million) |
|--------------|---|--|
| cadmium | .08 | .01-10.0 |
| chromium | .00005 | 1.0 |
| lead | .00003 | .1 |
| nickel | .0054 | .1 |
| copper | .003 | .1 |
| zinc | .01 | 10. |
| manganese | .002 | --- |

TABLE XIII

Environmental Protection Agency (Region IX) Interim Criteria for Dredged Material Disposal in Open Waters

Bottom Sediment Analyses

The following bottom sediment analyses (dry weight basis) are required for all projects:

| Parameter | Limit |
|--------------------|----------|
| (1) Mercury | 1 ppm |
| (2) Cadmium | 2 ppm |
| (3) Lead | 50 ppm |
| (4) Zinc | 130 ppm |
| (5) Oil and Grease | 1500 ppm |

Elutriate Analyses

The following tests on the elutriate and the water from the disposal site are required for all projects:

- (1) Immediate Oxygen Demand (prior to settling, on elutriate only)
- (2) Biochemical Oxygen Demand (5-day, 20 degrees C)
- (3) Suspended Solids
- (4) Organohalogens

When disposal is proposed for inland navigable waters the following tests are required for projects greater than 50,000 CY:

- (5) Phosphorus (total)
- (6) Total Kjeldahl Nitrogen
- (7) Nitrate

Site Specification

The site is located at Lat. 33 deg. 37 min. 06 sec. N, Long. 118 deg. 17 min. 24 sec. W, 5.3 nautical miles from shore (5.8 nautical miles from the mouth of Los Angeles Harbor). The site is 1,000 yards in radius and located in 100 fathoms of water.

Site Guidelines

(1) Major constituents may exceed ten (10) times the concentration of the same constituents in the water from the proposed disposal site in the elutriate test (volume weighted average).

(2) Parameters may exceed the limit in the bottom sediment analysis by more than 50 percent (volume weighted average).

FY02/03

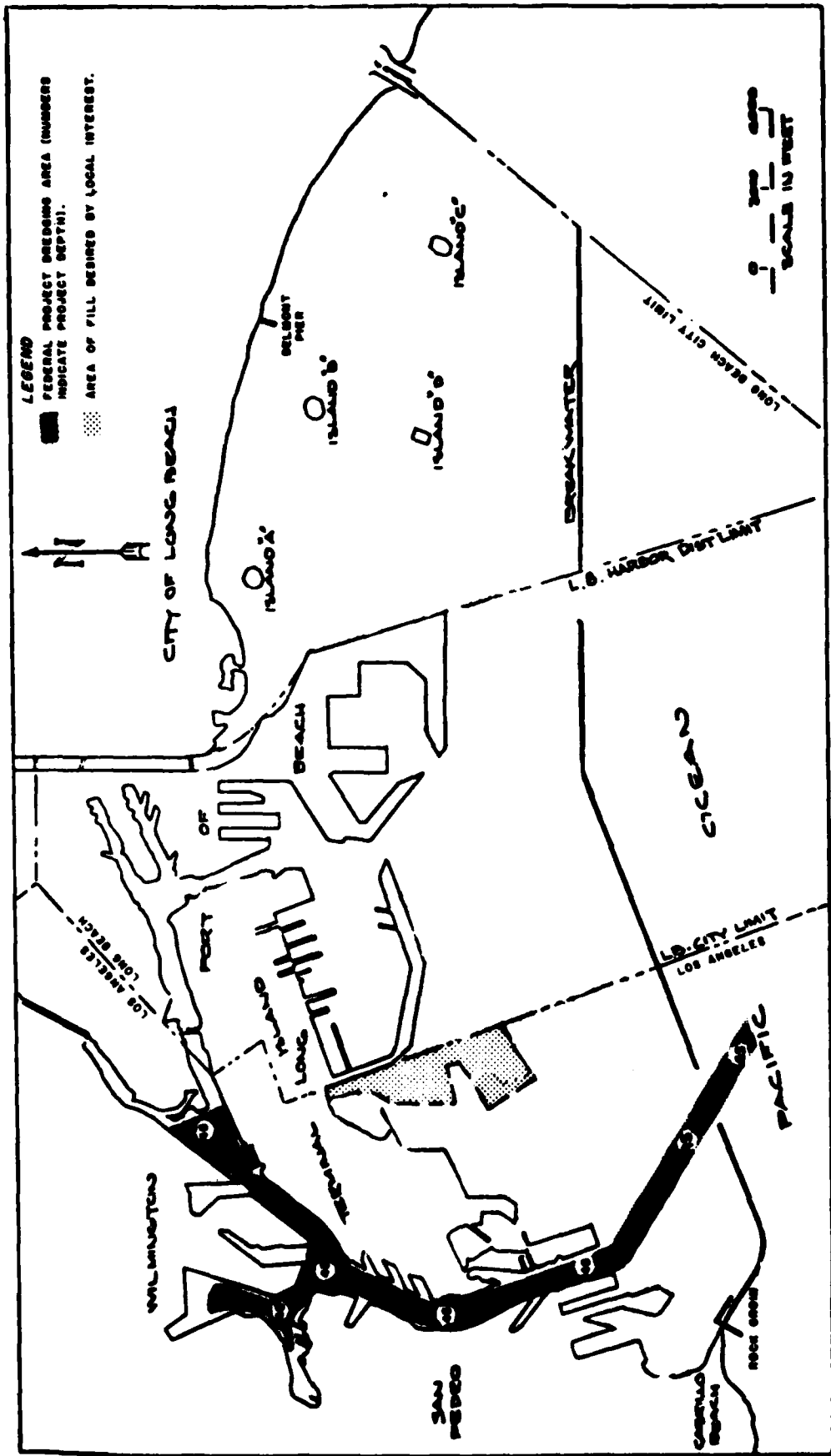
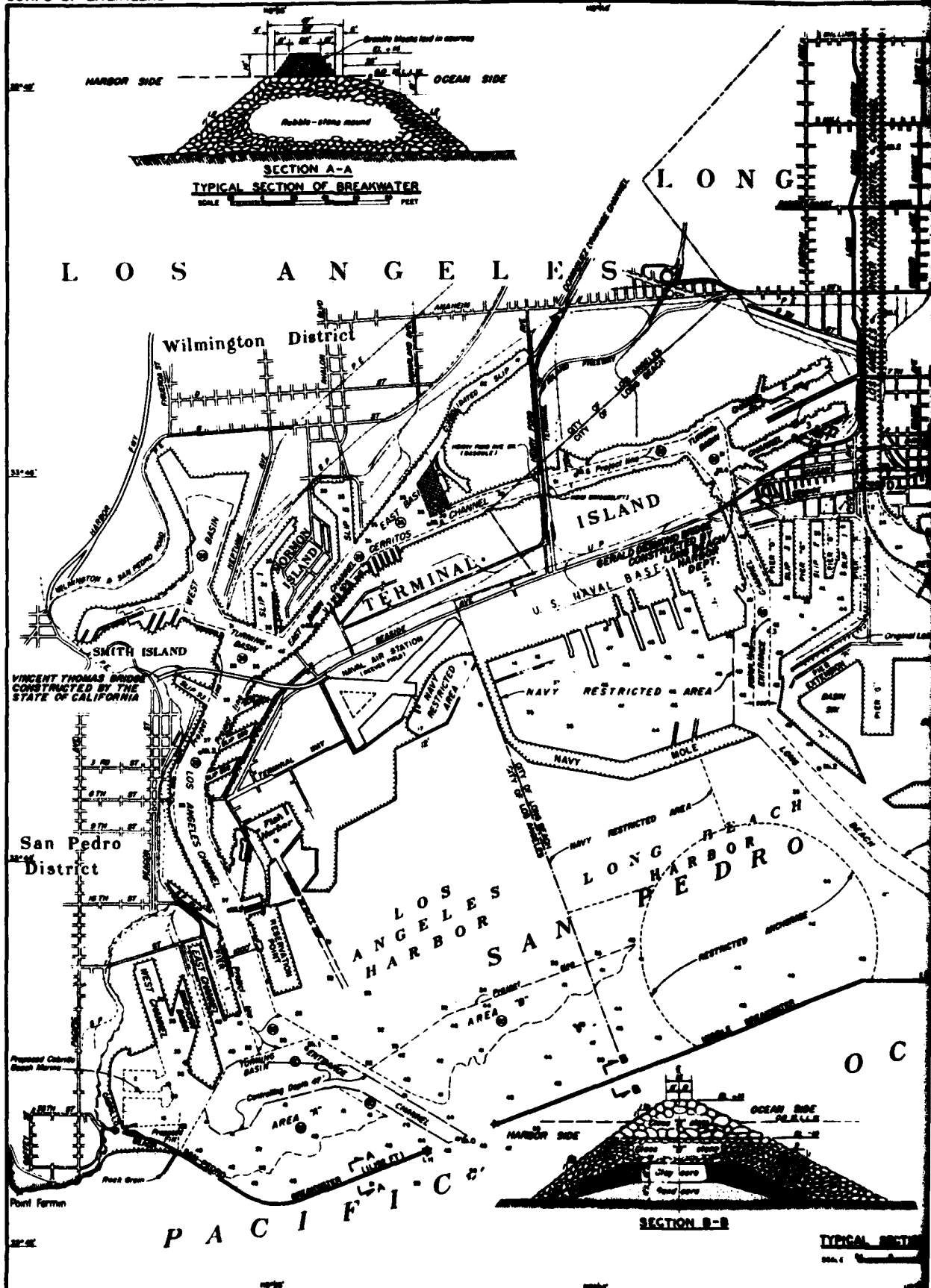


Figure 1. Location of dredge and fill areas in Los Angeles-Long Beach Harbor. Numbers in dredge areas in Los Angeles Harbor indicate proposed dredging depth.



LOS ANGELES

Wilmington District

San Pedro District

LONG BEACH

SMITH ISLAND

LONG ISLAND

TERMINAL

U.S. NAVAL BASE

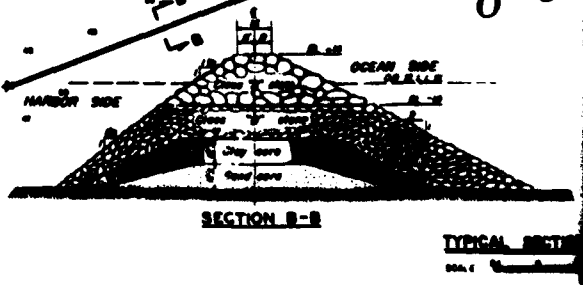
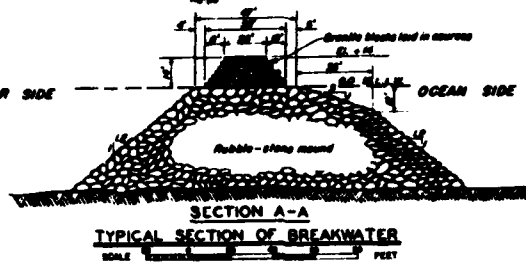
NAVY RESTRICTED AREA

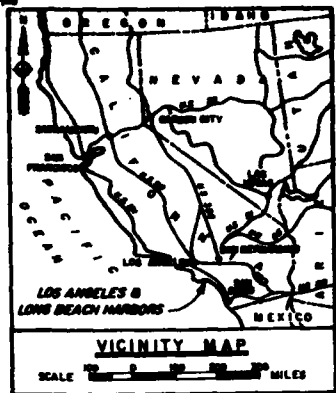
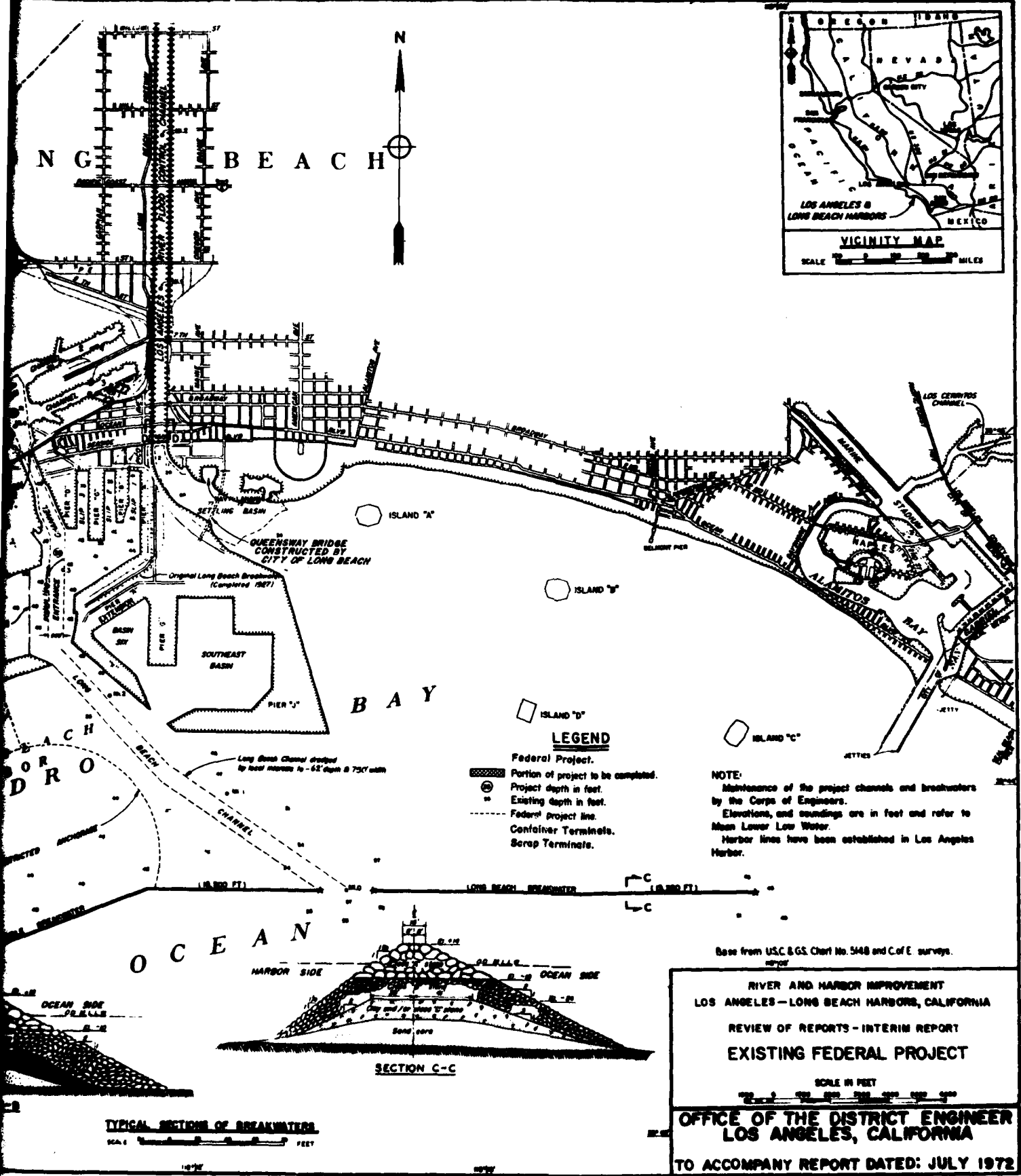
MOLE

LONG BEACH

SAN PEDRO

PACIFIC OCEAN





LEGEND

- Federal Project.
- ▨ Portion of project to be completed.
- ⊙ Project depth in feet.
- ⊙ Existing depth in feet.
- - - Federal project line.
- ⊠ Container Terminals.
- ⊡ Scrap Terminals.

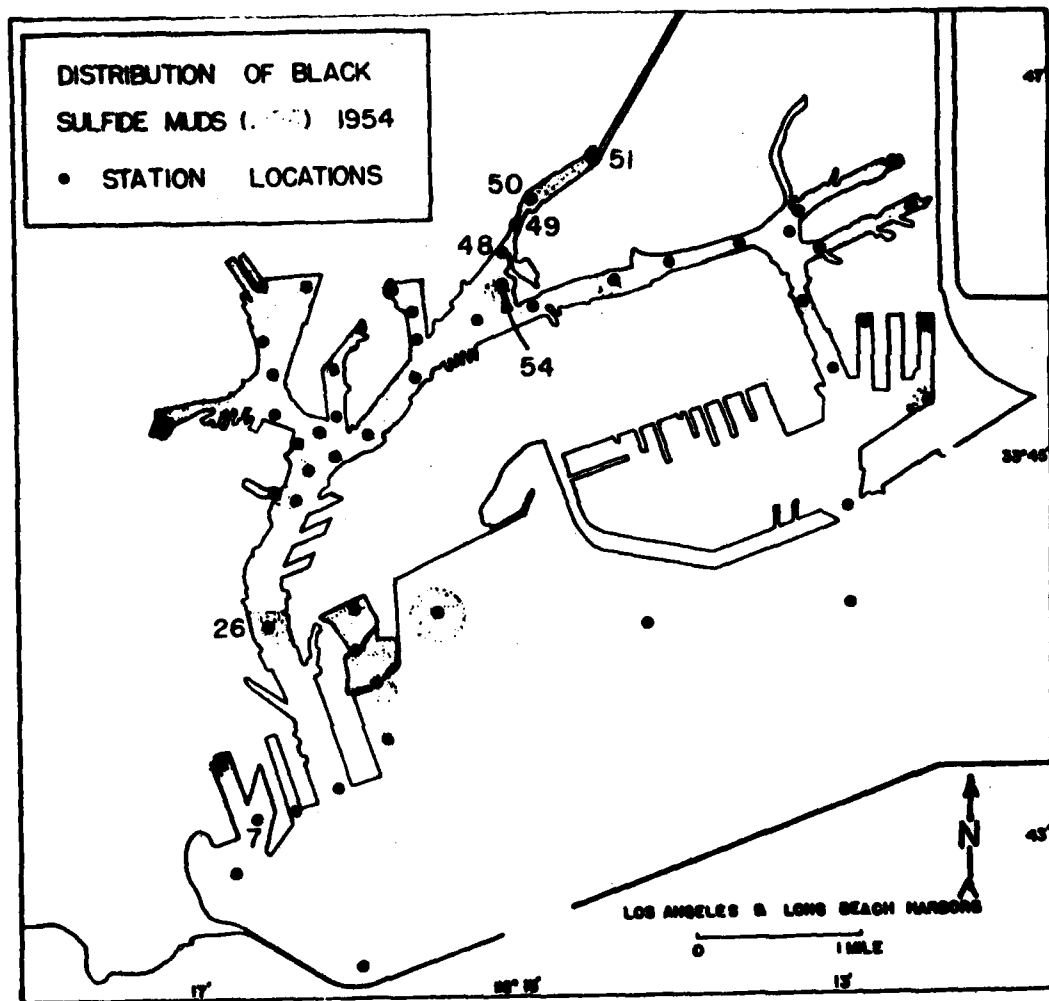
NOTE:
 Maintenance of the project channels and breakwaters by the Corps of Engineers.
 Elevations, and soundings are in feet and refer to Mean Lower Low Water.
 Harbor lines have been established in Los Angeles Harbor.

Base from USC & GS Chart No. 5448 and C of E surveys.

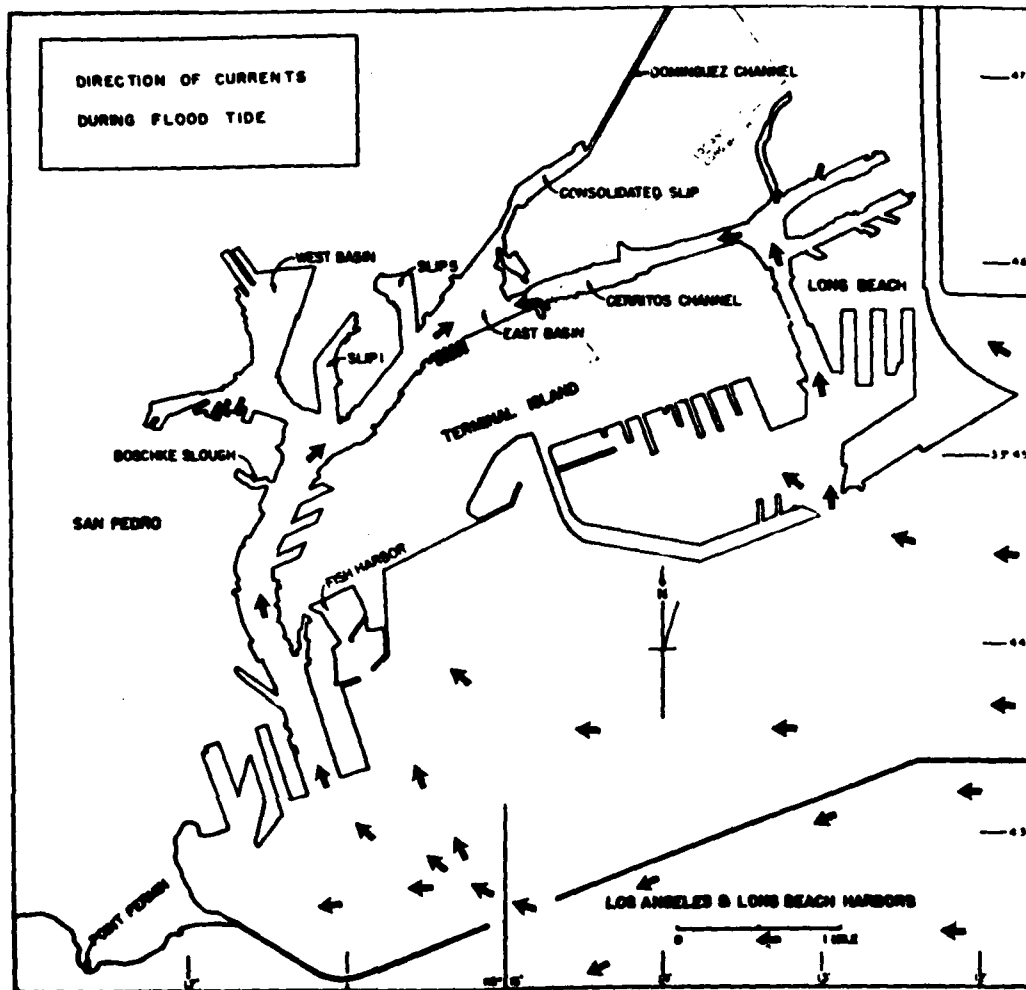
RIVER AND HARBOR IMPROVEMENT
 LOS ANGELES - LONG BEACH HARBORS, CALIFORNIA
 REVIEW OF REPORTS - INTERIM REPORT
 EXISTING FEDERAL PROJECT

SCALE IN FEET
 0 100 200 300 400 500 600 700 800 900 1000
**OFFICE OF THE DISTRICT ENGINEER
 LOS ANGELES, CALIFORNIA**
 TO ACCOMPANY REPORT DATED: JULY 1972

TYPICAL SECTION OF BREAKWATER
 SCALE _____ FEET

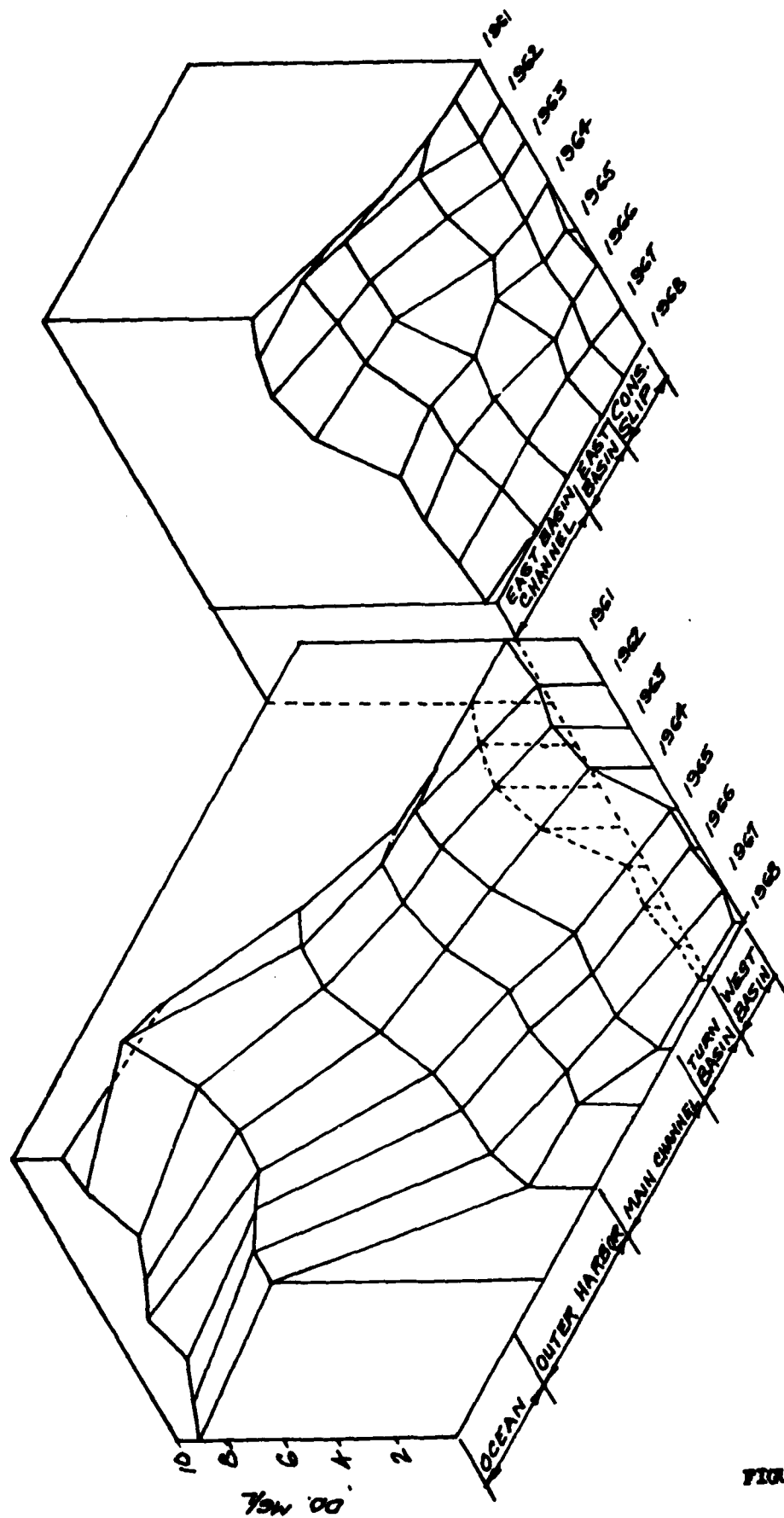


Distribution of black sulfide muds in Los Angeles-Long Beach Harbors, based on information obtained by Dr. Donald Reish (ref 9).



Direction of currents during flood tide in Los Angeles-Long Beach Harbors. Maximum speeds of 0.8 to 1.0 knots were measured near the entrance of Los Angeles Harbor (ref 9).

FIGURE 4



DISSOLVED OXYGEN AT SURFACE IN L.A. HARBOR vs. TIME (2)

FIGURE 5

TRANSPARENCY IN L.A. HARBOR vs. TIME (17)

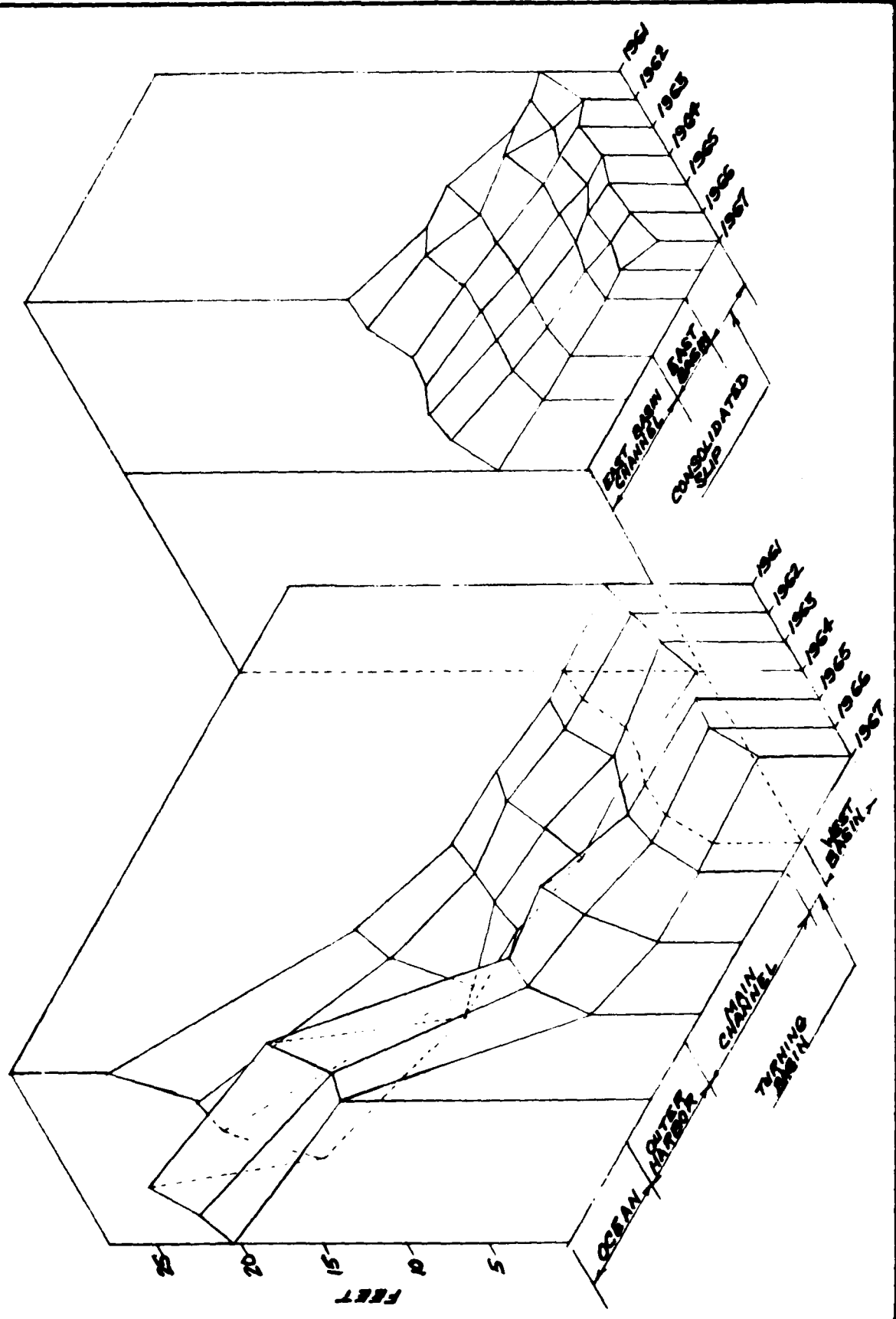


FIGURE 6

**WATER CLARITY - SURFACE - LOS ANGELES HARBOR
COLLECTION AND ANALYSIS BY PORT OF LOS ANGELES**

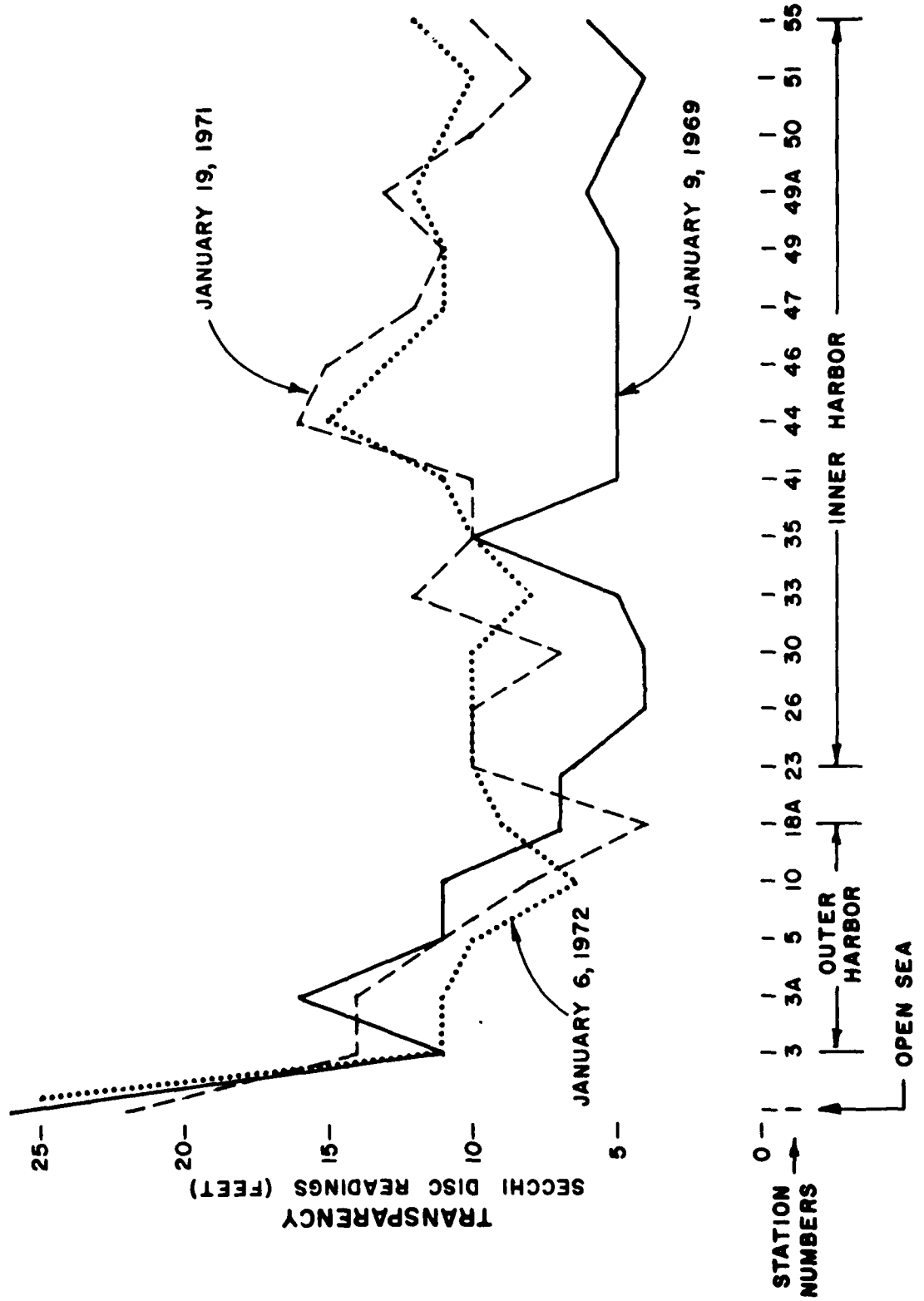


FIGURE 7

**DISSOLVED OXYGEN - SURFACE - LOS ANGELES HARBOR
COLLECTION AND ANALYSIS BY PORT OF LOS ANGELES**

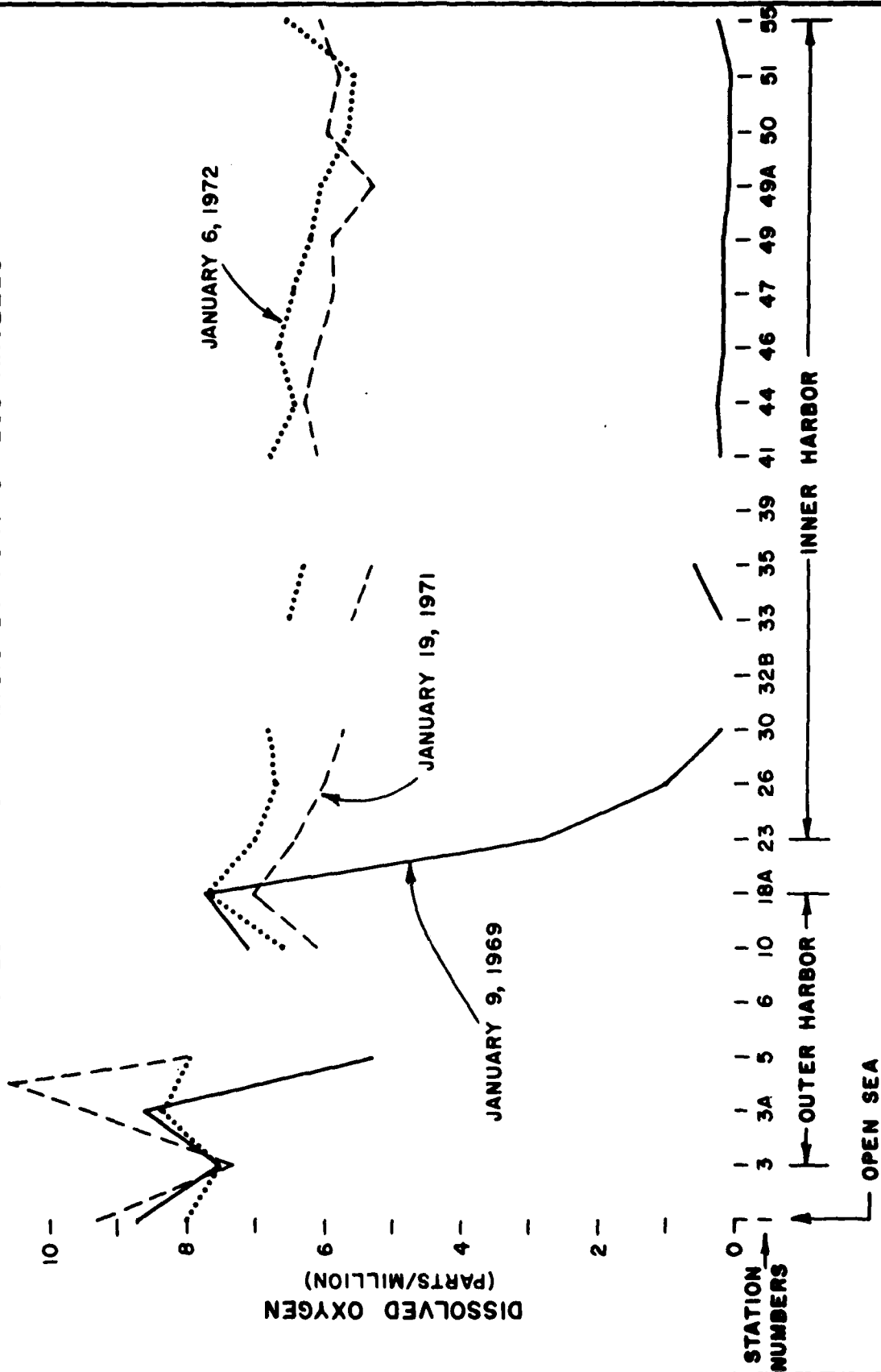
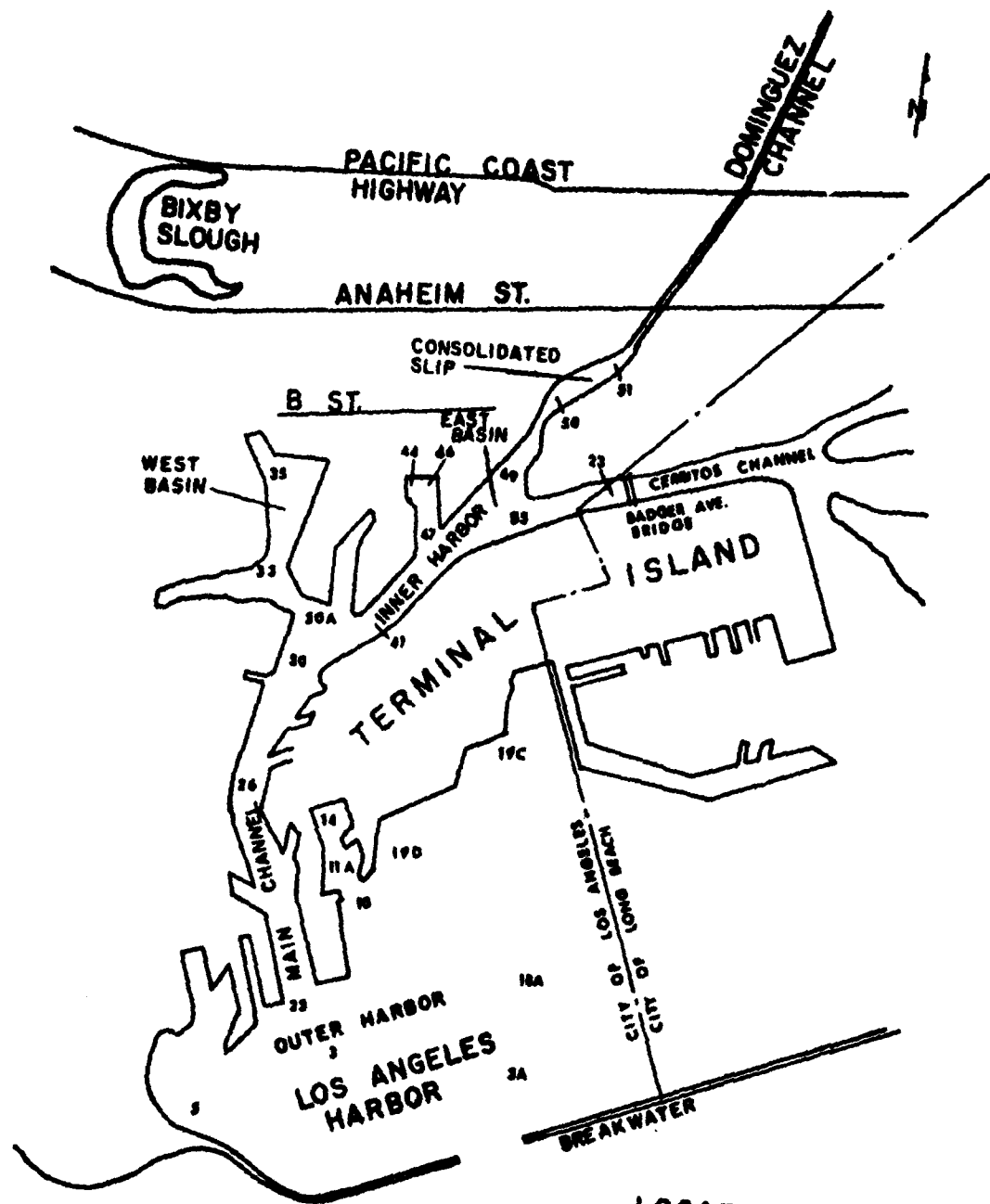


FIGURE 8



LEGEND
 NO.-INDICATES SAMPLING STATION

LOCATION OF WATER QUALITY SAMPLING STATIONS IN L.A. HARBOR

FIGURE 9

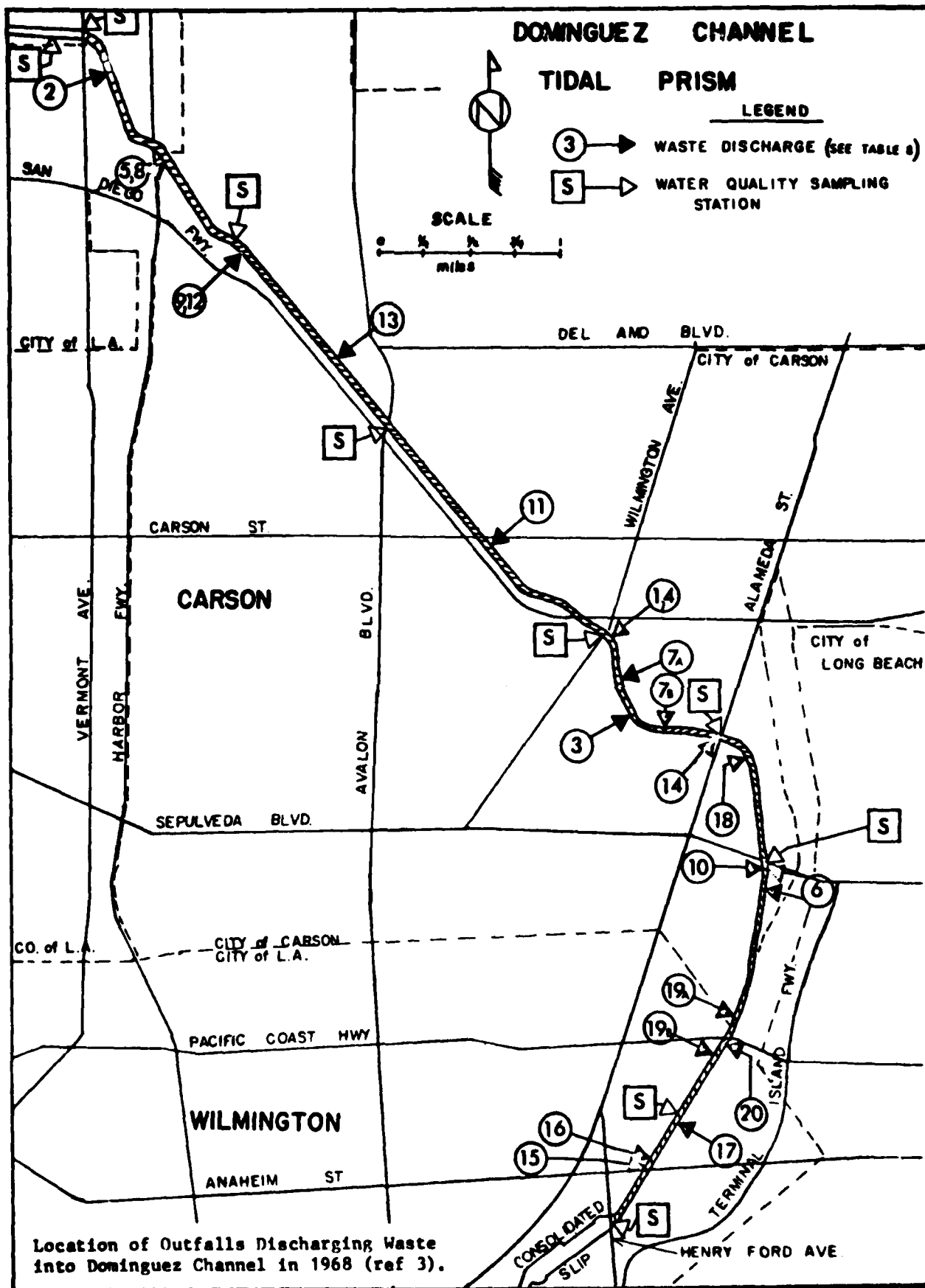


FIGURE 10

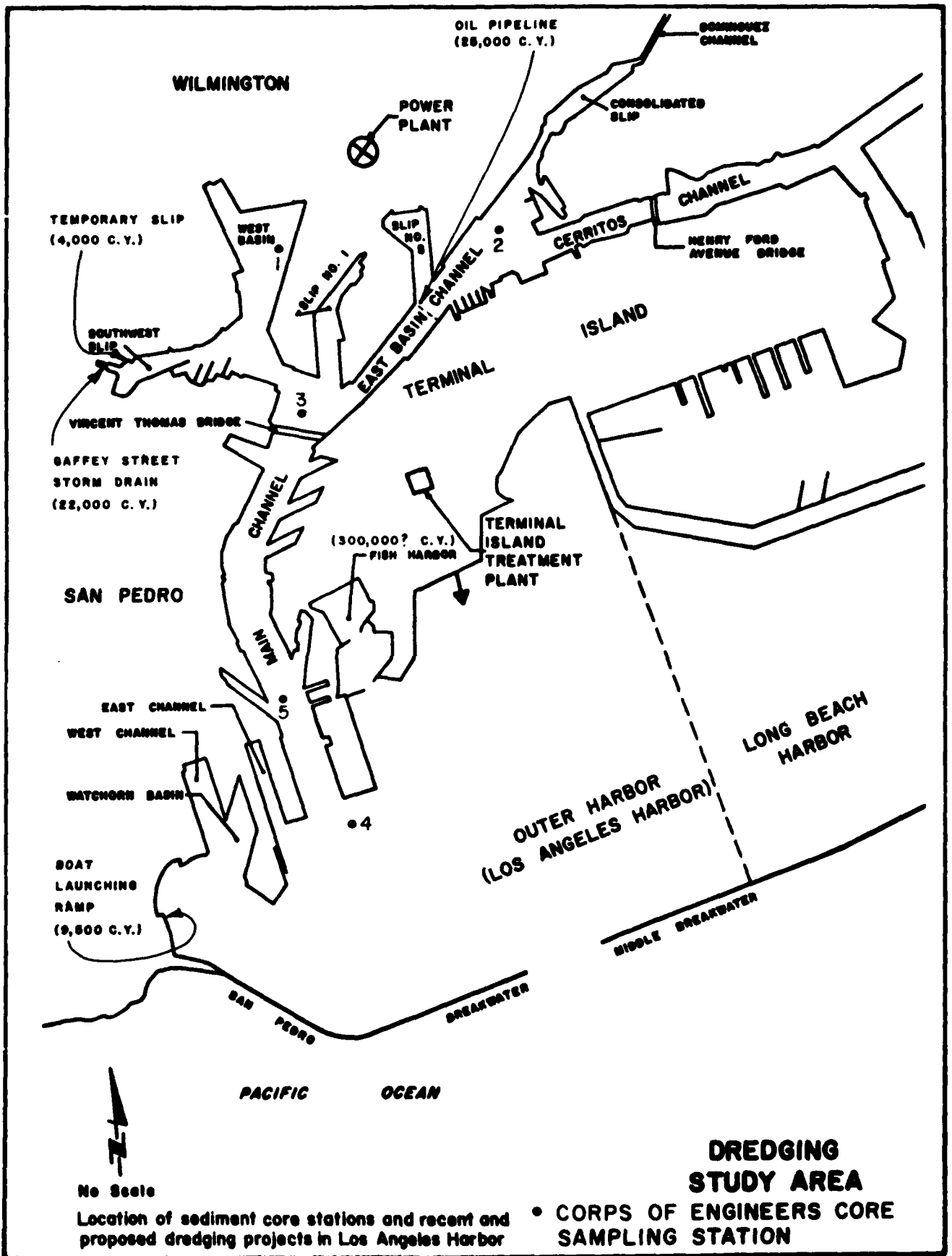


FIGURE 11

EMISSIONS

Percentage Contributions of All Contaminants from Major Sources

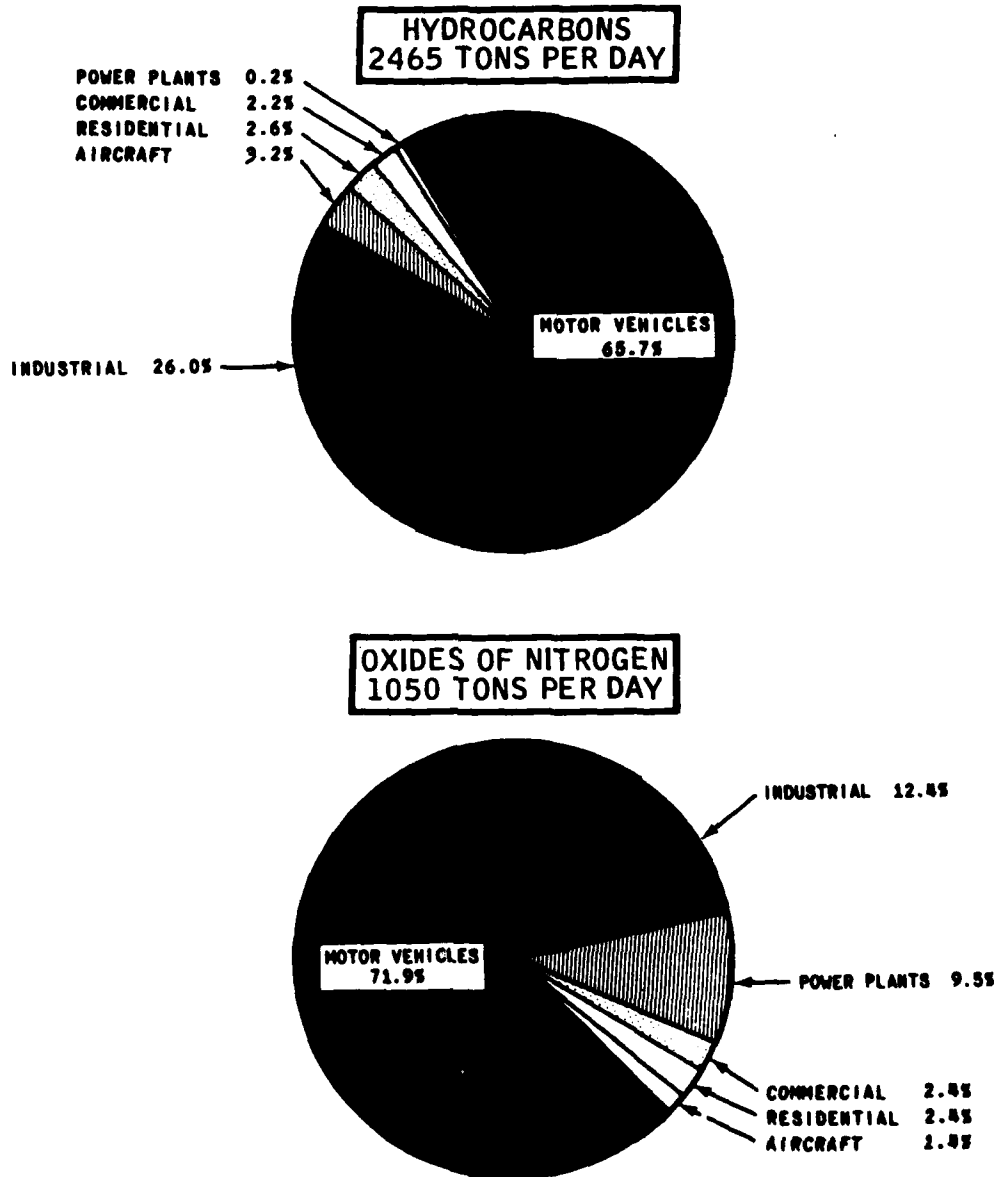


FIGURE 12A

EMISSIONS

Percentage Contributions of Air Contaminants from Major Sources (25)

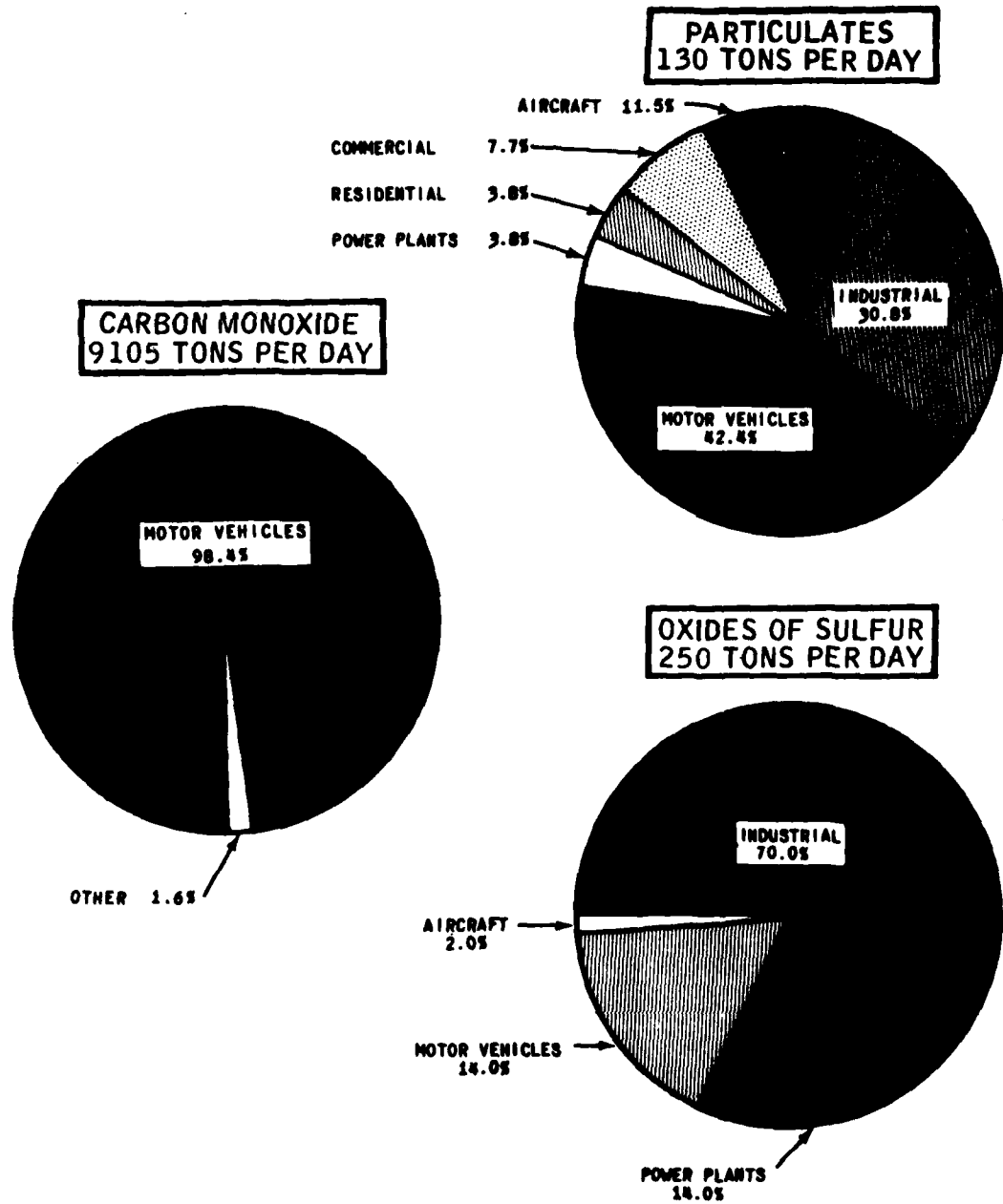
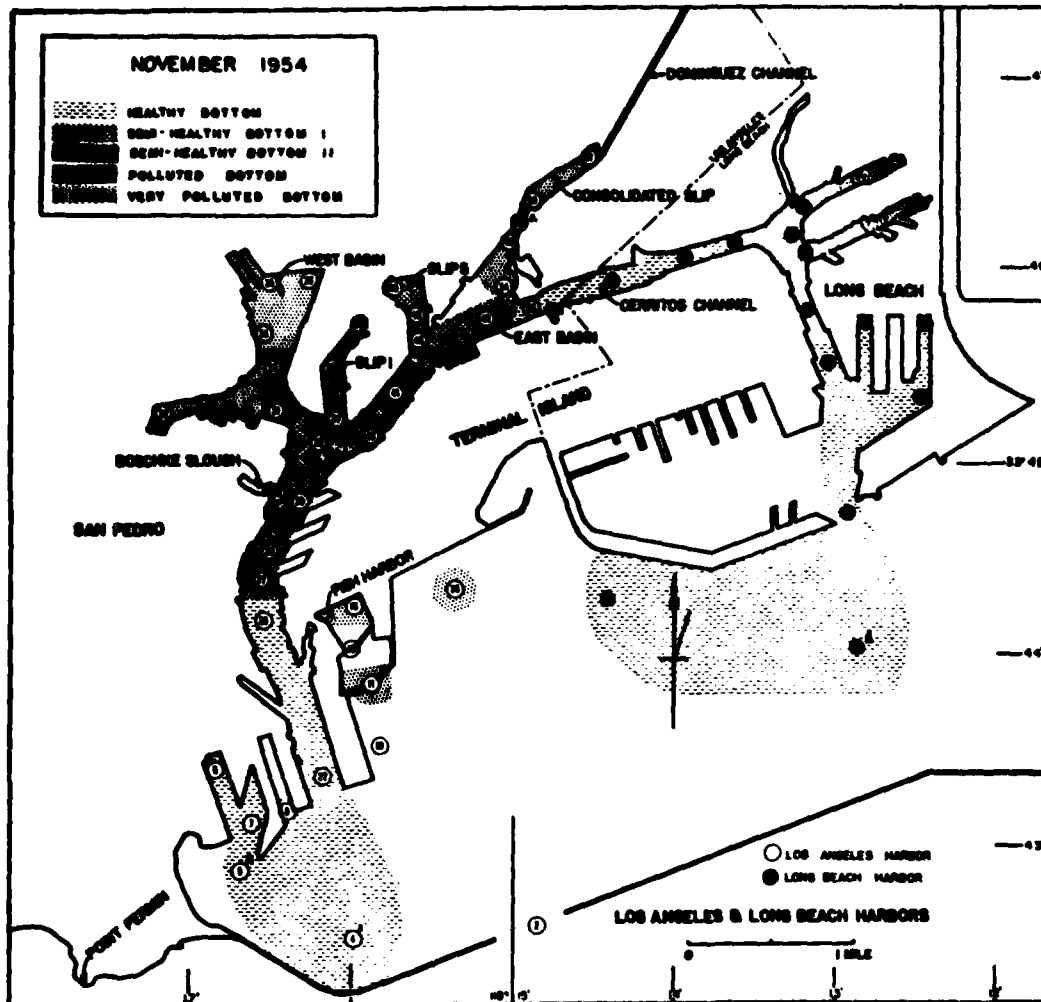


FIGURE 12B



Biological characterization of harbor bottom habitats showing areas of healthy and polluted bottom sediments. The condition of most habitats has greatly improved since 1954 when the last detailed survey was made. The circled numbers indicate station locations where water samples have been collected monthly since 1952 (ref 9).

FIGURE 13

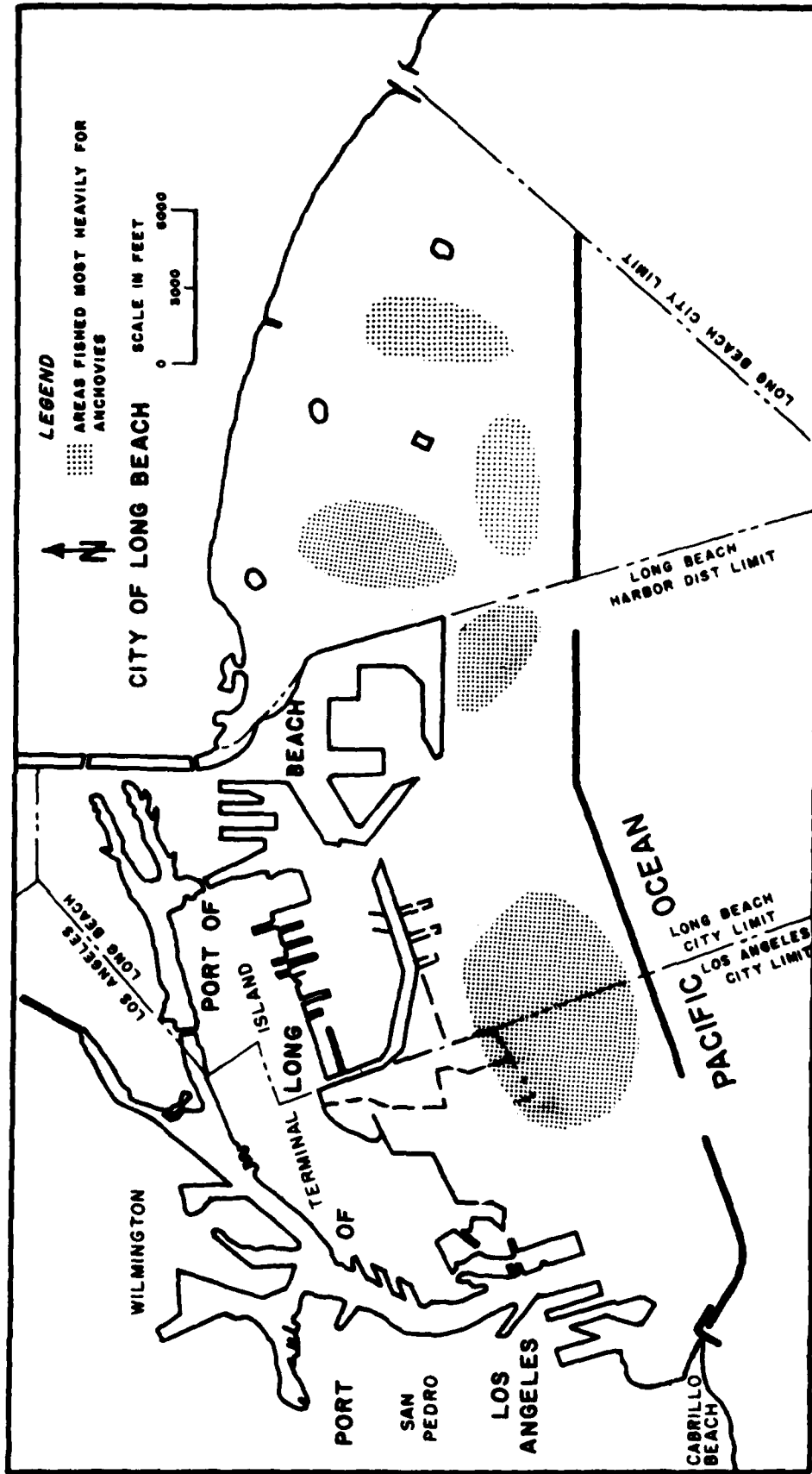


Figure 14 Location of major anchovy live bait catch areas in the Los Angeles-Long Beach Harbor. Map is based on reports obtained from bait fishermen.

APPENDIX A

LETTERS OF COMMENT

DISTRICT REVIEW

APPENDIX A



United States Department of the Interior
BUREAU OF RECLAMATION

SOUTHERN CALIFORNIA PLANNING OFFICE - REGION 3
528 MOUNTAIN VIEW AVENUE
SAN BERNARDINO, CALIFORNIA 92402

IN REPLY
REFER TO: 326-100
120.1

MAY 18 1972

Mr. J. P. Hatteberg
Acting Chief, Engineering Division
Department of the Army
Los Angeles District, Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

Dear Mr. Hatteberg:

We have received your letter dated May 1, 1972, requesting our review of your Preliminary Draft Environmental Statement-- Los Angeles-Long Beach Harbors--Los Angeles County, California.

The proposed plan to improve navigation facilities at these harbors does not conflict with existing or proposed projects of the Bureau of Reclamation. The Preliminary Draft Environmental Statement is adequate with respect to the environmental factors which relate to the Bureau of Reclamation's functional areas of responsibility and expertise.

These comments do not represent the review comments of the Bureau of Reclamation or the Department of the Interior on the Draft Environmental Statement. Departmental review must be accomplished by submitting the Draft Environmental Statement, and your request for its review, to the Assistant Secretary, Program Policy, Department of the Interior, in accordance with revised guidelines of the Council on Environmental Quality (36 F.R. 7724, April 23, 1971) and revised procedures of the Office of Management and Budget (Bulletin 72-6, September 14, 1971) on review of Environmental Statements by other Federal agencies. These procedures are to implement the policy and directives of Section 102 (2)(C) of the National Environmental Policy Act of 1969.

Sincerely,

J. G. Cushman

fn A. O. Feck
Area Planning Officer



United States Department of the Interior
BUREAU OF RECLAMATION

REGIONAL OFFICE - REGION 3
P.O. BOX 427
BOULDER CITY, NEVADA 89005

IN REPLY
REFER TO: 3-150
120.1

JUN 6 1972

Your reference:
SPLED-RE

Acting Chief, Engineering Division
Los Angeles District
Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

Dear Sir:

We have reviewed the Preliminary Draft Environmental Statement,
Los Angeles-Long Beach Harbors. The proposed action will not
affect existing or proposed Bureau of Reclamation activities.
Thank you for the opportunity to review this statement.

Sincerely,

E. A. Lundberg
Regional Director

In duplicate



IN REPLY REFER TO:
D6427 EQ-EIS
Your ref: SPLED-RE

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION

PACIFIC SOUTHWEST REGIONAL OFFICE

BOX 36062

480 GOLDEN GATE AVENUE

SAN FRANCISCO, CALIFORNIA 94102

May 31, 1972

District Engineer
Los Angeles District, Corps
of Engineers
P.O. Box 2711
Los Angeles, California 90053

Dear Sir:

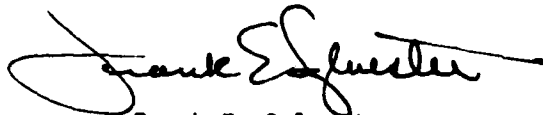
This responds to the letter from your office dated May 1, 1972, which requested our review and comment on your preliminary draft environmental statement for Los Angeles-Long Beach Harbors. Accordingly, we offer the following observations which constitute our field level comments and not the official views of this Bureau pursuant to the provisions of section 102 (2)(c) of Public Law 91-190.

1. The statement appears to cover adequately the possible impacts on recreation use of the harbor area. However, this does not necessarily apply to recreational fishing. We defer to the Bureau of Sport Fisheries and Wildlife for comment on all of the fishery aspects of the statement.
2. We suggest that you discuss the alternative of constructing the proposed container cargo facilities in another Southern California or West Coast location. This is not to say that the same goals could be accomplished by utilizing an alternate site. However, all possible alternatives to the project should be covered, and it is possible that the facilities could be constructed elsewhere with less environmental impact and satisfy the same needs in terms of either the regional or national economy.

3. Your cover letter indicates that long range harbor development would be covered by a separate environmental statement and that the subject statement applies exclusively to the dredge and fill phases. Were it possible, the logical order of business would be to first prepare the statement on the long term harbor development objectives and then tie each separate project statement into this "master" statement. Each individual project constitutes a contribution to the long term development. Therefore, it is difficult to evaluate each individual phase without considering the total picture. The alternative consideration suggested in (2) above could more logically be considered in the "master" statement. However, without such a "master" we believe it important to include such considerations in the individual statement.

We appreciate the opportunity to review and comment upon your statement.

Sincerely yours,



Frank E. Sylvester
Regional Director

cc: R. L. Eastman,
BOR, Washington, D.C.



UNITED STATES
DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY
Water Resources Division
345 Middlefield Road
Menlo Park, CA 94025

May 24, 1972

Mr. J. P. Hatteberg
Acting Chief, Engineering Division
Corps of Engineers
Los Angeles District
P. O. Box 2711
Los Angeles, CA 90053

Dear Mr. Hatteberg:

As requested we have reviewed the preliminary draft environmental statement for Los Angeles-Long Beach Harbors and our comments related to its effect on the water resources of the area are as follows:

The only mention of salt-water intrusion into the freshwater aquifers as a result of the proposed project appears on page 21, paragraph 93. We feel the statement is worded rather strongly particularly since no supporting evidence is presented or referenced. The comment that "salt-water intrusion . . . have been caused by excessive pumping" is misleading and should be deleted or qualified. The report on the Los Alamitos Barrier Project by Los Angeles County Flood Control District points out that intrusion has been "aggravated" by similar projects. A statement that adverse head conditions combined with a source of sea water can result in salt-water intrusion would be more appropriate.

Conversely, it should be pointed out that intrusion has already occurred in this area to such an extent that the shallower aquifers are no longer a source of potable water. The Central and West Basin Water Replenishment

District has been constructing an injection barrier across Dominguez Gap which is undoubtedly in operation by now. This barrier is intended to prevent further contamination of the Los Angeles Basin and should be effective even if the excavation project does remove any "impermeable" layers which may be present.

Regarding paragraph 94, page 21, a deletion of the last sentence is suggested. The Long Beach earthquake was mentioned on page 4, paragraph 16. The statement that the nearby fault zones "are believed to be inactive" is questionable.

The foregoing comments are provided informally for technical assistance and are not intended to represent the position of the Department of the Interior.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Wm H. Robinson", written in dark ink.

Wm H. Robinson
Acting Regional Hydrologist
Pacific Coast Region



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE

WESTERN REGION
450 GOLDEN GATE AVENUE, BOX 36063
SAN FRANCISCO, CALIFORNIA 94102

L7619
(WR)CF

May 17, 1972

Mr. J. P. Hatteberg
Acting Chief, Engineering
Division
Corps of Engineers
P. O. Box 2711
Los Angeles, California

Dear Mr. Hatteberg:

In response to your recent transmittal letter and attached preliminary draft environmental statement for the Los Angeles-Long Beach Harbors, we have the following comments.

We are not aware of any significant natural values in the area; however, to assist you in future planning in the area, we suggest that you contact the California Natural Areas Coordinating Committee. This group of concerned California scientists has developed an inventory of significant natural areas throughout the State. This committee can be contacted through the Executive Director, Box 670, Mill Valley, California 94941.

Sincerely yours,

Forrest M. Benson, Jr.
Acting Assistant Director,
Cooperative Programs



National Parks Centennial 1872-1972



OFFICE OF THE DIRECTOR

United States Department of the Interior

GEOLOGICAL SURVEY
WASHINGTON, D.C. 20242

June 15, 1972

District Engineer, Los Angeles District
Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

Dear Sir:

Last month the Director, Office of Environmental Project Review, referred a preliminary draft environmental statement, Los Angeles-Long Beach Harbors, California, to us for review.

We are enclosing copies of comments from our Geologic and Water Resources Division for your use in preparing the draft environmental statement on the deepening of areas in the Los Angeles part of the Los Angeles-Long Beach Harbors.

Sincerely yours,

Acting Director

United States Department of the Interior

GEOLOGICAL SURVEY
WASHINGTON, D.C. 20242

June 6, 1972

Memorandum

To: D. A. Bunevich, Office of the Director

From: G. H. Chase, WRD

Subject: Review of "preliminary" draft environmental statement, Los Angeles-Long Beach Harbors, California (ER-72/551)

The California District, WRD, has reviewed the subject draft environmental statement. Our comments related to its effect on the water resources of the area are as follow:

The only mention of salt-water intrusion into the freshwater aquifers as a result of the proposed project appears on page 21, paragraph 92. We feel that the statement is worded rather strongly, particularly since no supporting evidence is presented or referenced. The comment that "salt-water intrusion... have been caused by excessive pumping" is misleading and should be deleted or qualified. The report on the Los Alamitos Barrier Project by Los Angeles County Flood Control District points out that intrusion has been "aggravated" by similar projects. A statement that adverse head conditions combined with a source of sea water can result in salt-water intrusion would be more appropriate.

Conversely, it should be pointed out that intrusion has already occurred in this area to such an extent that the shallower aquifers are no longer a source of potable water. The Central and West Basin Water Replenishment District has been constructing an injection barrier across Dominguez Gap which is undoubtedly in operation by now. This barrier is intended to prevent further contamination of the Los Angeles Basin and should be effective even if the excavation project does remove any "impermeable" layers which may be present.

Regarding paragraph 94, page 21, a deletion of the last sentence is suggested. The Long Beach earthquake was mentioned on page 4, paragraph 16. The statement that the nearby fault zones "are believed to be inactive" is questionable.

(signed) George H. Chase

Retyped for reproduction



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
DIVISION OF RIVER BASIN STUDIES
2800 Cottage Way, Room E-2727
Sacramento, California 95825

June 20, 1972

Your reference:
SPLED-EN
May 1, 1972

District Engineer
Los Angeles District, Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

Dear Sir:

This is in response to your May 1 request for comments on the Preliminary Draft Environmental Statement (ER-72/551) and Interim Review Report for Los Angeles-Long Beach Harbors, Los Angeles County, California.

Our comments on the preliminary draft environmental statement do not constitute the review of the Department of the Interior on the draft environmental statement, as required under the provisions of the National Environmental Policy Act (P.L. 91-190).

We offer the following comments on the preliminary draft environmental statement:

Page 1, paragraph 2: The project description is not adequate. More information on the length, width, and depth of the channels and other pertinent information should be given.

Page 1, paragraph 5: It is our impression that, in addition to channel dredging, the first stage of this project will include the filling of Slip 230, development of marinas at Fish Harbor and Cabrillo Beach, additional marina development in the West Channel, and modification of the pierhead lines in the West Basin. If this is the case, these items should be discussed in the statement.

It is stated that spoil obtained would provide about 206 acres of land fill. On page 25 of your interim review report, a 307-acre diked area is mentioned. Clarification appears necessary.

Page 2, paragraph 6: According to information in this paragraph, the proposed dredge and fill project is only the first stage in a more comprehensive harbor development. Your statement that channels will be dredged in the Los Angeles and Long Beach Harbors to depths up to 80 feet and that about 2,500 acres of outer harbor will be filled to provide new wharf areas, together with information we have concerning future dredging, indicates that by 1985 most of the harbor will be filled. The Bureau of Sport Fisheries and Wildlife is concerned that the proposed long-range harbor development outlined in paragraph 6 could seriously affect the natural resources of the area. These resources include important sport and commercial fish, marine mammals, and water-associated birds.

Page 8, paragraph 39: If criteria for dissolved oxygen concentrations is changed, we recommend that it not be set below 5.0 ppm.

Page 12, paragraph 55: This paragraph gives the impression that new habitats created along channel sides and bottoms, and by the installation of pilings and concrete and rock dikes compensates for the destruction of salt flats and estuarine marshes. New habitat has been created, but it does not replace the high-value wetlands lost.

Page 13, paragraph 59: At a number of places in the statement, the term waterfowl is used in a very general sense. Waterfowl is ordinarily applied to members of the family Anatidae - swans, geese, and ducks. You may want to refer to water-associated birds.

Page 16, paragraph 74: Species taken in Los Angeles Harbor are white croaker, queenfish, shiner perch, walleye, surf perch, pile perch, bonito, white sea bass, California halibut, barracuda, Pacific jack mackerel, sardines, and corbina.

Page 16, paragraph 76: Change Department of Fish and Wildlife to Bureau of Sport Fisheries and Wildlife. We do not agree that anchovies are feeding on the great volume of organic particles discharged from the Terminal Island outfall. Work by Dr. Anotole Loukashkin indicates that the anchovy feeds on planktonic organisms.

Page 21, first paragraph: There is no discussion in the statement of where the material for the rock structure around the margins of the fill area will come from. Information on location of quarries, amount of rock material to be used, and impact on fish and wildlife at the quarry site should be given.

Page 30, paragraph 140: Studies being planned by the Corps of Engineers to obtain information for accurate prediction of the impact of the project on the live bait industry should be coordinated with the California Department of Fish and Game, Bureau of Sport Fisheries and Wildlife, and National Marine Fisheries Services.

Page 37, paragraph 173: The piecemeal loss of marine habitat within the harbor can be considered of great importance. On page 1, the 206-acre land fill is discussed, and on page 2 it is stated that about 2,500 acres of the outer harbor will be filled and that about 1,200 acres of marshland has been dredged. Overall, this is a considerable loss. We may find that the shoal part of San Pedro Bay will be dredged and filled in the proposed long-range harbor development.

Table IIIA: A study of this table leads us to believe that the extruded core samples were not taken to project depth in some cases. We have information that indicates mercury levels occurring between Holes 2 and 3 exceed EPA limits.

It should be stated at some appropriate place in the draft that dredging operations and disposal of spoil will be scheduled so as to reduce turbidity and siltation to the lowest level practicable. The Environmental Impact Statement should also state that the Corps of Engineers will maintain close coordination with personnel of the Bureau of Sport Fisheries and Wildlife and the California Department of Fish and Game prior to and during dredging and spoil operations to safeguard fish and wildlife resources.

Our comments on the Interim Review Report are as follows:

Page 28, Environmental and Ecological Impact: In connection with channel dredging, it is stated that "The possible detrimental effect is the displacement of some live bait fisheries from their present location in the sheltered outer harbor to one farther to

the south. This deficit is expected to be more than offset by the beneficial effects of the creation of new habitats for marine life in the rock dikes which will be required to retain the fills." We feel the effects of the project, although adverse, will not be as damaging as the total future land fill planned for the Los Angeles-Long Beach Harbors. The project under consideration may be the first step in completely obliterating the anchovy bait-fishery. Rock dikes will not offset this loss.

In addition to the brown pelican, the California least tern should be mentioned as an endangered species known to use the project area.

Sincerely,

Norman R. Chupp
for Norman R. Chupp
Field Supervisor

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
SOIL AND WATER CONSERVATION RESEARCH DIVISION
SOUTHWEST BRANCH, P.O. BOX 2326
RIVERSIDE, CALIFORNIA 92506

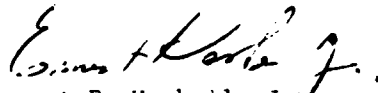
May 26, 1972

Mr. J. P. Hatteberg, Acting Chief
Engineering Division
Department of the Army
Los Angeles District, Corps of Engineers
P. O. Box 2711
Los Angeles, CA 90053

Dear Mr. Hatteberg:

We have received your preliminary draft of Environmental
Statement, Los Angeles-Long Beach Harbors, Los Angeles
County, California and have no comment.

Sincerely,



Ernest E. Haskell, Jr.
Acting Branch Chief

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

2020 Milvia Street, Berkeley CA 94704

Your File: SPLED-RE

May 22, 1972

Mr. J. P. Hatteberg, Acting Chief
Engineering Division
Corps of Engineers
P. O. Box 2711
Los Angeles, CA 90053

Dear Mr. Hatteberg:

Your draft environment statement for Los Angeles-Long Beach Harbors has been reviewed.

It appears that most of the work involved consists of dredging and deepening the harbors. We do not find that the work would impact on that of the Soil Conservation Service, and the Soil Conservation Service has no work or plans in the area of your proposal.

Therefore, concerning the draft environmental statement, we have no comments.

Sincerely,

Helseth, acting

T. P. Helseth
State Conservationist

cc: Donald F. Miller, SCS, Riverside, CA
Kenneth E. Grant, Adm., SCS, Wash., DC
w/copy of environmental statement



**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

WESTERN REGION
P. O. BOX 92007 WORLDWAY POSTAL CENTER
LOS ANGELES CALIFORNIA 90009



18 May 1972

Mr. J. P. Hatteberg
Acting Chief, Engineering Division
Department of the Army
Los Angeles District, Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

Dear Mr. Hatteberg:

As requested, we have now completed a review of your preliminary draft environmental statement for the Los Angeles-Long Beach Harbors.

Our findings indicate that this proposed project will not present any problem from an environmental viewpoint to any existing or presently planned FAA facilities. Please be advised that this approval does not obviate the requirement for the Corps of Engineers to file a notice with the FAA where applicable and as stipulated under Part 77 of the Federal Aviation Regulations.

We appreciate the courtesy extended in bringing this matter to our attention.

Sincerely,


CHARLES G. GROSH
Chief, Planning Staff, WE-4

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION-REGION SEVEN Nine
HIGHWAY PROGRAMS OFFICE

ARIZONA
CALIFORNIA
HAWAII
NEVADA

450 Golden Gate Avenue, Box 36096, San Francisco, Calif. 94102

June 22, 1972

IN REPLY REFER TO:
930-00.8



Department of the Army
Los Angeles District, Corps of Engineers
District Engineer
Attn: Environmental Section
P. O. Box 2711
Los Angeles, California 90053

Gentlemen:

We have reviewed the Preliminary Draft Environmental Impact Statement for the proposed Los Angeles-Long Beach Harbors project in Los Angeles County, California, and offer the following comments for your consideration:

1. Although there will be no immediate effect on Federal-aid highways due to the proposed harbor construction, there are several bridges that carry traffic over the harbor and various channels. It should be noted in the draft EIS that the admission of larger ships into the harbor may necessitate future reconstruction of some of these bridges to provide vertical clearance.
2. More emphasis should be placed on the increased land transportation which will be generated by this project, particularly truck and rail systems. Also, any coordination with the various agencies responsible for these transportation facilities should be discussed.

We appreciate this opportunity to review the subject statement.

Sincerely yours,

F. E. HAWLEY
Director, Highway Programs Office


MITCHELL TANNER
Chief, Environmental Division



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES
Marine Minerals Technology Center
3150 Paradise Drive, Tiburon, CA. 94920

May 9, 1972

Mr. J. P. Hatteberg
Acting Chief, Engineering Division
Department of the Army
Los Angeles District, Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

Dear Mr. Hatteberg:

We have perused the Preliminary Draft Environmental Statement For The Los Angeles-Long Beach Harbors, dated March 1972, with interest. We feel it is a thoroughly prepared, well documented work and consider it acceptable in form and content.

Sincerely,

Harold D. Hess
Physical Scientist



THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

June 26, 1972

Mr. J. P. Hatteberg
Acting Chief, Engineering Division
U.S. Department of the Army, Corps
of Engineers
Los Angeles, California 90053

Dear Mr. Hatteberg:

The preliminary draft environmental statement for "Los Angeles-Long Beach Harbors, Los Angeles County, California, reference SPLED-RE, which accompanied your letter of May 1, 1972, has been received by the Department of Commerce for review and comment.

The Department of Commerce has reviewed the draft environmental statement and has the following comments to offer for your consideration.

Premised on the U.S. Corps of Engineers' report, covering proposed dredging in San Pedro, the planned improvements are expected to slightly reduce the estuarine flushing rate. The dredge and fill will obsolete sections of the nautical charts covering the harbor, pending publication of a corrected edition.

From the standpoint of aquatic resources, our main areas of concern are focused on (1) the disposal sites for the dredged spoil material and (2) the encroachment of the planned fill into one of the areas in the harbor used by anchovy live bait fishermen.

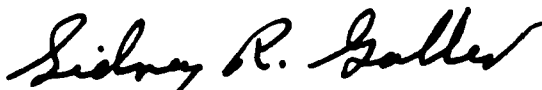
Inasmuch as the dredged material contains pollutants, it would be preferable to deposit this material on land. However, the statement indicates that land sites are either unavailable or that the cost of transporting the material to such sites would be prohibitive. Disposal of spoil in alternative fill areas

is mentioned in paragraph 161, on page 35, but the suggestion is accompanied by no discussion of alternative sites. As an alternative, the construction of dikes and settling ponds within which the spoil would be placed should be discussed. If these structures were properly constructed and managed, and if all applicable California water quality standards were met, the adverse biological effects associated with disposal of 10 million cubic yards of spoil probably could be mitigated.

The effect of displacement of a segment of the anchovy population in Los Angeles-Long Beach Harbor is largely unknown. In view of the uncertainties, we suggest that pre-construction and post-construction studies be undertaken to determine the size, distribution, and movements of the anchovy population in the harbor. Studies designed to assess the effects of the encroachment (land fill in the harbor) into the anchovy live bait fishing area could be useful in subsequently assessing the probable impact of future and more extensive developments proposed by the Ports of Los Angeles and Long Beach, as well as by the Navy.

We hope these comments will be of assistance to you in the preparation of the draft environmental statement.

Sincerely,



Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs



IN REPLY
REFER TO

DCRL-PM

DEFENSE SUPPLY AGENCY

DEFENSE CONTRACT ADMINISTRATION SERVICES REGION, LOS ANGELES
11099 SOUTH LA CIENEGA BOULEVARD
LOS ANGELES, CALIFORNIA 90045

10 May 1972

SUBJECT: Los Angeles - Long Beach Harbor Preliminary Draft
Environmental Statement, Review of

TO: Dept of the Army
Los Angeles District Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053

1. Reference (a) Department of the Army Letter SPLED-RE dated 1 May 1972.
2. In accordance with request contained in reference (a), Subject Draft was reviewed by this activity.
3. The Environmental Statement did not reveal any impact area of concern to this command. In view of this we do not choose to comment at this time.

FOR THE COMMANDER:


JOHN J. LEVINE
Chief, Industrial Resources and
Mobilization Planning Division



COMMANDANT
ELEVENTH NAVAL DISTRICT
SAN DIEGO, CALIFORNIA 92132

IN REPLY REFER TO

11000
Ser 104/32
25 MAY 1972

From: Commandant, Eleventh Naval District
To: District Engineer, Department of the Army,
Los Angeles, Corps of Engineers, P. O. Box 2711,
Los Angeles, California 90053

Subj: Environmental Statement for Los Angeles-Long Beach
Harbors Dredging Project

Ref: (a) Your ltr SPLED-RE of 1 May 1972

1. The subject environmental statement forwarded to this Command by reference (a) has been referred to the Western Division of the Naval Facilities Engineering Command. The review and preparation of coordinated Navy comments on the environmental statement will be reported to your office by the Western Division office.

Copy to:
CO WESTNAVFAC
COMNAVBASE LOSA-LBEACH


J. S. LANEY
Chief of Staff

TELEPHONE
SAN BRUNO—871-6600
AREA CODE 415

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
SAN BRUNO, CALIFORNIA 94066

IN REPLY REFER TO:

90E-BFM/10

22 JUN 1972

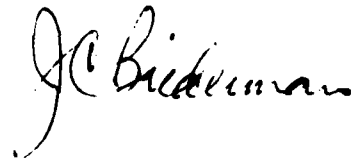
From: Commanding Officer, Western Division, Naval Facilities
Engineering Command
To: District Engineer, Department of the Army, Los Angeles District,
Corps of Engineers, P.O. Box 2711, Los Angeles, CA 90053
Subj: Preliminary Draft Environmental Impact Statement,
Los Angeles-Long Beach Harbors; comments concerning
Ref: (a) CORPS OF ENGRS LOSA ltr SPLED-EN of 1 May 1972
Encl: (1) Drawing of proposed modification to disposal area

1. Reference (a) requested comments on an Environmental Statement and Interim Review Report from the Commander, U. S. Naval Base Los Angeles. The Commander, Naval Base Los Angeles, has forwarded his comments to this Command for incorporation into a consolidated Navy reply.

2. The proposed dredging and fill operations are expected to have minimal impact on Navy operations in the area. It is requested, however, that a minimum channel width of 150 feet be maintained during and after construction of the disposal area dike for access to Reeves Field.

3. The Navy's Master Plan for the Long Beach complex includes the construction of an additional 75 acres of mole area as shown in enclosure (1). It is requested that the Army Corps of Engineers take under consideration the modification of the exterior retaining dikes to include this area. This could provide additional area for the deposition of dredge spoils not only for the proposed project but for future maintenance dredging. The Navy also has under consideration future projects wherein the disposal of dredge spoils will be a factor.

4. If the request in paragraph 3 appears feasible, further discussion between this Command, the Corps of Engineers, and the cities of Los Angeles and Long Beach, should be initiated. Initially, the point of contact for this Command is Commander B. F. Montoya, telephone (415) 871-6600, extension 2501. He can arrange for the presence of members from our Planning, Construction or Real Estate staffs if required at any subsequent meetings.



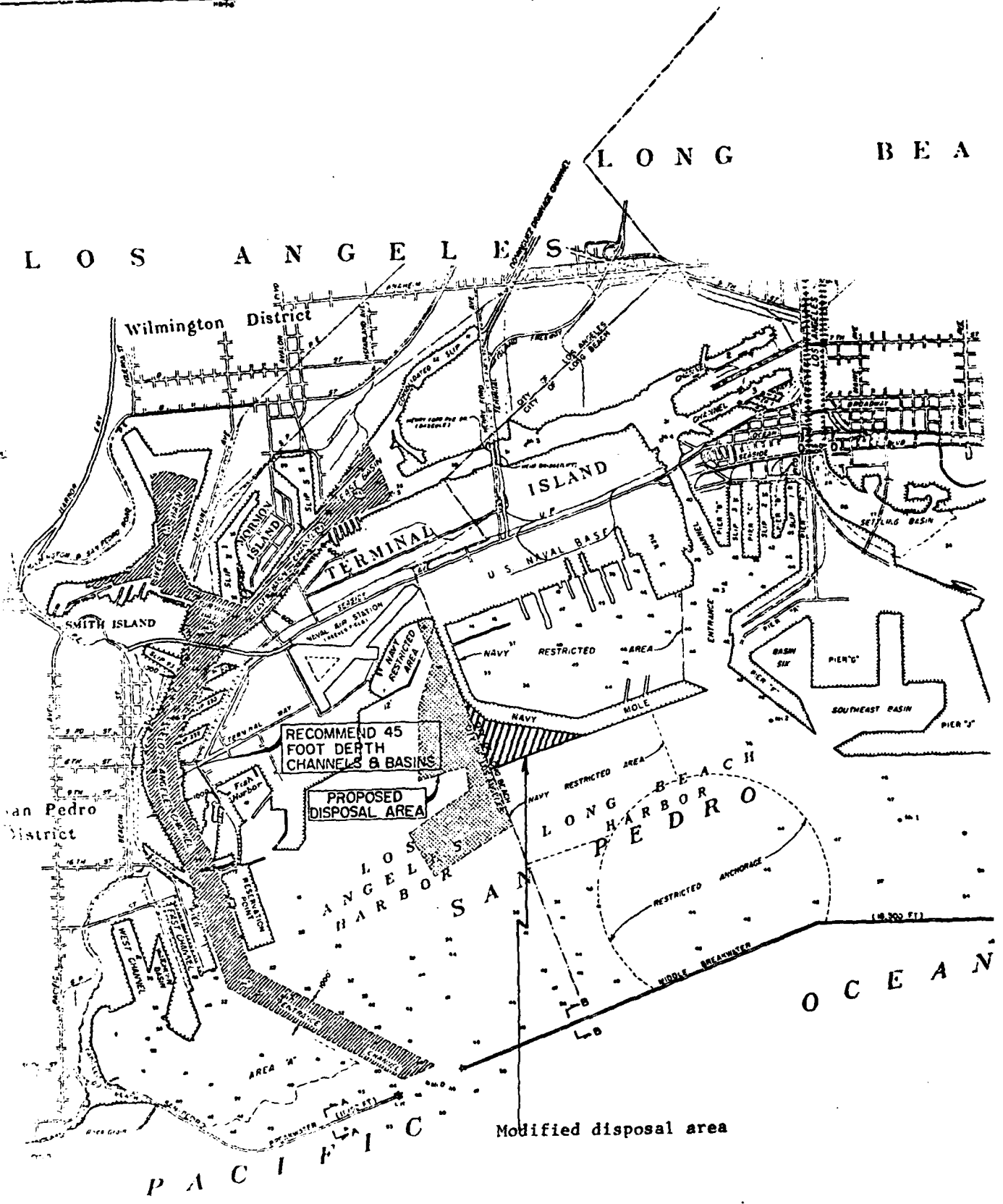
J. C. BIEDERMAN
Acting Executive Officer

90E-BFM/10

22 JUN 1972

Subj: Preliminary Draft Environmental Impact Statement,
Los Angeles-Long Beach Harbors; comments concerning

Copy to:
COMELEVEN
NAVBASE LOSA LBEACH
NAVSHIPYD LBEACH
NSC LBEACH
NAVSTA LBEACH
SDIEGO BR WESTNAVFACENCOM



Modified disposal area

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION IX
100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

JUL 7 1972

District Engineer
Corps of Engineers
Los Angeles District
P. O. Box 2711
Los Angeles CA 90053

Dear Sir:

We are replying to your letter of May 1, 1972 requesting our review and comment on the preliminary draft Environmental Impact Statement and Interim Review Report for the proposed Los Angeles - Long Beach Harbors Project, Los Angeles County, California.

We have reviewed both documents and believe that the following points need to be addressed in greater detail in the reports.

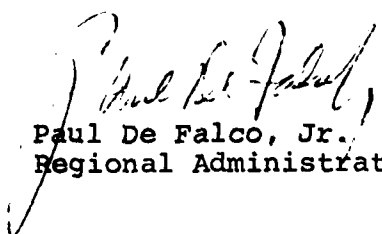
1. The relationship between the proposed dredging and the Los Angeles - Long Beach Harbors Master Plan.
2. The effects of dredging on harbor flushing and the anchovy fishery.
3. The inconsistencies which exist between the EIS Statement and the Interim Review Report.
4. The poor air quality situation in the Los Angeles Basin and this project's impact on that situation.
5. The inequities and deficiencies which exist in the Benefit - Cost Analysis.
6. The San Francisco Bay Area In-Depth Study and its relationship to the Los Angeles - Long Beach Harbor Development.

Specific comments relating to these points are attached.

-2-

We believe that by addressing these pertinent areas of concern the preliminary draft statement and interim review report will be substantially improved and will more fully assess the environmental consequences of this proposed project.

Sincerely,



Paul De Falco, Jr.
Regional Administrator

Enclosure

ENVIRONMENTAL PROTECTION AGENCY
REGION IX

Review and comments on the Corps of Engineers, Los Angeles District, Preliminary Draft Environmental Impact Statement for the proposed Los Angeles - Long Beach Harbors Project, Los Angeles County, California.

One of our prime concerns with the impact statement is that it only addresses itself to the first stage dredging of the proposed Los Angeles - Long Beach Harbors Master Plan. The Corps has stated that an EIS for the entire master plan will be prepared and circulated for review in 1975. It is our position that this particular dredging action is the first major Federal action associated with the ultimate harbor development plan. Therefore we feel it would be more appropriate to deal with the entire harbor development and its associated impacts first, before any particular segments of the plan are implemented.

It appears that there is very little information available on harbor circulation and flushing. This lack of knowledge has caused problems in prior dredging projects in the harbor area.

Physical or oceanographic studies could provide a basis for accurate predictions of flushing effects. However, under the Corps' current timetable, neither will be complete until after this project is built.

The statement needs to be more specific in dealing with the flushing impacts that will occur in the inner and outer harbor as the harbor is dredged to its ultimate depth of 80 feet. In addition to the flushing problems and the disruption of marine organisms living on the channel bottoms we are concerned about the displacement of live bait fisheries from the outer harbor to areas farther south. This displacement may ultimately result in the loss of this fishery altogether. The California Department of Fish and Game has stated that by filling the proposed 2500 acres of outer harbor a significant threat to the anchovy fishery would occur. This in turn would have a major impact on southern California sportfishing.

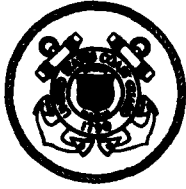
The impact statement recognizes the severe air quality problems which exist in the Los Angeles Basin. However, the statement fails to equate growth factors and the net economic stimulation due to the project, with an increase in motor vehicle emissions. This is a serious oversight. Current strategies being implemented by the State of California and EPA call for population

figures substantially less than the one presented in these reports. Population figures which appear in the California Air Implementation Plan call for levels of growth which are consistent with the other strategies being implemented currently to reduce air pollution in the Los Angeles Basin.

In addition to calling for levels of growth substantially above those outlined in the California Air Implementation Plan the Corps figures on pages C-6 (Table 2) and C-11 (Table 8) are in conflict with those compiled by the California Department of Finance, "Population Estimates for California Counties," Population Research Unit, 1623 10th Street, Sacramento, California, on August 16, 1971.

The impact statement indicates that the construction of this project will necessitate the installation of some surface improvements such as streets and utilities. Yet there is no discussion of the impact of installing these surface improvements. Although such improvements will be done by local interests, their environmental impacts should be discussed in the impact statement because their construction depends on the implementation of this project.

In keeping with the population projections which support the strategies being developed to meet the Clean Air Act Standards of 1975 it would be advisable for the statement to consider alternative project locations on the west coast.



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
COMMANDER (oan)
ELEVENTH COAST GUARD DISTRICT
HEARTWELL BLDG.
19 PINE AVE.
LONG BEACH, CALIF. 90802

3161.2/PF
Ser: oan 250-72
20 JUN 1972

From: Commander, Eleventh Coast Guard District
To: District Engineer, Corps of Engineers, Los Angeles District

Subj: Preliminary Draft Environmental Statement - Los Angeles - Long Beach Harbors, Los Angeles County, California; comments on

Ref: (a) Your ltr SPLED-RE of 1 May 1972


1. Reference (a) requested that the District Commander review and comment on the Preliminary Draft Environmental Statement - Los Angeles - Long Beach Harbors, Los Angeles County, California. In response to the request, the comments herein are forwarded for your consideration.
2. The statement in paragraph 28 which reads, "The Commandant of the 11th Coast Guard District reports that large amounts of oil are discharged outside the harbor when arriving and departing ships empty their bilge water into the sea (Ref. 20)" is misleading in that it gives the incorrect impression that large amounts of oil are discharged just outside this harbor in violation of statutory prohibitions, and that this amount is considerably more than in adjacent coastal waters. If a statement of this nature was made by a staff member of the 11th Coast Guard District, as indicated in reference 20, it was made in error or was erroneously interpreted.
3. The Draft Environmental Statement acknowledges the temporary adverse impact on navigation during the construction phase and makes reference to 2 fatalities and damage to 100 small craft during the similar Pier J project. Except for the statement, "Every effort would be made to mark the dredging and fill sites with buoys and lights," there is no discussion of other measures planned to minimize these hazards. This is a matter of concern to the District Commander and additional reasonable precautions should be taken in this area.
4. In a similar vein, the project will probably result in some disruption in aids to navigation services available to the mariner during the construction phase. Aids in the dredging areas will have to be relocated and submarine cables which supply power to the aids will be disturbed. The continuation of the excellent cooperation between our respective organizations in the past will minimize these inconveniences.

Subj: Preliminary Draft Environmental Statement - Los Angeles-
Long Beach Harbors, Los Angeles County, California;
comments on

5. New aids to navigation will probably be required at the new facilities created by the proposed fill area. Although they are not significant environmental impacts, the requirements for these aids should be kept in mind as your project progresses.

6. In the draft statement, all references to the Commandant of the 11th Coast Guard District should be changed to Commander, Eleventh Coast Guard District.

7. The opportunity to comment on the Preliminary Draft Environmental Impact Statement is appreciated.


H. A. PEARCE JR.
Chief of Staff

NORMAN E. LIVERMORE, JR.
SECRETARY

RONALD REAGAN
GOVERNOR OF
CALIFORNIA

OFFICE OF THE SECRETARY
RESOURCES BUILDING
1416 NINTH STREET
90014

Department of Conservation
Department of Fish and Game
Department of Navigation and
Ocean Development
Department of Parks and Recreation
Department of Water Resources



Air Resources Board
Colorado River Board
San Francisco Bay Conservation and
Development Commission
State Lands Commission
State Reclamation Board
State Water Resources Control Board
Regional Water Quality Control Boards

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

JUL 28 1972

Lieutenant Colonel H. McK. Roper, Jr.
District Engineer
Los Angeles District
U. S. Army Corps of Engineers
Post Office Box 2711
Los Angeles, California 90053

Dear Colonel Roper:

By letter dated May 1, 1972, you transmitted for State review and comment copies of the Corps' Interim Review Report for Los Angeles-Long Beach Harbors and Preliminary Draft Environmental Statement dated March 1972. This letter summarizes comments of the State Departments of Fish and Game, Navigation and Ocean Development, Parks and Recreation, the Water Resources Control Board, and the State Lands Commission.

The State of California recognizes the fact that ports are a high priority coastal zone dependent industry. Modification and upgrading of developed ports are expected and necessary activities. The primary areas of concern are related to the need to dredge and dispose of spoils in a manner that results in the minimum practical level of disruption to living organisms, fill only that portion of the inner harbor that is absolutely necessary, and conduct the dredging operation in a way which results in minimum hazard to recreationists.

In general, certain sections of the Environmental Impact Statement are erroneous and incomplete and, therefore, should be redrafted. Moreover, the immediate proposed project should be placed in perspective with the anticipated overall development of the harbor. Accordingly, the redrafted Impact Statement should contain a complete description of the overall harbor development along with an accurate description of impact upon all fish and wildlife resources of the area. Care should be taken to assure that the development avoids adverse impact on the anchovy fishery, birdlife, tidal flushing, and water quality of the entire harbor area.

Comments on the project and Impact Statement are as follows:

The Impact Statement declares this project to be the first stage of a much larger development for the entire harbor area. The immediate project proposes over 200 acres of harbor area to be filled along with deepening of certain channels. Ultimate development as proposed by the Ports of Los Angeles and Long Beach and

the Navy Department calls for deepening of channels up to 80 feet, with 2,500 acres of the outer harbor to be filled, about 18 percent of the present water area. Reference is made to five other ongoing fill projects within the harbor. In view of the compounding effect of these additional projects, this project should be held in abeyance until a detailed long-range development plan, which assures orderly development of the harbor area and reasonable protection of fish and wildlife resources, is provided. Such a plan should include a comprehensive environmental impact statement for all aspects of the ultimate development related to impact on the fish and wildlife resources of the harbor area.

In addition, the State has received legal advice that recent Federal Court interpretations of the National Environmental Policy Act make it clear that a program cannot be divided into segments for the purpose of analyzing the environmental impact but must be considered in light of the overall effect.

We foresee the following adverse effects to fish and wildlife from proposed and anticipated, but not specified, projects if the present piecemeal approach to development and filling of the harbor continues:

- 1) The anchovy live-bait fishery may be destroyed through filling of habitat and interference with present fishing methods. In recent years, the harbor complex has supplied up to 95 percent of the live bait needed by California's ocean sport fishery. In 1963, harbor area party boats carried more than 156,000 anglers who used live bait to catch about one million fish. The 1965 California Fish and Wildlife Plan states that shore, ocean, and bay fishermen spend approximately \$36 million annually in Los Angeles County. A high percentage of this is spent within the harbor area. The anchovy live-bait fishery is a vital component to this use of marine resources and its elimination would have serious consequences on the party boat and other sport fisheries.
- 2) Habitat for shorebirds and other water-associated birds may be eventually eliminated resulting in displacement or actual reduction in bird populations. For example, the endangered least tern has a nesting colony near the mouth of the San Gabriel River. Encroaching development may eliminate the colony through filling of feeding areas, blockage of migration routes, or actual occupation of the nesting grounds.

Uniform deepening of remaining unfilled areas in the harbor would eliminate the feeding grounds of diving ducks.

- 3) Tidal flushing of the harbor may be substantially reduced with the result that water quality would be degraded and become unfit for desirable forms of marine life, including anchovies. Enclosed semi-stagnant areas would be susceptible to red tide conditions and resulting fish kills.

Although the present water quality of the inner and outer harbor is being substantially improved through enforcement of the Regional Water Quality Control Board's discharge requirements, adequate tidal flushing and dispersion are also vital components for continued improvement. The anticipated growth in shipping will increase the inevitable accidental

spillage of various pollutants from ships and shore facilities. Adequate tidal flushing will be needed to disperse the irretrievable spilled materials and maintain high water quality within the enclosed harbor area. Moreover, in marine water areas, reduced rates of flushing contribute to conditions that trigger red tide blooms which often cause widespread mortalities of fishlife.

The following are some comments on specific sections of the Draft Environmental Statement:

Page 16, Paragraph 76, Page 30, Paragraph 139 - The discussion concerning the anchovy needs to be revised. All conjecture related to the anchovy's feeding habits and possible preference or reliance upon sewage discharges should be eliminated from the report. For example, on pages 16 and 30 it is speculated that "many people" feel anchovies are abundant because they feed on organic sewage particles. Loukashkin's detailed work on the diet of anchovies presented in October, 1970, clearly shows that these fish prefer and depend upon the second link of the marine food chain, mainly the crustaceans known as copepods and euphausiids and at times utilize phytoplankton. (A. Loukashkin, 1970, On the Diet and Feeding Behavior of Northern Anchovy, *Engraulis mordax*, Proceedings of the California Academy of Sciences, 37(13):419-458. Loukashkin further pointed out that although the anchovy is primarily a filter feeder, it is also capable of being a selective particulate feeder. Unidentified organic particulate matter was found to be only a very minor incidental occurrence in their diet. The sewage discharges in the harbor area are not the food source of the anchovy and the elimination of these wastes will not be a detriment, but rather a benefit, for all marine organisms, including anchovies, that require a clean, unpolluted habitat.

Pages 5, 6, 7, 20, Paragraphs 21, 28, 33, and 91 respectively - These sections refer to the importance of tidal flushing to water quality in the harbor. However, for the "Direct Impacts" listed in paragraph 91, the interference with tidal flushing and the resultant effect on water quality is not listed. In view of paragraphs 21, 28, 33, and the findings of the San Francisco Bay Conservation and Development Commission, we do not believe this potential impact can be ignored. Therefore, it should be listed as a Direct Impact, although to an unknown degree. Incidentally, paragraph 28 refers to the large volume of accidental oil spillage now occurring in the harbor (7,000 barrels in 1967).

Page 23, Paragraph 102 - With regard to the Environmental Protection Agency criteria for determining the acceptability of dredged spoil for disposal in the nation's waters, please know that the Department of Fish and Game believes the present criteria are not adequate. Limitations on materials such as additional heavy metals, poly-chlorinated biphenyl compounds and other potentially cumulative pollutants have to be added to the criteria along with control on general toxicity.

Pages 1 and 2, Paragraphs 1 through 6 - These paragraphs provide an inadequate description of the immediate project. Although a separate copy of the project report was provided, the Impact Statement should contain enough details concerning

Lieutenant Colonel H. McK. Roper, Jr. -4-

the project to allow the Statement to stand alone as a complete document of the proposed action. Perhaps the project report should be appended to the Environmental Impact Statement.

Paragraph 6 refers to the proposed project as being only the first stage of a much more comprehensive development.

Often in the considerations of impact on fish and wildlife, each component of a large project, or each of a series of small projects, is insignificant when evaluated singly. However, the sum total of these may become significant. Therefore, the revised Statement should consider the total development of the harbor.

This concludes our comments at this time. As always, our staff is available for additional assistance on any of the matters discussed above.

Thank you for the opportunity to review your reports.

Sincerely yours,

Paul F. Clifton
for Secretary for Resources

DEPARTMENT OF PUBLIC WORKS

DIVISION OF HIGHWAYS

DISTRICT 7, P. O. BOX 2304, LOS ANGELES 90054



May 18, 1972

Environment, Misc.

J. P. Hattenberg
Acting Chief, Engineering
Division
U. S. Corps of Engineers
P. O. Box 2711
Los Angeles, CA 90053

Dear Mr. Hattenberg:

Your letter of May 1, 1972, requested our review of your preliminary draft Environmental Statement for Los Angeles-Long Beach Harbors.

We have no comments to offer other than it appears that this project will have no effect on any State Highway.

Thank you for allowing us the opportunity to review your Environmental Statement.

Very truly yours,

A handwritten signature in cursive script that reads "A. L. Himmelhoch".

A. L. HIMELHOCH
Deputy District Engineer



COUNTY OF LOS ANGELES / DEPARTMENT OF SMALL CRAFT HARBORS

Administration Building, Elm Way, Marina del Rey, California 90291 / 823-4571 / 870-6782



May 11, 1972

VICTOR ADORIAN
Director

Mr. J. P. Hatteberg
Engineering Division
Los Angeles District USCE
P. O. Box 2711
Los Angeles, California 90053

Dear Mr. Hatteberg:

SUBJECT: ENVIRONMENTAL STATEMENT, LOS ANGELES-LONG BEACH
HARBORS

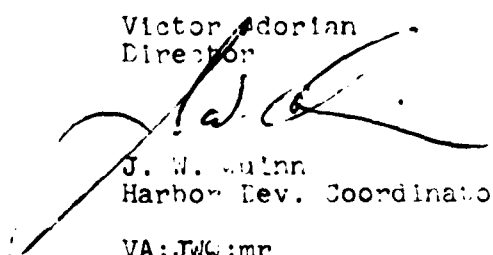
We have reviewed the preliminary draft of the subject environmental statement, and can offer no significant contribution to the content or conclusions.

A minor correction is in order in Paragraph 114 (page 26): The word "Commission" should be changed to read "Committee". This entity is comprised of representatives of the City and Port of Long Beach; the City and Port of Los Angeles; the County of Los Angeles; the Long Beach Chamber of Commerce; the San Pedro Chamber of Commerce; the Los Angeles Chamber of Commerce; and the Wilmington Chamber of Commerce.

It certainly appears to us that the beneficial results of the proposed project far outweigh the adverse affects; particularly since it occurs in an existing commercial-industrial port, and is not affecting a natural nor virgin area. The fact that the port's capability to sustain local and regional commerce will be dependent upon increasing its cargo handling capacities, warrants the relatively minor disruption of certain existing natural processes.

Very truly yours,

Victor Adorian
Director


J. W. Quinn
Harbor Dev. Coordinator

VA:JWQ:mr

D. K. CHRISTENSON
DIRECTOR OF PLANNING

FREDERICK J. BARLOW
DEPUTY DIRECTOR

EDGAR T. IRVINE
DEPUTY DIRECTOR

JOSEPH K. KENNEDY
DEPUTY DIRECTOR

COUNTY OF LOS ANGELES
THE REGIONAL PLANNING COMMISSION

320 WEST TEMPLE STREET
LOS ANGELES, CALIFORNIA 90012
TELEPHONE 628-9211

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IRMA RUTHER
SECRETARY TO THE COMMISSION

May 23, 1972

Mr. J. P. Hatteberg
Acting Chief, Engineering Division
Department of the Army
Los Angeles District, Corps of Engineers
P. O. Box 2711
Los Angeles, Calif. 90053

Dear Mr. Hatteberg:

Our agency has reviewed the Preliminary Draft Environmental Statement: Los Angeles - Long Beach Harbors, in response to your request dated May 4, 1972. In our opinion, the impact statement is thoroughly comprehensive in nature and analyzes the various environmental questions according to the best available information and appropriate logic.

Our evaluation of the impact statement focused on the Environmental Development Guide, the County's Interim General Plan. The proposed project does not conflict with basic policies set forth in the Guide. The Guide's 1990 Land Use Policy Guide shows Los Angeles and Long Beach Harbors in industrial use. The area is designated as a Commercial Harbor on the Major Transportation Network, 1970-1990.

In regard to planning and management problems within the Los Angeles County coastal zone, it seems appropriate that commercial shipping uses be confined to a specific area reserved for such purpose.

The primary concern of our agency is the planning implications of the long-range expansion program of the harbor districts. The contemplated long-range expansion would imply a possible reevaluation of socio-economic factors (employment, transportation, housing) in relation to the County General Plan program.

We look forward to continued coordination with your agency and with the Ports of Los Angeles and Long Beach regarding the immediate project or those of a similar nature in the harbor district.

Very truly yours,

THE REGIONAL PLANNING COMMISSION

O. K. Christenson
O. K. Christenson, Director of Planning

OKC:JSM:PG:sm



A. BRUINGTON
DISTRICT ENGINEER
W. RANSOM
DISTRICT ENGINEER

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
PROJECT PLANNING DIVISION

P. O. BOX 2418 TERMINAL ANNEX
LOS ANGELES, CALIFORNIA 90051

TELEPHONE 223-2111

CHARLES J. WILT
DIVISION ENGINEER

DONALD F. ...
ASSISTANT ENGINEER

June 21, 1972

FILE NO 1.21
All Streams and Projects
Los Angeles-Long Beach Harbors
Environmental Impact Statement Review

Col. H. McK. Roper, Jr.
District Engineer
U.S. Army Engineer District, Los Angeles
300 North Los Angeles Street
Los Angeles, CA 90012

Dear Sir:

Reference is made to your letter of May 4, 1972, requesting our review and comments on the preliminary draft Environmental Impact Statement for dredging and filling in the Los Angeles-Long Beach Harbors. We have reviewed the statement, and our comments are as follows:

1. Page 3, Paragraph 13, states: "The Dominguez Channel does not contribute significant amounts of sediment to the harbor because it is concrete lined..." It is "concrete lined" for about half of its upstream length, but the tidal estuary from the harbor to Vermont Avenue is lined with loose stone on the banks over a compacted clay lining.
2. Page 22, Paragraph 98a: Gaffey Street Storm Drain has been cleaned of debris and sedimentation. Therefore, the 22,000 cubic yards of material is not available from this drain.
3. "Fresh Water Hydrology", Items 12 and 13, page 3
"Geology", Items 14 through 19, pages 3 and 4
"Direct Impacts", Item 90, etc., page 20, etc.,
and particularly, Item 93, page 21: Recognition should be given in the above items to the ground water zones which underlie the harbor area and to the condition of direct exposure of the zones in the harbor to sea water. These exposed aquifers (or strata of the major aquifers) offer avenues of intrusion for degradation of inland fresh-water producing zones. An inland ground water gradient exists due to past overpumping of these zones.

Col. H. McK. Roper, Jr.

Page 2

June 21, 1972

Also, recognition should be given to the "Dominguez Gap Barrier Project" which has been constructed and is operated by the District as a fresh-water injection system to halt the intrusion. The project design considered that the "Gaspur Zone" (an ancestral riverbed) and the "200-foot Sand Zone" are both subject to direct sea water intrusion. Also considered was that the "200-foot Sand Zone" and "400-foot Gravel Zone" are both subject to degradation by movement of saline water laterally from the "Gaspur Zone" at areas of hydraulic mergence. Operation of the barrier project began in the spring of 1971, but "protective fresh-water levels" are just now being attained. Still needed to be determined are if the facilities as constructed are adequate, if some additional construction is needed for protection, and the exact operational methods required. Two copies of District Drawing No. 375-D 4 showing the barrier location are enclosed.

Probable effects of the proposed dredging on the hydraulic system are not readily ascertainable. It seems that the dredging might expose more aquifer areas and, by removing the mud sediments, could promote greater inland sea water flow. We suspect, but lack evidence for complete assurance, that the dredging to the depths proposed will not expose more aquifer zones or lenses to intrusion. We would be interested in examining logs of borings in the proposed dredging area if such are available.

Any changes of conditions will not be felt along the barrier alignment for a number of years due to the slow rate of ground water movement. However, eventual adverse conditions could result from the proposed dredging which could increase barrier injection and facility requirements.

Yours very truly,



C. J. Wilt
Division Engineer

KMW:ss

Enc. 2 *w/d*

CITY OF LOS ANGELES

CALIFORNIA



SAM YORTY
MAYOR

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**DEPARTMENT OF
CITY PLANNING**

861 CITY HALL
LOS ANGELES, CALIF 90012
485.2121

CALVIN S. HAMILTON
DIRECTOR

FRANK P. LOMBARDI
EXECUTIVE OFFICER

May 12, 1972

J.P. Hatterberg
Acting Chief, Engineering Division
Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053

Dear Mr. Hatterberg:

ENVIRONMENTAL STATEMENT - LOS ANGELES - LONG BEACH HARBORS

On May 5, 1972, I received a copy of the Preliminary Draft - Environmental Statement for the Los Angeles - Long Beach Harbors dated March, 1972. This statement presents an environmental inventory of the harbor area; and, a prediction of the environmental impacts which will result from dredging several ship channels and turning basins within the Los Angeles Harbor and the deposition of the dredge spoils in designated areas to create new waterfront lands.

As part of the comprehensive review process and in compliance with the National Environmental Policy Act of 1969, your transmittal letter which accompanied the subject statement requested that my Department review the statement and transmit back to your agency any comments we might have. In response to this request, members of my staff have undertaken a review of the submitted statement; have investigated the proposed project; and, offer the following comments for your consideration:

1. Under the PROJECT DESCRIPTION Section, clarify the fact that the report only refers to a project involving the Los Angeles Harbor; and, that the Long Beach Harbor is not involved in any way. Further, stress the fact that the project might have an effect on the environment of the entire harbor area and that steps are being taken to determine and minimize any adverse environmental effect.

J.P. Hatterberg
Los Angeles, California

- 2 -

May 12, 1972

2. Under the PROJECT DESCRIPTION Section, provide a paragraph (now included in Paragraph 147, Page 32) explaining that a physical model will be constructed to determine what changes in wave propagation and water circulation might be induced by the proposed project throughout the entire harbor area (i.e. Long Beach Harbor). Further, that if the model indicates that serious consequences might result, plans for the project can be altered to reduce the adverse effects.
3. Under the ENVIRONMENTAL IMPACT OF THE PROPOSED PROJECT Section, reiterate under Paragraphs 90(f) and 91(c) that a model is being constructed to determine what changes in hydraulic characteristics can be expected in the entire Harbor area as a consequence of the proposed project.
4. Under the ENVIRONMENTAL IMPACT OF THE PROPOSED PROJECT Section, include waste discharge requirements for the disposal of sediments obtained by the project in line with specified LAR-WQCB standards. These requirements should be specified prior to any approval of a final Environmental Statement (see Paragraph 99).
5. Under the ENVIRONMENTAL IMPACT OF THE PROPOSED PROJECT Section (see Paragraph 108, Page 25), state what measures are going to be taken during the dredging operation to minimize the spread of polluted spoil throughout the harbor. Further, what measures are going to be taken to minimize the spread of polluted spoil throughout the harbor during the loading, transporting and dumping of barges which will carry the spoil from the dredging site to the fill site.
6. Under the ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED SHOULD THE PROJECT BE IMPLEMENTED Section, more precisely define (if possible) the ecological consequences of the proposed project in the final Environmental Statement. This should more particularly relate to the effect of the project on the anchovy fishery and the destruction of marine habitats. This would be particularly relevant in view of the current concern of biologists on the scarcity of protected waters along the California coastline.

The Environmental Statement, as submitted, is very well done in my opinion. It is technical and comprehensive yet easily

J.P. Hatterberg
Los Angeles, California

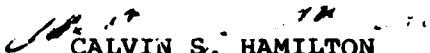
- 3 -

May 12, 1972

understood. I hope that the subject comments will aid in the preparation of a more comprehensive final Environmental Statement and positively contribute to the ultimate completion of a very difficult task.

If I may be of further service in this matter, please contact me at any time.

Very truly yours,


CALVIN S. HAMILTON
Director of Planning

CSH:JC:st

CITY OF LOS ANGELES

CALIFORNIA



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MAYOR

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LOS ANGELES 90012

Mr. J. P. Hatteberg
Acting Chief, Engineering Division
Department of the Army
Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

DATE May 31, 1972
FILE NO W.O. 41245
SUBJECT San Pedro Force Main
Unit II

Dear Mr. Hatteberg:

The "Preliminary Draft - Environmental Statement, for Los Angeles - Long Beach Harbors" transmitted by your letter of May 4, 1972 has been reviewed by my staff. We have no suggestions for changes or additions.

We have designed a 36" sewer force main to be constructed across the Main Channel southerly of the Vincent Thomas Bridge, and we will be submitting a formal application for a construction permit as soon as test borings of the channel bottom and analyses of samples are completed.

This letter also acknowledges your letter of May 4, 1972 addressed to Mr. A. Aarons, District Engineer, Harbor District, who is a member of my staff.

Sincerely,

Donald C. Tillman
DONALD C. TILLMAN
City Engineer

RSH



SAM YORTY
MAYOR

DEPARTMENT
OF
WATER AND POWER
THE CITY OF LOS ANGELES

ROBERT V. PHILLIPS
GENERAL MANAGER
AND CHIEF ENGINEER

FLOYD L. GOSS
CHIEF ELECTRICAL ENGINEER
AND ASSISTANT MANAGER

PAUL H. LANE
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WATER WORKS AND
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111 NORTH HOPE STREET
MAILING ADDRESS P. O. BOX 111
LOS ANGELES CALIFORNIA 90051

TELEPHONE (213) 481-4211
CABLE ADDRESS DEWAPOLA

May 30, 1972

Mr. J. P. Hatteberg
Acting Chief, Engineering Division
Department of the Army
Los Angeles District, Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

Dear Mr. Hatteberg:

Preliminary Draft Environmental
Statement for Los Angeles-Long Beach Harbors

We have reviewed the preliminary draft environmental statement for Los Angeles-Long Beach Harbors transmitted by your letter of May 4, 1972. The proposed dredging operations will affect the following facilities of the Department of Water and Power:

- A. The Department of Water and Power, City of Los Angeles, has two 34,500-volt submarine cables crossing the East Basin Channel within the area of your proposed dredging operations. These two cables, with approximately five feet of separation between them, were installed at a depth of minus 50 feet mean low water. Attached is a copy of the letter dated May 15, 1972, sent to Mr. H. McK. Roper, Jr., concerning this matter.

We are interested in the planned method of dredging in the area of these cables. These cables are essentially the only source of electrical power serving Department customers on Terminal Island. If these cables are damaged during the dredging operation, many customers will be without power until they can be repaired. Any relocation of cables would require the installation of new cables before existing cables are de-energized.

May 30, 1972

Any such relocation would, of course, require close coordination with the dredging operation.

Should you desire any additional information concerning the cables and their replacement, please contact Mr. A. D. Fricke, Engineer of Underground Distribution Design at 481-5011.

- B. The Department is greatly concerned about three existing water mains crossing the channel within the project area. The attached letter, dated May 12, 1972, was sent to Colonel H. McK. Roper, Jr., Los Angeles District Engineer, stating that two of these mains (a 12-inch and 20-inch) would be affected by the proposed dredging operation.

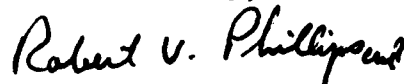
A serious deficiency of water supply will exist on Terminal Island should these mains be taken out of service. It is estimated that replacement of these facilities will require approximately two years to complete and may cost as much as \$800,000. This replacement would be a single pipeline, 24 inches in diameter and in the same approximate location as the existing 20-inch crossing, except at a lower depth.

The environmental statement implies that possible future dredging by the Los Angeles Harbor Department may increase the depth of the channel down to 80 feet. This possibility, although not part of this proposed action, could greatly affect the location and cost of the pipeline replacement.

Maintaining the existing system capacity and the diversified location of these sources of supply to the island are imperative. Before any final action is taken by the Corps of Engineers on this proposed project, we desire to discuss, in detail, the channel crossings and the problems of water supply to the Terminal Island area.

Should you desire any additional information concerning the pipelines and their replacement, please contact Mr. James F. Wickser, Senior Planning Engineer at 481-6157.

Sincerely,



ROBERT V. PHILLIPS
General Manager and Chief Engineer

Enclosures

PORT OF LOS ANGELES

L. L. WHITENECK
CHIEF HARBOR ENGINEER
L. E. SCHNEIDER
AST. CHIEF HARBOR ENGINEER

P. O. BOX 181, ROOM 814
SAN PEDRO, CALIF. 90733
832-7241
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CITY OF LOS ANGELES
SAM YORTY
MAYOR

BERNARD J. CAUGHLIN
GENERAL MANAGER

PACIFIC TRADE CENTER
255 WEST 5TH STREET
(P. O. BOX 181)
SAN PEDRO, CALIF. 90733

June 15, 1972

H. McK. Roper, Col., C.E.
District Engineer
U. S. Army District, Los Angeles
Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

Dear Colonel Roper:

SUBJECT: PRELIMINARY DRAFT ENVIRONMENTAL STATEMENT FOR
LOS ANGELES-LONG BEACH HARBORS

This Division has reviewed the subject report as requested in your letter of May 1, 1972 as well as Mr. J. P. Hatteberg's request by his letter of May 1, 1972. The following comments are submitted for your consideration for inclusion in the final report:

| <u>Page</u> | <u>Paragraph</u> | <u>Comment</u> |
|-----------------|------------------|--|
| Summary Page | 3a. | Insert as item (3): "A reduction in the rate of growth of trade and a variety of associated adverse economic and social consequences can be expected if no action is taken on the proposed project." Make item (3) new item (4) and item (4) new item (5). |
| 1 | 4 | Delete words "general cargo container" in first sentence and insert at end of --"including bulk, liquid bulk and container vessels." Insert at end of second sentence --"dry and liquid bulk cargoes and imported energy sources." |
| 2 | 9 | Add at the end of the last sentence --"from which \$222,433,587.00 was collected in U.S. Customs. (Reference U.S. District Collector of Customs.)" |

H. McK. Roper, Col., C.E.
District Engineer, Corps of Engineers

-2-

June 15, 1972

| <u>Page</u> | <u>Paragraph</u> | <u>Comment</u> |
|-------------|------------------|--|
| 5 | 24 | Change first sentence to read and add new sentence -- "and in Los Angeles inner harbor values are usually higher than 4.0 mg/L. Values of 2.0 mg/L are infrequently found and appear to be associated with occurrences of red tide and similar microorganisms." |
| 6 | 28 | Added information taken from "Prevention and Control of Oil Spills" sponsored by the American Petroleum Institute, the Environmental Protection Agency and the U.S. Coast Guard publication of 15-17 June, 1971, pages 199-204. It is reported as follows: From 1962 to 1969, total oil spills were 13,042 barrels with one spill being 4,500 barrels. In 1967 the California Department of Fish and Game reports 174 oil spills amounting to 1,423 barrels for Los Angeles-Long Beach Harbors and including the U.S. Navy. |
| 6 | 29 | Substitute for "sewage" in third sentence -- "primary treated sewage effluent" and substitute same phrase at the following locations for "sewage": |
| 16 | 76 | Line 11 |
| 22 | 97 | Line 4 |
| 30 | 141 | Line 5 |
| 31 | 145 | Line 6 |
| 7 | 30 | Add at end of 3rd sentence --"although substantial information is available from water quality monitor- ing programs of the Los Angeles Harbor Department and include water transparency, dissolved oxygen, temperature, color and presence or absence of oil and grease, odor, or suspended matter." |
| 7 | 31 | At line 10, after Board, delete "32", unless this is a reference. |

| <u>Page</u> | <u>Paragraph</u> | <u>Comment</u> |
|----------------------------|------------------|---|
| 16 | 74 | Delete --"a fishing barge and two fishing piers" and substitute "fishing pier." |
| 19 | 86 | Change "millimeter" to milliliter." |
| 20 | 91.h | Add--"The value of filled land and land adjacent thereto would likely appreciate due to increased commercial activity which may off-set any possible depreciation of remote land values." |
| 23 | 99 | End of line 9 insert--"However, the removal of polluted sediments from the harbor channels may off-set these adverse impacts and improve the total harbor environment." |
| 25 | 112 | Insert after 2nd sentence--"Bulk cargo facilities including dry and liquid bulk as well as energy import facilities for liquified natural gas (LNG) and others can be developed and expanded." |
| 26 | 115 | In second sentence "berthing costs." Should read--"terminal and berthing costs." |
| 30 | 138 | Add after last sentence--"Anchovy for live bait fishery are caught outside of the breakwater in the open ocean along the Southern California coast as at Malibu Pier, Paradise Cove (Malibu), Santa Monica Pier, and at other locations where fishing piers and sports fishing boats operate. Suppliers of live bait to these locations typically net their live bait in the open ocean." |
| 37 | 173 | Change last word in paragraph to--"relocated." |
| Table II | | Should be dated. |
| Tables III A, III B, IV | | If possible, indicate source of data. |

H. McK. Roper, Col., C.E.
District Engineer, Corps of Engineers

-4-

June 15, 1972

| <u>Page</u> | <u>Paragraph</u> | <u>Comment</u> |
|-------------|------------------|---|
| Table V | | Title should indicate "Air Pollution Data." |
| Table X | | Change "coclenterata" to "coelenterata." |

I believe these comments are of value in completing the final draft of this Environmental Statement.

Very truly yours,


L. L. WHITENECK
Chief Harbor Engineer

LLW: fal

cc: J. P. Hatteberg
Acting Chief, Engr. Div.
Corps of Engineers - L.A.

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION**107 SOUTH BROADWAY, SUITE 9026
LOS ANGELES, CALIFORNIA 90012

May 15, 1972

Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053

ATTENTION: LTC. H. McK. Roper, Jr., District Engineer

Re: Preliminary Draft Environmental Statement Los Angeles-Long Beach Harbors
March 1972 Your Announcement 17 April 1972

Dear Sir:

Thank you for the opportunity to comment on the subject statement.

It is, I believe, a responsible and accurate statement.

I have only a brief comment:

It is clear that a marked improvement has been made in the quality of the water of the harbors with concomittant increase in diversity and abundance of the flora and fauna thereof. Such improvement will continue with the actions of this Regional Water Quality Control Board already put in motion.

I believe that the dredging under consideration, paragraphs 1 through 5 in your project description section, would continue the upgrading of the quality of the harbors and would be a considerable plus factor.

I believe that aquatic life would rather quickly be reestablished in the new bottom exposed as a result of that dredging and that controls will prevent re-pollution of that bottom.

This Regional Water Quality Control Board will consider requirements which would assure no pollution would be caused by dredging and the deposition of the dredge spoil regardless of where that deposition would be.

If the dredge spoil is to be disposed as described in this project although there would be a loss of those bottom dwelling organisms in that area, I do not believe this loss would be major impact and that benefits gained by removal of poor quality sediments would far overweigh this loss.

Although there would be, of course, some alteration of the circulation pattern of the "outer harbor" I would not think its impact would be of major significance.

In making this statement I recognize that Long-Range improvements will be covered by a separate environmental impact statement.

Sincerely,

RAYMOND M. HERTEL
Executive Officer

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA
1421 SUNSET BOULEVARD
LOS ANGELES, CALIFORNIA

OFFICE OF
GENERAL MANAGER

MAY 10 1972

MAILING ADDRESS
POST OFFICE BOX 54153
LOS ANGELES, CALIF. 90054
PHONE 626-4282
AREA CODE 213

Mr. J. P. Hatteberg
Acting Chief, Engineering Division
Department of the Army
Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053

Dear Sir:

This will acknowledge receipt of your letter of May 4, 1972, transmitting a preliminary draft, for review and comment, of an environmental statement for proposed dredging in the Los Angeles-Long Beach Harbors.

Generally speaking, your environmental statement seems to be quite complete and you are to be commended for the effort that has obviously been put into this document.

In accordance with your request certain observations are offered as follows:

On page 1, the benefit cost ratio of 19 to 1 is quite a significant number. It is suggested that the manner in which this was determined be discussed a little more in detail.

On pages 10, 11 and 12, you discuss the matter of air pollution. In view of the fact that boats and ships discharge a minimal amount of pollution into the atmosphere, it is suggested that this material be appreciably condensed in scope. As you point out the primary contributor to air pollution in the Los Angeles area is still the automobile.

It is suggested too that possibly at the end of the report there be a page recapitulating various features of the project. This could include special emphasis on the need for

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Mr. J. P. Hatteberg

-2- MAY 17 1972

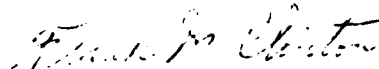
this dredging work as a part of a broader program by the United States to regain the position it once held among the major maritime powers of the world.

The list of references given following page 38 is excellent and quite comprehensive.

Referring to your different tables, Table I contains some very important information. Is it possible to expand this, that is, obtain additional data from other sources? This comment also applies to Table XI. Suggested typographical corrections are noted on Table II as well as the second page of Table VIII.

Because of the great amount of information contained in your report that could be used in developing Metropolitan's tideland grant, offshore from Bolsa Chica State Beach, we would appreciate receiving a copy of the final environmental document when it becomes available. The preliminary draft is returned herewith.

Very truly yours,



Frank M. Clinton
General Manager

HTH/ec

Encl. 221

POMONA COLLEGE
CLAREMONT, CALIFORNIA 91711

DEPARTMENT OF ZOOLOGY
SEEVER LABORATORY

26 June 1972

Mr. J. P. Hatteberg, Acting Chief
Engineering Division
Corps of Engineers, Department of the Army
Los Angeles District
P. O. Box 2711
Los Angeles, California 90053

Dear Mr. Hatteberg:

Thank you for sending me a copy of the preliminary draft environmental statement for the proposed project of extensive dredging and filling in Los Angeles-Long Beach Harbors. Unlike some other preliminary draft environmental statements which I have recently read, I find this one to be comprehensive, and one which considers many environmental aspects of the proposed project in considerable detail.

As a marine biologist, I have studied the ecology of Los Angeles Harbor intensively for the past four years. I am very aware of the startling changes that have taken place since the spring of 1970: numerous organisms are now present in the inner harbor where previously there was no life at all. However, in view of the intensive industrialization of the Harbor, I can see no likelihood that it will ever be of economic or esthetic significance as far as its marine life is concerned: there is no possibility for a return to the salt marsh-mud flat ecosystem which is far more productive in biological terms. This being the case, I can see little problem resulting from even extensive alterations in the Harbor area. Whether there is slightly more, or slightly less, opportunity for fouling organisms in the inner Harbor is of no real consequence to marine biology, to biological education, or to the ecological integrity of the Southern California coastline as a whole. I should point out that I would not take such a sanguine view of similar dredge-and-fill proposals for any other embayment in Southern California!

The preliminary draft environmental statement does not detail any new studies on the biology and ecology of the Harbor area, but does draw together information from a wide variety of outside sources. I do not believe that the gaps in the ecological information as presented are at all debilitating to this report. And for the most part, it is very complete and comprehensive. The draft statement clearly identifies certain important problems:

- 1). The effects of in-water disposal of dredged spoil from the inner harbor, containing high concentrations of heavy metals and other toxic substances, are likely to be severe, whether the material is dumped near shore or far offshore. Such in-water disposal would be ecologically most unsound, and the conclusion to use the material as fill seems by far the wisest decision.

2) Displacement and disturbance of the anchovy bait fishery may be a serious problem, as the draft statement points out. Presumably the California Department of Fish and Game is conducting appropriate studies.

3) Displacement of feeding grounds for various birds, even the Least Tern and Brown Pelican (both endangered species) is unlikely to be much of a problem.

4) The possible use of fresh fill for nesting by Least Terns seems most unlikely, and should not be indicated as a possible benefit of the project. The spoil area is soon to be developed for industry and shipping, and thus will be available to the terns for at best a very short time. Furthermore, even during this short time, human disturbance will surely be too great to permit undisturbed nesting of the birds.

5) Visually, the new fill land may detract from the view of the Harbor from the higher elevations of San Pedro and the Palos Verdes Hills. Owners of expensive homes in the higher elevations may strongly object to additional extensive fill. This is clearly not a problem to which a marine biologist can professionally address himself, except to observe that the situation exists and should be considered.

6) The loss of open water in the outer Harbor has considerable implications for sport boating. At the present time, the outer Harbor seems quite congested by sail and motor and fishing boats on many days. Reduction of open water area, and alteration of traffic patterns may markedly increase boat congestion.

In sum, I can see few serious environmental problems associated with this proposed project, and those few are discussed at length in the draft environmental statement.

Sincerely yours,



Larry C. Oglesby, Ph.D.
Associate Professor of Zoology

Vice-President, Pomona Valley
Audubon Society

copy: National Audubon Society, Western Regional Office

APPENDIX B

**LETTERS OF COMMENT
DEPARTMENTAL REVIEW**

APPENDIX B



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX
100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

26 September 1973

Chief of Engineers
Department of the Army
Washington DC 20314

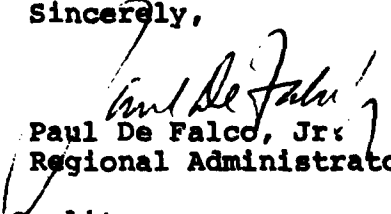
Gentlemen:

Enclosed is our review and comment on the draft environmental impact statement prepared by the Los Angeles District Corps of Engineers for the proposed Expansion of Los Angeles-Long Beach Harbors, California.

This Agency feels that the impact statement is not adequate because it covers only the initial phase of a long-range development. Since this project will establish a precedent for implementation of an existing long-range plan, and since this project will increase the attractiveness of the Harbors as a deepwater port site, this Agency feels that a comprehensive, program-type impact statement must precede decision-making on this proposal. We have therefore classified our comments on this project Category 3. This classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act. An explanation of our rating system is enclosed.

EPA appreciates the opportunity to review this impact statement and would like to receive five copies of the final impact statement when it is sent to the Council on Environmental Quality.

Sincerely,


Paul De Falco, Jr.
Regional Administrator

cc: Council on Environmental Quality

Review and comments on the draft environmental impact statement prepared by the Los Angeles District Corps of Engineers for the proposal to Expand Los Angeles-Long Beach Harbors.

This Agency is dissatisfied with the response the Corps of Engineers made to questions raised by EPA in our review of the pre-draft impact statement. EPA, the Bureau of Outdoor Recreation, the Bureau of Sport Fisheries and Wildlife, and the Resources Agency of California all identified this project as the first stage of a long-range plan of improvement and requested information about the environmental impacts of the entire plan. The response of the Corps was that "The presently proposed plan is incrementally justified and is not dependent upon nor contributory to future development. Several more years of research are needed before plans for the long-range development can be evaluated." EPA feels that the three years which have elapsed since the publication of the Harbor master plans represents an adequate period to allow preparation of an environmental impact statement on the entire plan. Obviously this statement should be flexible and should consider phasing and the large number of alternative plans that are available. Of particular concern will be the relationship of the Harbors in plans for a West Coast Deepwater Port. It is this Agency's position that this project, although "incrementally justified," could represent a commitment to eventual use of the Los Angeles-Long Beach Harbors as a deepwater port facility because the initial deeping of this port will provide a substantial economic impetus towards the selection of the Harbors as an eventual deepwater site. To comply with the substance and the spirit of the National Environmental Policy Act, the Corps must consider these factors in its decision making. The guidelines published by the Council on Environmental Quality on August 1, 1973 reflect this need for an early and broadranged concern: "In many cases, broad program statements will be required in order to assess the environmental effects of a number of individual actions on a given geographical area...or the overall impact of a large-scale-program."

This Agency understands the need for technological improvements at the Ports and supports those improvements. However, we are concerned about the long-range impact of any program of expansion in the Los Angeles Intrastate Air Quality Control Basin. We therefore urge that any alterations in the port

facilities contain no additional handling capacity until an impact statement is prepared on the long-range effects of the master plans for the ports.

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

REPLY TO
ATTENTION OF:

DAEN-CWP-W

14 May 1974

Mr. Paul De Falco, Jr.
Regional Administrator
U.S. Environmental Protection Agency
Region IX
100 California Street
San Francisco, California 94111

Dear Mr. De Falco:

This is in response to your letter which inclosed the review comments of the Environmental Protection Agency concerning the draft environmental impact statement relating to my proposed report on Los Angeles - Long Beach Harbor, California.

The EPA comments indicated that the draft *environmental* statement was inadequate and the comments were classified Category 3. This judgment was based upon the consideration that the draft environmental statement covered only the initial phase of a long-range development plan and that a comprehensive program-type impact statement should be presented.

In response to your comments, a meeting was held between representatives of our organizations. The purpose of the meeting was to discuss the revisions to the draft EIS which would properly address the EPA departmental review comments. The following items were considered mutually satisfactory:

1. A discussion of the effects of the proposed work on any future proposed development, and;
2. A traffic generation analysis for surface transport serving future development on the proposed dredged material disposal site, and;
3. An evaluation of the impacts of alternative dredged material disposal sites for the proposed project, especially, upland disposal sites and ocean disposal, and;

DAEN-CWP-W
Mr. Paul De Falco, Jr.

14 May 1974

4. The projected long-range economic stimulation and traffic generation resulting from the most severe future conditions, assumed to be the proposed master plan of the Ports of Los Angeles and Long Beach.

The final environmental impact statement for the proposed project at Los Angeles - Long Beach Harbor will include these items and five copies of the final EIS will be sent to your office after it is filed with CEQ.

Sincerely,

(signed)

JOHN V. PARISH, JR.
Colonel, Corps of Engineers
Executive Director of Civil Works



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In reply refer to:
PEP ER 73/1030

9 November 1973

Dear General Gribble:

Thank you for your letter of July 19, 1973, requesting our views and comments on the Interim Review Report and draft environmental statement for Dredging in the Los Angeles-Long Beach Harbors. Our comments will be separated between the Report and the draft statement.

Comments on the Report

This proposed project will not adversely affect any existing, proposed, or known potential units of the National Park System, or any known historic or environmental education sites eligible or considered potentially eligible for the National Landmark Programs. However, the proposed action may adversely affect a potential natural landmark identified in our South Pacific Border Natural Region Study. The potential landmark, Palos Verdes Peninsula, is 1,600 acres in size and extends along the coast from just north of Palos Verdes Point to just east of Point Fermin where it abuts the Federal Project area. Plate 1 of the Report includes Point Fermin. Pertinent comments on the environmental impact of the project on this peninsula are mentioned in the next section covering the draft statement.

From a fish and wildlife viewpoint, the proposed project to modify Los Angeles-Long Beach Harbors will have an adverse effect on these resources in that area. There is a distinct possibility the project could disrupt a nesting colony of least terns, an endangered species, at the mouth of the San Gabriel River. Similarly, the brown pelican, another endangered species, is known to inhabit the project area. The project will also disrupt an anchovy fishing ground located near the proposed fill area.

Further, coordination is recommended between our agencies to modify construction techniques so as to reduce any adverse effects the project will have on the endangered species and the anchovy fishery.

From a mineral resources standpoint, we do not anticipate any adverse impacts in the Federal project area. The project will be a beneficial aid to mineral shipping. It should be called to the Corps' attention that the Wilmington oilfield does extend through the harbor area and a number of nonproductive wells have been drilled in the past in search of petroleum. The Wilmington oilfield is the largest producer in the Los Angeles basin with a cumulative production at the end of 1972 of 1.55 billion barrels of petroleum and 943 million cubic feet of natural gas. In 1972, Wilmington field produced 20.2 percent of the State's total oil. About 71 percent of the field production was from offshore.

A number of offshore wells were drilled directionally from onshore locations. Also, the Wilmington water-flood project is the largest oilfield repressurization operation of its kind in the country. Water injection, approaching the 500 million barrel per year mark, serves the dual purpose of increasing the ultimate oil recovery and arresting surface subsidence.

Comments on the Draft Statement

The action of dredging and filling in the harbor covers a geographically small area but has the potential to affect a much larger environment including Palos Verdes Peninsula. In addition to being considered as a national landmark, Palos Verdes is rich in coastal flora and fauna and natural seascapes.

Page 18, paragraph 88 of the draft statement presents a quick and insufficient discussion of cultural, archeological, and historical features, including Fort MacArthur and the San Pedro Bluffs which are part of Palos Verdes Peninsula. Since the draft statement recognizes these cultural values, the final statement should elaborate on their value and make a concise presentation as to their likelihood of surviving primary and secondary dredging impacts.

As early as possible in the planning process, steps should be taken to identify and evaluate any properties listed in or eligible for nomination to the National Register of Historic Places to determine whether or not they will be affected by the project. In this particular draft statement, there is no indication that considerations required by the National Historic Preservation Act (80 Stat. 915) and Executive Order 11593 (May 13, 1971) have been made a part of project formulation.

The entire role of cultural resources in the environment must be surveyed by professionals trained to evaluate the resource, assess project impact on the resource, develop procedures to mitigate adverse impacts, and outline unavoidable impacts and irreversible and irretrievable commitments of resources. This procedure should also extend to submerged lands affected by the project, particularly when that project is a dredge and fill operation. There is some indication in the Los Angeles Harbor area (including the dredge disposal area) that there has been no previous disruption of the submerged lands. This situation should lead an impact statement preparer to careful subsurface examination before concluding that cultural resources were non-existent. All indirect or secondary effects on both dry and submerged cultural resources should be discussed in the final environmental statement on this Federal project.

Although page 4, paragraph 16 of the draft statement now contains a fuller discussion of seismic hazards than the preliminary draft statement, it is still recommended that the intensities and accelerations of anticipated earthquakes be discussed. We concur with the discussion and conclusion of page 20, paragraph 94 regarding the respect which must be maintained when constructing large civil works projects in fault zones. The environmental impacts and related special design features should be covered in the final statement.

Further, we support the extraction and analysis of core borings in the project area. Considerable data from borings have already been obtained and summarized. Based on additional borings to be taken up to the preparation of the final statement, the physical properties of the dredge sediments should be evaluated for stability in spoil banks

under earthquake pressures, estimated ability to support protective dikes and subdivision dikes as illustrated in figures 15 and 16 of the draft statement, suitability for support of structures on the filled land, and approximate time to develop bearing capacity on the filled land adequate for planned uses.

As previously mentioned when commenting on the Report, the impact on fish and wildlife resources is considered potentially adverse. In covering the broad area of the project's impact on fish and wildlife resources, it is felt that certain items need clarification and some conclusions are not substantiated. It appears the project will have an adverse impact on two endangered species (the least tern and the brown pelican) and an anchovy fishing ground near the proposed fill site.

Specific comments in this area follow:

Page 16a, paragraph 73. It is not true that the least tern no longer nests in the harbor area. A colony of about 60 birds is nesting near the mouth of the San Gabriel River and 15-20 least terns attempted to nest on Terminal Island in 1973.

Page 16a, paragraph 76. The draft statement fails to mention that some anchovies are caught within the proposed fill area. It does mention, however, that a substantial catch is made within one or two miles of the proposed site. This paragraph should be revised to show the importance of the fill area for netting anchovies in relation to other harbor areas.

Page 19, paragraph 91. The statement does not adequately describe the area that will be obliterated by the fill. We believe a comprehensive description of the bottom habitat, including specific information on plants and animals occupying the area should be provided. An additional direct impact should be considered in the statement; i.e., the fill could provide additional feeding and resting sites for birdlife. A portion of the area, properly managed, could provide nesting habitat for the least tern and possibly other water associated birds.

Page 24, paragraph 112. Item "e" should be broadened to include fish and fish habitats. Another indirect impact is the loss of sport and commercial fishing opportunities. This loss could be mitigated by providing public access to the edge of the fill for fishing.

It is by no means certain the harbor bottom environment will be improved by the project (top of page 25, indirect impact item f). As the statement repeatedly points out, until more advanced studies are conducted, including experiments with the physical model of the harbor and the examination of additional bottom samples taken to project depth, conclusions of harbor bottom improvement or possible degradation are largely unsubstantiated.

Increasing the depth of the channel by as much as ten feet will have a profound influence on the amount of light that reaches the bottom. A reduction in light will adversely influence the numbers and varieties of organisms that will be able to survive in the new environment. Increasing the volume of water below the tidal prism by as much as 29 percent could have a very detrimental effect on water quality in the inner harbor. A combination of greater depths and a reduced rate of flushing could result in dissolved oxygen concentrations well below the acceptable standard of 5.0 ppm.

Figure 13 of the draft statement shows that samples taken on and adjacent to the fill area were classified as healthy bottom. The last sentence in paragraph 119, page 26, implies that the bottom sediments in the fill area are of poor quality. This apparent contradiction should be clarified.

The second sentence in paragraph 123, page 27, is incorrect. As previously mentioned, least terns do nest in the harbor area. A reduction of feeding areas may adversely affect breeding populations in the San Gabriel River and lower the chances of these birds re-establishing a nesting colony on Terminal Island.

Page 27, paragraph 125. This entire paragraph is very speculative. It attempts to convey a promising picture of post-project conditions that cannot be supported by available data. If, as the last sentence suggests, organically rich, oxygen absorbing bottom sediments are exposed, it is

conceivable that the waters overlying these sediments would become de-oxygenated.

We cannot accept the premise that past or future improvements in the water quality of Los Angeles-Long Beach Harbors can mitigate or offset any damaging environmental effects resulting from the proposed project (page 30, paragraphs 137 and 138). While we know, for a fact, that harbor conditions have improved in the past ten years, it cannot be said, with any certainty, that conditions will improve in the future.

Page 31, paragraph 143. Another direct impact that should be more fully described (it is alluded to in item d.), is the permanent loss of the aquatic environment in the area of the proposed fill. Also, the 10 million cubic yards of dredge spoil will occupy approximately 6000-acre-feet of aquatic marine habitat.

Page 32, paragraphs 145-150. Spoil disposal in the navigable waters or at sea is now regulated by the Federal Water Pollution Control Act Amendments of 1972 and the Marine Protection, Research, and Sanctuaries Act of 1972, P.L. 92-500 and 532, respectively. P.L. 92-532 is an outgrowth of the 1970 Council on Environmental Quality's report entitled "Ocean Dumping - A National Policy," and it regulates dredged spoil disposal by requiring the issuance of a permit by the Corps of Engineers pursuant to EPA criteria. A similar permit will be required for any dredged spoil disposal in inland navigable waters under P.L. 92-500.

Guidelines and interim dump sites are published for ocean dumping. However, guidelines for dredged spoil disposal in inland navigable waters are not yet available. It is assumed that the Corps intends to tailor its various dredge and fill projects to both sets of guidelines in order to comply with its permitting system.

With this new background, the alternatives of deep ocean disposal and harbor disposal should be rewritten to more fully describe the implications of P.L. 92-500 and 532. For example, the deep ocean alternative should discuss the environmental and economic considerations pointing out that the nearest interim dump site is approximately 5.8



OFFICE OF THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

September 4, 1973

Lt. General F.J. Clarke
Chief of Engineers
U.S. Department of the Army
Washington, D.C. 20314

Dear General Clarke:

The draft environmental impact statement for Los Angeles-Long Beach Harbors, California, which accompanied your letter of July 19, 1973, has been received by the Department of Commerce for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

Environmental Setting Without the Project - Biology

Paragraph 58

The third sentence of this paragraph states: "Water pollution, however, limits the use of the harbor waters to the hardier species (ref. 24)." This statement is based on a reference dated 1955 that may not provide information applicable to present harbor conditions. In addition, Tables VIII and IX list the fish and larger marine invertebrates that inhabit the harbor waters. The animals included in these lists are definitely not limited to the so-called "hardier species" referred to above. In fact, these lists indicate that the harbor waters support a healthy and diverse population of marine organisms.

Adverse Environmental Effects Which Cannot Be Avoided Should the Project Be Implemented

Paragraph 121

The first sentence of this paragraph states: "The species that presently inhabit the harbor waters are largely those

that are most able to tolerate a polluted environment." Perhaps this conclusion should be reconsidered in view of the fact that the species lists in Tables VIII and IX indicate that the harbor waters support a healthy and diverse population of marine organisms.

Paragraphs 136, 137, and 138

Paragraph 136 indicates that tidal flushing of the harbor will be decreased by the project. The following paragraph states that "Rapid rates of flushing are necessary only if the waters are being rapidly polluted." Paragraph 138 then concludes that "The resulting deterioration in water quality would be much less than the improvement in water quality that has been experienced during the last few years due to the curtailment of waste discharges." Perhaps a more objective appraisal would indicate that the efforts of others to clean the same harbor that this proposal will help to pollute cannot compensate the marine environment for the adverse effects that will be caused by this project.

Alternatives to the Proposed Project

Paragraph 145

The final sentence of this paragraph indicates that spoil disposal at sea is ecologically hazardous. Although ocean disposal of dredge spoil is undesirable, it is certainly no more hazardous to marine biota than burying and thereby eliminating 307 acres of the remaining aquatic habitat within the harbor.

Paragraph 146

This paragraph dismisses landside disposal of some or all of the 10 million cubic yards of spoil with the assertion that "No suitable sites...are within twenty miles of the harbors. Therefore no further discussion of landside disposal is warranted." From the standpoint of evaluating the impact of filling in 307 acres of aquatic habitat, further discussion

of upland disposal of the dredge spoil is certainly warranted. The factual basis for this assertion should be discussed. Are other land sites available within, for example, 25 miles of the harbors? What should be the environmental impacts of disposal of the spoil at various alternative upland disposal sites?

Paragraphs 145, 146, 147, 148, and 149

Rather than objectively appraising the various alternatives, these paragraphs all appear to be a rationalization for the final sentence in paragraph 149, which states: "Furthermore, this method of disposal is considerably more expensive than the recommended method, and it does not provide the new lands desired by the port authorities for increased wharfing facilities." In fact, paragraph 148 candidly states: "No particular location has been considered for the dumping of spoil at sea." If there are no plans for studying any offshore dumping location, the hypothesis that "The currents might even carry the pollutants shoreward. Thus the disposal in the deep sea might cause increased pollution at the dredging site and might fail to prevent the dispersal of toxic pollutants throughout the marine environment" cannot be verified or refuted. Therefore, we suggest that the environmental impact statement (a) discuss plans for studying the impact of offshore disposal, (b) support the hypothesis with data and results of studies conducted in other areas, or (c) delete the argument regarding the environmental disadvantages of this method of disposal and retain only the argument for the economic advantages of the proposed project.

We further suggest that prior to initiating the proposed project, the status and results of the following Corps contract studies be fully considered, evaluated, and discussed:

- Concept Development for Appurtenant Containment Area Facilities for Dredged Material Separation, Drying, and Rehandling. (ID No. Y305-5C01).

- Study of Regional Landfill and Construction Material Needs in Terms of Dredged Material Characteristics and Availability. (ID No. Y304-5C04).
- Investigation of Legal, Policy, and Institutional Constraints Associated with Dredged Material Marketing and Land Enhancement. (ID No. Y316-5C06).

In addition, the processes that have been developed by various research groups (e.g., Tekology Corporation, Palisades Park, New Jersey) for manufacturing bricks and blocks from inorganic solid wastes should be discussed (see Environmental Science and Technology, Vol. 6, No. 5, June 1972, pages 502-503).

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving a copy of the final statement.

Sincerely,

Sidney R. Galler
Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

AD-A136 716

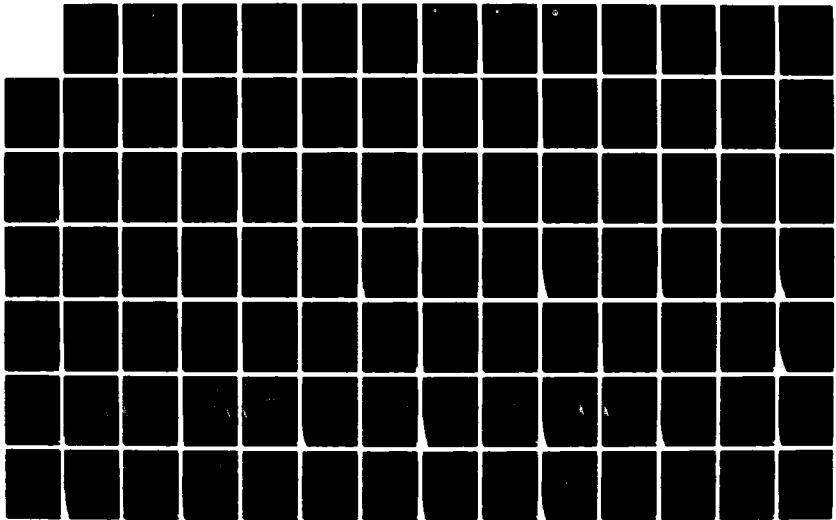
LOS ANGELES BEACH HARBORS LOS ANGELES COUNTY CALIFORNIA
(U) OFFICE OF THE CHIEF OF ENGINEERS (ARMY) WASHINGTON
DC OCT 74

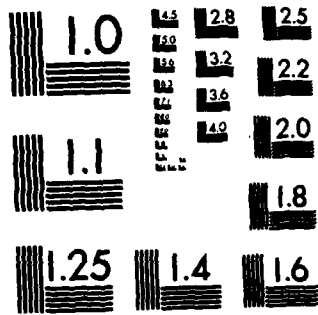
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

NORMAN B. LIVERMORE, JR.
SECRETARY

RONALD REAGAN
GOVERNOR OF
CALIFORNIA

OFFICE OF THE SECRETARY
RESOURCES BUILDING
1416 NINTH STREET
95814

Department of Conservation
Department of Fish and Game
Department of Navigation and
Ocean Development
Department of Parks and Recreation
Department of Water Resources



Air Resources Board
Colorado River Board
San Francisco Bay Conservation and
Development Commission
State Lands Commission
State Reclamation Board
State Water Resources Control Board
Regional Water Quality Control Boards

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

22 May 1974

Lt. General W. C. Gribble, Jr.
Chief of Engineers
Department of the Army
Washington, DC 20314

Dear General Gribble:

The State of California has reviewed the Draft Environmental Statement and the Interim Review Report for the Los Angeles-Long Beach Harbors. The review accomplished by the State fulfills the requirement under Part II of the U. S. Office of Management and Budget Circular A-95 and the National Environmental Policy Act of 1969.

The Statement and Interim Report were reviewed by the State Departments of Conservation, Commerce, Fish and Game, Health, Navigation and Ocean Development, Parks and Recreation, Transportation, and Water Resources; the State Lands Division of the State Lands Commission; the Air Resources Board; the State Water Resources Control Board; and the California Coastal Zone Conservation Commission. The State's general comments are given below and specific comments are attached hereto.

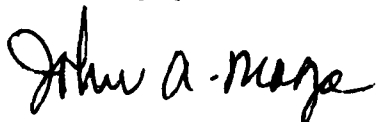
1. The federal portion of the project presumably falls under the requirements of the Coastal Zone Management Act of 1972 (Section 307) as to consistency "with approved state management programs". Procedurally the related nonfederal portions of the project -- dredging or other harbor work -- will require a permit issued by the South Coast Regional Commission. Although treating the two main segments of the project separately as far as procedures are concerned the Commission will need to review all elements of the interrelated improvement plan simultaneously.
2. The Statement summarizes the expected adverse environmental impacts; however, more information should be presented on beneficial aspects of the proposed improvements.

The attached pages of specific comments are an integral part of this letter.

Lt. General W. C. Gribble, Jr. -2-

Thank you for the opportunity to review and comment on the Draft Environmental Statement and Interim Review Report.

Sincerely yours,


for N. B. LIVERMORE, JR.
Secretary for Resources

Attachment

**SPECIFIC COMMENTS ON THE
DRAFT ENVIRONMENTAL STATEMENT AND INTERIM REVIEW REPORT
LOS ANGELES-LONG BEACH HARBORS**

These specific comments are an integral part of the State's general comments.

DRAFT ENVIRONMENTAL STATEMENT

1. Paragraphs Nos. 84, 85, and 86, on pages 17 and 18, do not accurately describe the exact geographical areas within the Los Angeles-Long Beach Harbors Complex, which are presently designated as "Ocean Water-Contact Sports Areas" by the California Regional Water Quality Control Board, Los Angeles Region. The water quality in such designated areas must meet the bacteriological standards established by the State Department of Health.

The Statement should indicate that the entire "Outer Harbor" is a declared ocean water-contact sports area. We call this to your attention as the proposed dredging process extends through the "Outer Harbor".

2. The "Environmental Setting Without the Project" should include a paragraph stating that "Inner Los Angeles Harbor" waters are used for fluming of fish by the fish canneries in Fish Harbor. This use has been approved by the Regional Water Quality Control Board.
3. Paragraph 91, page 19, should include a discussion of the project's interference with tidal flushing and the resultant adverse effect on water quality. This is especially true of the inner harbor.
4. According to paragraph 93, page 20, it would appear that in all probability the bottom of the proposed dredging will be above the top of the Gaspar aquifer. However, as a precaution, we recommend that the dredging be closely coordinated with the Los Angeles County Flood Control District so that any necessary adjustments in the operation of the Dominguez Gap Barrier Project can be made to control any possible further sea water intrusion.
5. The predictions contained in paragraph 138, page 30, should be more adequately discussed. Considering the above-mentioned predictions, the changes in water quality which may result from the project would be in conflict with state policy. The State Water Resources Control Board's "Nondegradation Policy" (Resolution 68-16) contains a key provision as follows:

"Whenever the existing quality for water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies."

Degradation of water quality below levels prescribed in the state policies as a result of the project would appear to violate the "Nondegradation Policy".

6. Paragraph 139, page 30, indicates the U. S. Army Corps of Engineers has made plans to construct a physical model of the harbor, and that if the model should indicate that serious consequences would result, the Corps plans to alter the project to reduce adverse effects.

If the plans need to be altered, the Statement should indicate that the revised plans would not unreasonably affect present and anticipated beneficial use of harbor waters, and not result in water quality less than that prescribed in the State Water Resources Control Board policies.

7. On page 47, in response to our previous comment concerning long-range planning and orderly development, it is indicated that the implementation of the plans at this time is considered highly justified because of the "urgent need" for the project and the opinion that the project is "incrementally justified" regardless of future development.

However, planning for the entire Los Angeles-Long Beach Harbors area should be coordinated and considered with long-range objectives. Hydraulic effects should be studied with models and considered as an integral part of project planning instead of a corrective afterthought. The method of spoil and associated wash water disposal must be determined in accordance with applicable state and federal criteria. The proposed method does not appear likely to meet these criteria.

8. On page 48, in response to "Comment: Pages 5, 6, 7, and 20, Paragraphs 21, 28, 33, and 91, respectively", indicates that the configuration of the proposed landfill will be designed to preclude adverse effects on water quality. In addition, the dredge area should also be designed to preclude adverse effects on water quality in the dredged inner harbor area.

INTERIM REVIEW REPORT

1. In connection with hydraulic effects, the Report indicates the prudence of hydraulic studies by scale modeling the area. This is important in terms of potential adverse effects due to silting, increasing water pollution through reduced flushing, and reducing the maneuvering room for ships. The Navy expresses particular concern on this point by stating "such a study (is) mandatory". Such a study is planned; however, utilization of results from it would require possible alteration of plans. The availability of the results of this study should be indicated in the Report.
2. Regarding disposal of spoil, return wash water from a landfill operation may be contaminated with various toxic substances. This problem should be further investigated because there is some disagreement on the behavior of toxic substances when sediments are disturbed. Since the

sediments of concern are indicated to contain significant concentrations of pollutants, there is a possibility that the wash water will be contaminated. The Report indicates that the wash water is expected to meet state waste discharge criteria. This will depend on what the actual wash water quality is and what discharge regulations are established. The Report indicates that the spoil does not meet U. S. Environmental Protection Agency (EPA) criteria for open water disposal. Current Regional Water Quality Control policy is not to allow return of wash water from spoil that does not meet this criteria.



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGIONAL OFFICE

OFFICE OF
THE REGIONAL DIRECTOR

September 18, 1973

F. J. Clarke
Lieutenant General, USA
Chief of Engineers
Department of the Army
Washington, DC 20314

Dear General Clarke:

The Draft Environmental Impact Statement for the Los Angeles - Long Beach Harbors has been reviewed by this office.

We defer to EPA for comments relative to pollution control and potential impact on the Los Angeles basin. No other comments are offered.

The opportunity to review this statement is appreciated.

Sincerely,

[Handwritten signature]
Fernando E. C. De Baca
Regional Director
fw



**DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD**

MAILING ADDRESS: (G-WS/83)
U.S. COAST GUARD
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20000
PHONE: (202) 426-2262

4 September 1973

• Lieutenant General F. J. Clarke
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Clarke:

This is in response to your letter of 19 July 1973 addressed to Secretary Brinegar concerning the draft environmental impact statement on Long Beach-Los Angeles Harbors, California.

The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to the project.

The opportunity to review this project is appreciated.

Sincerely,

A handwritten signature in cursive script, appearing to read "R. I. Price".

R. I. PRICE
Captain, U. S. Coast Guard
Deputy Chief, Office of Marine
Environment and Systems
By direction of the Commandant



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

REPLY TO
ATTENTION OF:

DAEN-CWP-W

15 July 1974

SUBJECT: Los Angeles-Long Beach Harbors Survey Report, Interim #1

District Engineer
Los Angeles
ATTN: SPLED-C

1. Inclosed for your use in preparation and reproduction of the Final EIS for subject study are the original copies of Comments from the State of California and interested Federal Agencies.
2. Return of the inclosures is requested after they have served their purpose.

FOR THE CHIEF OF ENGINEERS:

- 7 Incl
1. Commerce (4 pp)
 2. DOT (1 Pg)
 3. HEW (1 Pg)
 4. Interior (7 pp)
 5. EPA (4 pp)
 6. State (5 pp)
 7. Reply to EPA (2 pp)

CF:
South Pacific Division, SPDPD

Adolph A. Hight

ADOLPH A. HIGHT
Colonel, Corps of Engineers
Assistant Director of Civil Works,
Pacific

APPENDIX C

**IMPACT OF FEDERAL PROJECT AND
LOS ANGELES-LONG BEACH HARBORS
MASTER PLANS ON LAND USE DEVELOPMENT,
TRAFFIC GENERATION AND AIR QUALITY**

APPENDIX C

APPENDIX C

**IMPACT OF FEDERAL PROJECT AND
LOS ANGELES-LONG BEACH HARBORS
MASTER PLANS ON LAND USE DEVELOPMENT,
TRAFFIC GENERATION AND AIR QUALITY**

By Norman Nierenberg and Frank McDonald

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| Land Use Development by Decade | C-7 |
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APPENDIX C

IMPACT OF FEDERAL PROJECT AND LOS ANGELES-LONG BEACH HARBORS MASTER PLAN FOR LAND USE DEVELOPMENT, TRAFFIC GENERATION AND AIR QUALITY

1. SCOPE

1.1 The study described in the appendix was made to determine the impact of the Federal project on Los Angeles-Long Beach Harbors master plans and land use development, traffic generation and air quality.

2. METHODOLOGY

2.1 The information required for the investigation was obtained from the following sources:

a. Discussions with Los Angeles-Long Beach Harbor officials, representatives of the California Department of Transportation and Motor Vehicles, and officials of railroad companies.

b. Publications of Los Angeles-Long Beach Harbors, Highway Research Board-National Academy of Sciences, California Department of Transportation, and railroad companies.

c. University City Traffic Analysis – November 1972, prepared for Penasquitos, Inc., San Diego, by Alan M. Voorhees and Associates, Inc., San Diego. (University City is a comprehensive community development project located adjacent to the University of California, San Diego campus.)

2.3 Net acres of land use for interim recommended plan, alternative plans and master plans were assigned trip factors. On the basis of the number of acres in the "Traffic Generators" study made by Cal Trans (approximately 130 and 150 acres for industrial parks which are comparable to industrial acreage at Los Angeles-Long Beach Harbors), 112 trips per acre was ascribed to heavy industry (used for Rohr industrial plant in the Traffic Generators study), 224 acres were allocated to light industry (based upon acreage and trips at Balboa Avenue and Sorrento Valley light industrial parks in the same study), and 178 trips for general industry (a figure selected midpoint between light and heavy industry). The marina trip factor is based upon a recent survey made by the City of Long Beach for the Long Beach marina.

2.4 Trips were converted to average daily traffic by multiplying net acres by trip factors. Average daily traffic divided by trip ends which represented both directions of travel resulted in the number of vehicles. (In the traffic generation model, the average daily traffic generated – total number of trips – was not divided by two to obtain total number of vehicles. To compensate, vehicle miles were not multiplied by two to represent trips to destination and return.)

2.5 Average daily traffic was allocated by type of vehicle — heavy duty trucks (diesel and gasoline powered) and automobiles, small trucks and other small vehicles.

2.6 Average daily traffic by trains was allocated to the various land uses.

2.7 Ship traffic pollution is an insignificant portion of total air pollution, therefore no attempt was made to quantify it in this study.

2.8 Traffic distances were assigned on the basis of internal and external traffic on present and future highways and railroads.

2.9 Average vehicle miles travelled on a daily basis for each type of vehicle was calculated for the interim project alternative and the port's master plans.

2.10 On the basis of average vehicle miles travelled on a daily basis by all types of vehicles including special purpose vehicles, the pounds of pollutants generated daily by these vehicles were calculated.

2.11 Atmospheric loading is the pounds of pollutants generated. To determine the effect on air quality it would be necessary to quantify atmospheric concentrations. Existing emission data for both port areas and projections of emission data for existing port areas plus projections of emissions for the recommended project and the master plans would be required to quantify atmospheric concentrations. No attempt was made to accomplish this as the state of the arts makes quantification difficult and questionable.

2.12 A traffic generation model was used for input and output data in the following manner:

Input data:

Average daily traffic by land use (parcel) by year group.
Distance from the parcel to each point of exit.
Percentage of the daily traffic by vehicle type (automobile and other light duty vehicles; diesel, gas, and propane trucks).
Percentage of the traffic going to each bridge from each parcel.
Mileage by vehicle type external to the port.

Computed output:

Average daily traffic over each bridge.
Average daily mileage by land use by vehicle type.
Total average daily mileage by land use and by vehicle type.
Gallons of fuel used.
Pounds of NO_x, CO, and HC generated by vehicle type by land use.

3. ASSUMPTIONS

- 3.1 On the basis of traffic counts, heavy duty trucks are estimated at 20 percent of the total number of vehicles in average daily traffic generated.
- 3.2 The balance of 80 percent of vehicles are automobiles, small trucks and other small vehicles.
- 3.3 The number of trains allocated are based upon historical trends in the relationship between total cargo tonnage moved and railroad cars and trucks moving that tonnage.
- 3.4 The ratio of trains to trucks will increase slightly as a result of the greater efficiency of train movement and less pollutants generated.
- 3.5 Each train would contain an average of 30 cars with one locomotive and would equal one truck for average daily traffic purposes.
- 3.6 Approximately 10 years ago, railroad cars were about 0.07 percent of the number of trucks. It is estimated that currently they represent about 0.12 percent and the year 2000 are projected at about 0.13 percent.
- 3.7 The master plans of the ports provide for development in three phases (1975-85, 1985-95 and 1995-2005). For each phase, one-third of the total traffic generation was allocated to the first 3 years of development, two-thirds of the total to the following 4 years and total traffic generation in the last 3 years. Each phase requires 10 years for full development.
- 3.8 Total traffic generation will remain constant after the year 2005 until the year 2030.
- 3.9 For special purpose vehicles, the Port of Los Angeles Lash Terminal Study was used to determine the average daily fuel consumption and pollutants generated by these vehicles. Based upon the acreage (19.4) of the proposed Lash Terminal as related to future acreage of interim project and master plans land use, a determination was made of the fuel consumption by special purpose vehicles and the pollutants generated. (Pounds per day per acre – CO 22.7, NO_x 7 and HC 1.14.)
- 3.10 Average vehicle miles travelled within the ports were based upon travel from the newly created land areas and/or new land uses resulting from spoil deposition on existing lands to the major bridges. Travel external to the ports was based upon the following round trip mileage: 140 miles for trucks, 40 miles for automobiles and, marshalling yards in Wilmington, Torrance and the City of Commerce for trains (average 20 miles).
- 3.11 Internal "milling ground" traffic was calculated to be about 5 percent of average daily traffic for heavy duty trucks and automobiles, small trucks and other small vehicles.
- 3.12 New land uses based upon the deposit of spoil on existing subsided oil lands will result in a net increase in traffic and pollutants.

3.13 New lands are expected to be used in accordance with the master plans of the harbors. New land uses on existing subsided lands are projected to be cargo terminals.

3.14 Pounds of pollutants per gallon of fuel used will remain constant for the forecast period.

3.15 The recommended plan will provide 187 acres of newly created land. This represents 6 percent of the existing 3,100 acres of land area in the port of Los Angeles and would contain land use development similar to the existing development. Atmospheric loading and concentrations would be an additional 6 percent of existing pollutants. Additional land use development will comply with emission standards.

3.16 San Pedro Bay phased development will occur by one of the alternatives in plate 19 which depicts two alternative pathways.

4. EFFECTS OF ALTERNATIVE INTERIM PROJECT PLANS

4.1 DESCRIPTION OF ALTERNATIVE PLANS

Alternative A (NED)

This proposal is the recommended plan. An hydraulic dredge would remove material from the channels and place it behind impervious dikes built by the Port of Los Angeles. The new land created would be 187 acres, adjacent to Terminal Island (the 307-acre figure previously quoted is in error; there was a mistake in quantity calculations.) Total project cost is thus reduced because less diking is required.

MAJOR ASSUMPTIONS:

- Hydraulic dredge, 36 inches in diameter, no booster pumps; dredge works with project limits and in adjacent berthing areas
- Creation of 187 acres of new land, elevation plus 12 feet MLLW

The new land created is part of the Port of Los Angeles' Phase I and II development plans which provide for light industrial tank farm, bulk and cargo terminal areas (see pl. 1).

Alternative B

In this proposal, all dredged material would be dumped at sea. Within the project lines, a government hopper dredge would be used; outside, in the adjacent berthing area, material would be removed by self-loading hopper barge. All materials would be dumped at an EPA approved disposal site, 100 fathoms deep, about 5.8 nautical miles southwesterly of the Los Angeles breakwater entrance. There would not be any land created nor any land enhancement benefits.

MAJOR ASSUMPTIONS:

- Corps of Engineers hopper dredges "Harding" and Biddle" each perform half the dredging within the project limits; self-loading hopper barges would operate in adjacent berthing areas
- No land created, no dikes required to be built by the Port of Los Angeles (see pl. 3)

Alternative C

In this proposal, the top 5 feet of dredged material would be disposed of at 100 fathoms, EPA approved disposal site. That portion within the project limits would be removed and transported by a government hopper dredge; within adjacent berthing areas, material would be removed by self-loading hopper barges.

The bottom 5 feet of material, inside and outside of the project limits would be removed by hydraulic pipeline dredge and placed behind impervious dikes built by the Port of Los Angeles, creating 107 acres of new land, elevation plus 12 feet MLLW, adjacent to Terminal Island.

The new land created is part of the light industrial tank farm and bulk terminal areas in the Phase I Port of Los Angeles development plan (see pl. 5).

Alternative D

In this option, two existing water areas of the harbor, Slip 228 and Slip 5, are filled in behind rock retaining dikes constructed by the Port of Los Angeles across the entrance to each slip. An additional landfill would be placed on the mainland, near Anchorage Road west of the Henry Ford Bridge and north of the Cerritos Channel. The fill material would be dredged by an hydraulic pipeline dredge. The balance of the material would be carried out to sea by government hopper and disposed of at the 100 fathom, EPA approved disposal site. (It is assumed that all dredgings outside of the project limits would be used for fills.)

MAJOR ASSUMPTIONS:

- Corps of Enginners hopper dredges operate within the project limits; hydraulic pipeline dredges operate within project limits and in adjacent berthing areas
- Forty-two acres of new land created, elevation plus 12 feet, MLLW, behind rock dikes constructed by the Port of Los Angeles and behind existing marginal wharves; 35 acres of subsided lands are raised to plus 12 feet MLLW, behind existing earth dikes and new earth dikes (add 35 percent cross-diking for water quality reasons) (see pl. 7)

Alternative E

This alternative is the same as Alternative D, except that an additional landfill area is added, reducing the volume destined for offshore disposal. The landfill is provided by closing off the existing seaplane (Navy) basin by sealing the existing breakwater and constructing a closing rock dike.

MAJOR ASSUMPTIONS:

- Corps of Engineers hopper dredges operate within project limits; hydraulic pipeline dredges operate within project limits and in adjacent berthing areas.
- One hundred twenty-eight acres of new land created, and 35 acres of subsided lands raised, all to elevation plus 12 feet MLLW. Of the total new land and raised subsided lands, 86 acres are included in the Port of Los Angeles Master Plan for light industrial and tank farm areas (see pl. 9)

Alternative F

This proposal consists of filling Slip 228 and Slip 5, and the subsided area near Anchorage Road on the mainland, the same as noted in Alternative D. Instead of disposing of the balance at sea it would be stockpiled, at various heights, on the Slip 5 area, the Anchorage Road area, and two additional sites on Terminal Island -- across from the Customhouse and at Reeves Field. The stockpiled material would ultimately be hauled away and placed elsewhere in the harbor area. It is assumed that most of it can be placed in the subsided areas of the Wilmington oil field over a period of 10 years.

MAJOR ASSUMPTIONS:

- Hydraulic pipeline dredge systems handle and place all materials behind appropriate dikes
- Forty-two acres of new land created, elevation plus 12 feet; and 35 acres of subsided land raised to elevation plus 12 feet MLLW; stockpiled on a total of 139 acres, to be removed later and placed elsewhere, presumably on subsided lands (see pl. 11)

Alternative G

This proposal consists of filling Slip 228, Slip 5, and the naval seaplane area, and also raising the subsided area near Anchorage Road. The balance of the dredged material would be stockpiled at various heights on these areas: (except for Slip 228) the stockpiles would ultimately be hauled away and placed elsewhere, as noted in Alternative F.

MAJOR ASSUMPTIONS:

- Hydraulic pipeline dredging systems handle and place all material behind appropriate dikes
- One hundred twenty-eight acres of new land created, elevation plus 12 feet MLLW; 35 acres of subsided land raised to elevation plus 12 feet; stockpiles, on a total of 158 acres, to be removed later and placed elsewhere, presumably on subsided lands in the Wilmington oil field. Of the new land created, 86 acres are in the Port of Los Angeles Master Plan Phase I light industrial and tank farm areas (see pl. 13)

Alternative H

This proposal consists of filling the naval seaplane area and a small area adjacent to and seaward of it. The balance of the dredged material would be stockpiled on that area and also on two additional areas on Terminal Island, on and adjacent to Reeves Field. The stockpiles would ultimately be hauled away and placed elsewhere in the harbor area. It is assumed that most of it can be placed in the subsided areas of the Wilmington oil field over a period of 20 years.

MAJOR ASSUMPTIONS:

- Hydraulic pipeline dredge systems handle and place all materials behind appropriate dikes
- One hundred three acres of new land created, elevation plus 12 feet MLLW, stockpiles in a total of 170 acres to be removed later and placed elsewhere (see pl. 15)

4.2 LAND USE DEVELOPMENT BY DECADE. Table 1 shows land use development by decade (phases) for seven alternatives (including the recommended plan) which involves deposition of spoil to create new land or placement on existing subsided lands. Alternative B is not shown as this is an ocean disposal of spoil without the creation of new lands. This table also shows traffic and air pollution generation for the alternatives including the recommended plan discussed in the next two sections. Plates 1 through 16 show land acreage for the alternatives.

4.3 For Alternatives A, C, D and E, lands will be used and developed in Phase I - 1975 to 1985, Alternatives F and G lands in three phases, 1975 through 2005 and Alternative H in two phases, 1985 through 2005.

4.4 New land use acreage varies from 77 acres for Alternative D to 423 acres for Alternative H. The recommended plan, Alternative A, which is also the National Economic Development (NED) plan, provides for deposition of spoil which creates 187 acres of new lands.

4.5 As indicated in the section covering assumptions, new lands will be used in accordance with the Harbor's master plans and new land uses on subsided lands will be cargo terminals.

4.6 **TRAFFIC GENERATION.** Average traffic generated for the alternatives varies from 17,172 for Alternative D to 77,847 for Alternative G. Average daily traffic for the recommended plan is 36,300. (See table 1.)

4.7 Total miles travelled includes internal "milling around" and external traffic. Plates 1 through 16 show alternative plans for land acreage location in relation to present and future highways, streets and railroads.

4.8 **POLLUTANTS GENERATED AND IMPACT ON AIR QUALITY.** Tables 1 and 2 show air pollution generation by decades for each alternative plan including the recommended plan. All figures represent daily atmospheric loading. Total pounds of pollutants generated by projected traffic for Alternative D is 126,585 pounds for carbon monoxide CO, 40,172 pounds of oxides of nitrogen NOx and 24,334 pounds of hydrocarbons HC (lowest estimate).

4.9 It is estimated that Alternative G will generate the greatest air pollution. Total pounds of pollutants consist of 562,930 pounds of CO, 175,936 pounds of NOx and 103,513 pounds of HC.

4.10 Traffic from the recommended plan is projected to produce 256,891 pounds of CO, 82,879 pounds of NOx and 49,167 pounds of HC.

4.11 On the basis of the assumption of an additional 6 percent of atmospheric loading and concentration of pollutants resulting from the addition of 187 acres of newly created land (land use would be typical of the existing 3,100 acres in the Port of Los Angeles), it appears that the effect on air quality would be insignificant.

5. EFFECTS OF LOS ANGELES AND LONG BEACH HARBORS

MASTER PLANS

5.1 **LAND USE DEVELOPMENT BY DECADES.** Table 3 shows both ports' master plans for land use development, average daily traffic generated and number of vehicles broken down by diesel and gasoline types and trains by decades.

5.2 In addition, pollutants generated by decades are shown. For master plans, plate 17 shows land use development by decades (phases) and location with respect to highways and streets and plate 18 indicates the same information for railroads. Plate 19 depicts two alternative pathways from interim project to the master plan development for San Pedro Bay.

5.3 This section discusses land use development and the next two sections cover traffic generation and pollutants generated as well as impact on air quality. About 48 percent (1,404 acres) of total new land use provided in the master plan will be developed in Phase I. The balance of the 2,921 acres of new land use are projected for Phases II and III.

5.4 About 1,191 acres are expected to be developed for general industrial use. This represents the largest percentage (41 percent) of acreage in one particular use. Cargo and bulk terminals are projected for 425 acres and 345 acres, respectively, encompassing the second and third largest acreage.

5.5 The importance of energy and recreation is reflected in the large land areas set aside for energy and oil terminals and marinas as presented in table 3.

5.6 TRAFFIC GENERATION. Of the total average daily traffic (ADT) generated (699,562) by the year 2005, 353,772 or about 51 percent is projected by the end of Phase I (1985). Slightly in excess of 86 percent of the total ADT is expected to occur by the end of Phase II (1995). The same pattern applies to the number of vehicles. In as much as no train traffic has been allocated to marinas, the percentages of trains do not have a comparable ADT pattern for the three phases.

5.7 The first phase shows about 38 percent of total trains as compared to in excess of 43 percent of total trains in Phase II (see table 3).

5.8 Vehicle miles travelled per day 11,372,029, which includes "milling around" traffic within both port areas and external traffic for Phase I, represents 49 percent of total miles per day for the three Phases (23,067,270).

5.9 The increment of daily vehicle miles travelled in Phase II is larger than the increment for Phase III by 5,030,655 miles. Phase III's increment represents the smallest percentage (14 percent) of total daily vehicle miles travelled. (See table 3.)

5.10 POLLUTANTS GENERATED AND IMPACT ON AIR QUALITY. As indicated previously, table 3 presents, in addition to other items, air pollution generated from projected additional land use by decade contained in the master plan of both ports. The total pounds of pollutants generated daily indicated in this table, does not include pollutants resulting from "milling around" traffic mileage or external mileage. Table 4 encompasses total air pollution to include these sources in addition to pollutants from special purpose vehicles. The greatest portion of atmospheric loading is projected to occur in Phase I with 3,787,933 total pounds of CO, NO_x, and HC. This represents about 50 percent of total pounds of pollutants per day by 2005. Phase III of the master plans is expected to produce the smallest increment of air pollution per day with the additional atmospheric loading of 1,075,426 pounds.

5.11 Of the total atmospheric loading per day by the year 2005, which is assumed to remain constant for the balance of the forecast period, CO is expected to be the largest portion with about 66 percent of the total.

5.12 As was noted in the section on methodology, no attempt was made to quantify future atmospheric concentrations of pollution that would result from the master plans implementation.

5.13 The reasons for this are (a) the emissions data present and future, for the existing port areas need to be determined, (b) future atmospheric loading of the port lands without the additional land uses contemplated by the master plans, need to be added to the future atmospheric loading of the new land uses in the master plans, (c) calculation of total atmospheric concentrations of pollutants in the future is required and (d) the state of the arts makes the quantification of atmospheric concentrations difficult and questionable.

Alternative A - (Tabl

Phase I - (1975-1985)

| LAND USE | ACRES | TRIP FACTOR | TOTAL NUMBER OF TRIPS | TRUCKS | | | CA |
|----------------|-------------------|-------------|-----------------------|--------|-------|---------|-------|
| | | | | DIESEL | GAS | PROPANE | |
| LIGHT INDUSTRY | 5. | 448. | 2240. | 272. | 174. | 0. | 1784. |
| TANK FARM | 30. | 0. | 12. | 0 | 0 | 0 | 12. |
| MILK TERMINAL | 100. | 224. | 22297. | 2717. | 1740. | 0 | 17849 |
| CARGO TERMINAL | <u>52.</u> 187 | 224. | 11648. | 1413. | 905. | 0 | 928 |
| | -0 | -0 | 0 | -0 | -0 | -0 | -0 |

NOTE 1: INCLUDES 8 GRAMS OF HC PER GASOLINE VEHICLE TRIP EMITTED
 2: PROPANE VEHICLES ARE NON-POLLUTING

Alternative A - (Table 1)

| TRUCKS | | CARS | TRAINS | AVERAGE VEHICLE MILES PER DAY | MILES PER GALLON | GALLONS OF FUEL USED | GRAM POLLUTANT GALLON | |
|--------|---------|--------|--------|--|---------------------------------|------------------------------------|-----------------------------|-----------------|
| GAS | PROPANE | | | | | | CO | NO _x |
| 174. | 0. | 1784. | 28. | 894. 571. 1. 5860. 1. | 4 4 (NOTE 2) 15 .75 | 223. 143. 391. 1. | 102 617 | 1 3 |
| 0 | 0 | 12. | 0 | 0 0 0 39. 0 | 4 4 (NOTE 2) 15 .75 | 0 0 3. 0 | 102 617 | 1 3 |
| 1740. | 0 | 17849. | 2*69 | 9680. 6200. 0 63584. 0 | 4 4 (NOTE 2) 15 .75 | 2422. 1550. 4238. 10. | 102 617 | 1 3 |
| 905. | 0 | 9281. | 1.4 | 5074. 3250. 0 33328. 0 | 4 4 (NOTE 2) 15 .75 | 1268. 812. 2222. 6. | 102 617 | 1 3 |
| -0 | -0 | -0 | -0 | 0 0 0 0 0 | 4 4 (NOTE 2) 15 .75 | 0 0 0 0 | 102 617 | 1 3 |

VEHICLE TRIP EMITTED AS VAPORS AFTER VEHICLE SHUT DOWN (EVAPORATIVE EMISSIONS)

1

2

| | GRAMS OF POLLUTANTS PER GALLON OF FUEL | | | TOTAL POUNDS GENERATED | | |
|--|--|-----|----|------------------------|-----|-------------|
| | I-----I | | | I-----I | | |
| | CO | NOX | HC | CO | NOX | HC (NOTE 1) |

| | | | | | | |
|-----|------|-----|-----|-------|-------|-------|
| 3. | 102 | 168 | 17 | 50. | 83. | 8. |
| 3. | 617 | 381 | 129 | 194. | 120. | 44. |
| 1. | 1973 | 82 | 306 | 194. | 71. | 295. |
| 1. | 59 | 167 | 43 | 0. | 0. | 0. |
| 0 | 102 | 168 | 17 | 0 | 0 | 0 |
| 0 | 617 | 381 | 129 | 0 | 0 | 0 |
| 3. | 1973 | 82 | 306 | 0 | 0. | 2. |
| 0 | 59 | 167 | 43 | 0 | 0 | 0 |
| 22. | 102 | 168 | 17 | 544. | 895. | 90. |
| 50. | 617 | 381 | 129 | 2108. | 1301. | 471. |
| 38. | 1973 | 82 | 306 | 2108. | 766. | 3174. |
| 10. | 59 | 167 | 43 | 1. | 4. | 1. |
| 38. | 102 | 168 | 17 | 285. | 470. | 48. |
| 12. | 617 | 381 | 129 | 1105. | 682. | 247. |
| 22. | 1973 | 82 | 306 | 1105. | 402. | 1663. |
| 6. | 59 | 167 | 43 | 1. | 2. | 0. |
| 0 | 102 | 168 | 17 | 0 | 0 | 0 |
| 0 | 617 | 381 | 129 | 0 | 0 | 0 |
| 0 | 1973 | 82 | 306 | 0 | 0 | 0 |
| 0 | 59 | 167 | 43 | 0 | 0 | 0 |

(FIVE EMISSIONS)

| | | | |
|--------|------|------|------|
| Diesel | 679 | 1448 | 146 |
| Gas | 3407 | 2103 | 762 |
| Cars | 3407 | 1239 | 5134 |
| Trains | 2 | 6 | 1 |

3

Alternativ

| Phase I (1975-85) | | TRIP PARTY | TOTAL NUMBER OF TRIPS | TRUCKS | | |
|-------------------|-------------|---------------|--------------------------------|--------|-------|---------|
| LAND USE | ACRES | | | DIESEL | GAS | PROPANE |
| LIGHT INDUSTRY | 9. | 448. | 2240. | 272. | 174. | 0. |
| TANK FARM | 30. | 0. | 12. | 0 | 0 | 0 |
| MILK TERMINAL | 72. 107. | 274. | 16178. | 1956. | 1253. | 0 |

NOTE 1: INCLUDES 4 GRAMS OF HC PER GASOLINE VEHICLE TRIP
 2: PROPANE VEHICLES ARE NON-POLLUTING

Alternative C - (Table 1 Continued)

| MODE | CARS | TRAINS | AVERAGE | | | GRAMS OF POLLUTANTS PER GALLON OF FUEL | | |
|---------|--------|--------|-----------------------|------------------|----------------------|--|-----|-----|
| | | | VEHICLE MILES PER DAY | MILES PER GALLON | GALLONS OF FUEL USED | CO | NOX | HC |
| PROPANE | | | 863. | 4 | 216. | 102 | 168 | 17 |
| | | | 551. | 4 | 138. | 617 | 381 | 129 |
| | | | 1. | (NOTE 2) | | | | |
| | 1784. | | 5657. | 15 | 377. | 1973 | 82 | 306 |
| | | .28 | 1. | .75 | 1. | 59 | 167 | 43 |
| | | | 0 | 4 | 0 | 102 | 168 | 17 |
| | | | 0 | 4 | 0 | 617 | 381 | 129 |
| | | | 0 | (NOTE 2) | | | | |
| | 12. | | 38. | 15 | 3. | 1973 | 82 | 306 |
| | | 0 | 0 | .75 | 0 | 59 | 167 | 43 |
| | | | 6654. | 4 | 1664. | 102 | 168 | 17 |
| | | | 4263. | 4 | 1066. | 617 | 381 | 129 |
| | | | 0 | (NOTE 2) | | | | |
| | 12851. | | 43712. | 15 | 2914. | 1973 | 82 | 306 |
| | | 1.94. | 6. | .75 | 8. | 59 | 167 | 43 |

TOTAL

TRIP EMITTED AS VAPORS AFTER VEHICLE SHUT DOWN (EVAPORATIVE EMISSION)

2

| Phase I (1975-85-) | | TRIP FACTOR | TOTAL NUMBER OF TRIPS | TRUCKS | | | CARS |
|--------------------|-----------|----------------|--------------------------------|--------|------|---------|-------|
| LAND USE | ACRES | | | DIESEL | GAS | PROPANE | |
| CARGO TERMINAL | 5. | 224. | 1120. | 136. | 86. | 0. | 892. |
| CARGO TERMINAL | 37. | 224. | 8288. | 1004. | 641. | 4. | 6604. |
| CARGO TERMINAL | 35. | 224. | 7840. | 949. | 607. | 1. | 6246. |
| | -0 | -0 | 0 | -0 | -0 | -0 | -0 |
| | -0 | -0 | 0 | -0 | -0 | -0 | -0 |
| | <u>77</u> | | | | | -0 | -0 |

NOTE 1: INCLUDES 8 GRAMS OF HC PER GASOLINE VEHICLE TRIP. EMITTED AS V
 2: PROPANE VEHICLES ARE NON-POLLUTING

1

D-(Table 1 Continued)

| I | CARS | TRAINS | AVERAGE VEHICLE MILES PER DAY | MILES PER GALLON | GALLONS OF FUEL USED | GRAMS OF POLLUTANTS PER GALLON OF FUEL | | | |
|-------|------|--------|--|------------------------|----------------------------|--|-----|-----|--|
| | | | | | | CO | NOX | HC | |
| 892. | | .13 | 620 ₂ | 4 | 155 ₂ | 102 | 168 | 17 | |
| | | | 394 ₂ | 4 | 98 ₂ | 617 | 381 | 129 | |
| | | | 2 ₂ | (NOTE 2) | | | | | |
| | | | 4063 ₂ | 15 | 271 ₂ | 1973 | 82 | 306 | |
| | | | 1. | .75 | 1. | 59 | 167 | 43 | |
| 6604. | | .99 | 6321 ₂ | 4 | 1580 ₂ | 102 | 168 | 17 | |
| | | | 4040 ₂ | 4 | 1010 ₂ | 617 | 381 | 129 | |
| | | | 26 ₂ | (NOTE 2) | | | | | |
| | | | 41587 ₂ | 15 | 2772 ₂ | 1973 | 82 | 306 | |
| | | | 6. | .75 | 8. | 59 | 167 | 43 | |
| 6246. | | .94 | 3324 ₂ | 4 | 831 ₂ | 102 | 168 | 17 | |
| | | | 2126 ₂ | 4 | 532 ₂ | 617 | 381 | 129 | |
| | | | 3 ₂ | (NOTE 2) | | | | | |
| | | | 21885 ₂ | 15 | 1459 ₂ | 1973 | 82 | 306 | |
| | | | 3. | .75 | 4. | 59 | 167 | 43 | |
| =0 | =0 | =0 | 0 | 4 | 0 | 102 | 168 | 17 | |
| | | | 0 | 4 | 0 | 617 | 381 | 129 | |
| | | | 0 | (NOTE 2) | | | | | |
| | | | 0 | 15 | 0 | 1973 | 82 | 306 | |
| | | | 0 | .75 | 0 | 59 | 167 | 43 | |
| =0 | =0 | =0 | 0 | 4 | 0 | 102 | 168 | 17 | |
| | | | 0 | 4 | 0 | 617 | 381 | 129 | |
| | | | 0 | (NOTE 2) | | | | | |
| | | | 0 | 15 | 0 | 1973 | 82 | 306 | |
| | | | 0 | .75 | 0 | 59 | 167 | 43 | |

EMITTED AS VAPORS AFTER VEHICLE SHUT DOWN (EVAPORATIVE EMISSIONS)

TOTAL

| GRAMS OF POLLUTANTS PER GALLON OF FUEL | | | TOTAL POUNDS GENERATED | | |
|--|-----|----|------------------------|-----|-------------|
| CO | NOX | HC | CO | NOX | HC (NOTE 1) |

| | | | | | |
|------|-----|-----|-------|------|-------|
| 102 | 168 | 17 | 35. | 57. | 6. |
| 617 | 381 | 129 | 134. | 83. | 30. |
| 1973 | 82 | 306 | 134. | 49. | 198. |
| 59 | 167 | 43 | 0. | 0. | 0. |
| 102 | 168 | 17 | 355. | 585. | 59. |
| 617 | 381 | 129 | 1374. | 848. | 299. |
| 1973 | 82 | 306 | 1374. | 501. | 1987. |
| 59 | 167 | 43 | 1. | 3. | 1. |
| 102 | 168 | 17 | 187. | 308. | 31. |
| 617 | 381 | 129 | 723. | 446. | 162. |
| 1973 | 82 | 306 | 723. | 264. | 1094. |
| 59 | 167 | 43 | 1. | 1. | 0. |
| 102 | 168 | 17 | 0 | 0 | 0 |
| 617 | 381 | 129 | 0 | 0 | 0 |
| 1973 | 82 | 306 | 0 | 0 | 0 |
| 59 | 167 | 43 | 0 | 0 | 0 |
| 102 | 168 | 17 | 0 | 0 | 0 |
| 617 | 381 | 129 | 0 | 0 | 0 |
| 1973 | 82 | 306 | 0 | 0 | 0 |
| 59 | 167 | 43 | 0 | 0 | 0 |

VE EMISSIONS)

TOTAL

| | | | |
|--------|------|------|------|
| DIESEL | 577 | 950 | 96 |
| GAS | 2231 | 1377 | 491 |
| CARS | 2231 | 814 | 3279 |
| TRAINS | 2 | 4 | 1 |

1 3

Altern

| Phase I (1975-85) | | | TOTAL NUMBER OF TRIPS | TRUCKS | | |
|-------------------|-------|----------------|--------------------------------|--------|-------|---------|
| LAND USE | ACRES | TRIP FACTOR | | DYSEL | GAS | PROPANE |
| CARGO TMNL 1 | 9. | 224. | 1120. | 136. | 86. | 0. |
| CARGO TMNL 2 | 37. | 224. | 8288. | 1004. | 641. | 4. |
| CARGO TMNL 3 | 35. | 224. | 7840. | 949. | 607. | 1. |
| LIGHT IND. | 40. | 448. | 17920. | 2177. | 1391. | 2. |
| TANK FARM | 46. | 0. | 12. | 0 | 0 | 0 |
| | 146 | | | | | |

NOTE 1: INCLUDES 8 GRAMS OF HC PER GASOLINE VEHICLE TRIP ENT
 2: PROPANE VEHICLES ARE NON-POLLUTING

1

Alternative E -(Table 1 Continued)

| TRUCKS FUEL | CARS | | TRAINS | AVERAGE VEHICLE MILES PER DAY | MILES PER GALLON | GALLONS OF FUEL USED | GRAMS POLLUTANT GALLON OF | |
|----------------|-------|---------|--------|--|------------------------|----------------------------|---------------------------------|-----|
| | GAS | PROPANE | | | | | CO | NOX |
| 26. | 86. | 0. | | 393. | 4 | 98. | 102 | 160 |
| | | | | 250. | 4 | 63. | 617 | 381 |
| | | 0. | | 1. | (NOTE 2) | | | |
| | | 892. | | 2580. | 15 | 172. | 1973 | 81 |
| | | | .13 | 0. | .75 | 1. | 59 | 161 |
| 34. | 641. | 4. | | 2027. | 4 | 732. | 102 | 160 |
| | | | | 1871. | 4 | 468. | 617 | 381 |
| | | 4. | | 12. | (NOTE 2) | | | |
| | | 6604. | | 19261. | 15 | 1284. | 1973 | 81 |
| | | | .99 | 3. | .75 | 4. | 59 | 161 |
| 49. | 607. | 1. | | 1617. | 4 | 404. | 102 | 160 |
| | | | | 1034. | 4 | 259. | 617 | 381 |
| | | 1. | | 1. | (NOTE 2) | | | |
| | | 6246. | | 10647. | 15 | 710. | 1973 | 81 |
| | | | .94 | 2. | .75 | 2. | 59 | 161 |
| 77. | 1391. | 2. | | 6486. | 4 | 1622. | 102 | 160 |
| | | | | 4143. | 4 | 1036. | 617 | 381 |
| | | 2. | | 5. | (NOTE 2) | | | |
| | | 14275. | | 42520. | 15 | 2835. | 1973 | 81 |
| | | | 2.15 | 6. | .75 | 8. | 59 | 161 |
| 0 | 0 | 0 | | 0 | 4 | 0 | 102 | 160 |
| | | | | 0 | 4 | 0 | 617 | 381 |
| | | 0 | | 0 | (NOTE 2) | | | |
| | | 12. | | 38. | 15 | 3. | 1973 | 81 |
| | | | 0 | 0 | .75 | 0 | 59 | 161 |

VEHICLE TRIP EMITTED AS VAPORS AFTER VEHICLE SHUT DOWN (EVAPORATIVE EMISSIONS)

2

| GALLONS OF FUEL USED | GRAMS OF POLLUTANTS PER GALLON OF FUEL | | | TOTAL POUNDS GENERATED | | |
|----------------------|--|-----|-----|------------------------|------|-------------|
| | CO | NOX | HC | CO | NOX | HC (NOTE 1) |
| 98. | 102 | 168 | 17 | 92. | 36. | 4. |
| 63. | 617 | 381 | 129 | 65. | 53. | 19. |
| 172. | 102 | 82 | 306 | 85. | 31. | 132. |
| 1. | 59 | 167 | 43 | 1. | 0. | 0. |
| 732. | 102 | 168 | 17 | 165. | 271. | 27. |
| 468. | 617 | 381 | 129 | 636. | 393. | 144. |
| 1284. | 102 | 82 | 306 | 636. | 232. | 983. |
| 45. | 59 | 167 | 43 | 0. | 1. | 0. |
| 404. | 102 | 168 | 17 | 91. | 150. | 15. |
| 259. | 617 | 381 | 129 | 352. | 217. | 44. |
| 710. | 102 | 82 | 306 | 352. | 128. | 589. |
| 2. | 59 | 167 | 43 | 0. | 1. | 0. |
| 1622. | 102 | 168 | 17 | 365. | 601. | 61. |
| 1036. | 617 | 381 | 129 | 1409. | 870. | 319. |
| 2835. | 102 | 82 | 306 | 1409. | 513. | 2144. |
| 8. | 59 | 167 | 43 | 1. | 3. | 1. |
| 0 | 102 | 168 | 17 | 0 | 0 | 0 |
| 0 | 617 | 381 | 129 | 0 | 0 | 0 |
| 3. | 102 | 82 | 306 | 0 | 0. | 2. |
| 0 | 59 | 167 | 43 | 0 | 0 | 0 |

TOTAL

| (EVAPORATIVE EMISSION) | | | |
|------------------------|--------|------|------|
| | DIESEL | 643 | 1058 |
| | GAS | 2482 | 1533 |
| | CARS | 2481 | 904 |
| | TRAINS | 2 | 5 |

3

(Table 1 Continued) Alternative

| Phase I (1975-85) | | | TOTAL NUMBER OF TRIPS | TRUCKS | | |
|------------------------------|-------|----------------|--------------------------------|--------|-------|---------|
| LAND USE | ACRES | TRIP FACTOR | | DIESEL | GAS | PROPANE |
| CARGO TMNL 1 | 5. | 224. | 1120. | 134. | 86. | 0. |
| CARGO TMNL 2 | 37. | 224. | 8288. | 1004. | 641. | 0. |
| CARGO TMNL 3 | 35. | 224. | 7840. | 949. | 607. | 1. |
| Phase II and III (1985-2005) | | | | | | |
| CARGO TMNL 4 | 89. | 224. | 19936. | 2412. | 1543. | 2. |
| CARGO TMNL 5 | 89. | 224. | 19936. | 2412. | 1543. | 2. |
| CARGO TMNL 6 | 89. | 224. | 19936. | 2412. | 1543. | 2. |
| | 344 | | | | | 2. |

NOTE 1: INCLUDES 8 GRAMS OF HC PER GASOLINE VEHICLE TRIP EMITTED
 2: PROPANE VEHICLES ARE NON-POLLUTING

Continued) Alternative F 1 of 2

| CHECKS | CARR | TRAINS | AVERAGE VEHICLE MILES PER DAY | MILES PER GALLON | GALLONS OF FUEL USED | GRAMS OF POLLUTANTS PER GALLON OF FUEL | | |
|--------|--------|--------|--|------------------------|----------------------------|--|------------|----|
| | | | | | | CO | NOX | HC |
| 06. | n. | | 620. 394. 2. | 4 4 (NOTE 2) | 155. 98. | 102 617 | 168 381 | |
| | 892. | .13 | 4063. 1. | 15 .75 | 271. 1. | 1973 59 | 82 167 | |
| 01. | n. | | 6321. 4040. 26. | 4 4 (NOTE 2) | 1580. 1010. | 102 617 | 168 381 | |
| | 6608. | .99 | 41587. 6. | 15 .75 | 2772. 8. | 1973 59 | 82 167 | |
| 07. | 1. | | 3324. 2126. 3. | 4 4 (NOTE 2) | 831. 532. | 102 617 | 168 381 | |
| | 6246. | .94 | 21885. 3. | 15 .75 | 1459. 4. | 1973 59 | 82 167 | |
| 03. | 2. | | 10275. 6573. 8. | 4 4 (NOTE 2) | 2569. 1643. | 102 617 | 168 381 | |
| | 15883. | 2.39 | 67653. 10. | 15 .75 | 4510. 14. | 1973 59 | 82 167 | |
| 03. | 2. | | 8502. 5839. 7. | 4 4 (NOTE 2) | 2126. 1360. | 102 617 | 168 381 | |
| | 15883. | 2.39 | 55982. 8. | 15 .75 | 3732. 11. | 1973 59 | 82 167 | |
| 03. | 2. | | 4416. 6023. 8. | 4 4 (NOTE 2) | 2354. 1506. | 102 617 | 168 381 | |
| | 15883. | 2.39 | 61998. 9. | 15 .75 | 4133. 12. | 1973 59 | 82 167 | |

TRIP EMISSIONS AS VAPORS AFTER VEHICLE SHUT DOWN (EVAPORATIVE EMISSIONS)

2

| GALLONS OF FUEL USED | GRAMS OF POLLUTANTS PER GALLON OF FUEL | | | TOTAL POUNDS GENERATED | | |
|----------------------|--|------------|-----------|------------------------|---------------|-------------|
| | CO | NOX | HC | CO | NOX | HC (NOTE 1) |
| 155. 98. | 102 617 | 168 391 | 17 129 | 35. 134. | 57. 83. | 6. 30. |
| 271. 1. | 1973 59 | 82 167 | 306 43 | 134. 0. | 49. 0. | 198. 0. |
| 1590. 1010. | 102 617 | 168 391 | 17 129 | 355. 1374. | 585. 848. | 59. 299. |
| 2772. 8. | 1973 59 | 82 167 | 306 43 | 1374. 1. | 501. 3. | 1987. 1. |
| 831. 532. | 102 617 | 168 391 | 17 129 | 187. 723. | 308. 446. | 31. 162. |
| 1459. 4. | 1973 59 | 82 167 | 306 43 | 723. 1. | 264. 2. | 1094. 0. |
| 2564. 1643. | 102 617 | 168 391 | 17 129 | 578. 2235. | 951. 1390. | 46. 495. |
| 4510. 14. | 1973 59 | 82 167 | 306 43 | 2235. 2. | 815. 5. | 3323. 1. |
| 2126. 1360. | 102 617 | 168 391 | 17 129 | 478. 1849. | 787. 1142. | 80. 414. |
| 3732. 11. | 1973 59 | 82 167 | 306 43 | 1849. 1. | 675. 4. | 2798. 1. |
| 2354. 1506. | 102 617 | 168 391 | 17 129 | 529. 2048. | 872. 1265. | 88. 455. |
| 4133. 12. | 1973 59 | 82 167 | 306 43 | 2048. 2. | 747. 5. | 3066. 1. |

EVAPORATIVE EMISSIONS)

2

1

3

(TABLE 1 CONTINUED)
ALTERNATIVE F (CONTINUED) 2 of 2

| TOTALS | | | |
|--------------|------|------|-------|
| DIESEL | 390 | 546 | 65 |
| GAS | 1508 | 931 | 329 |
| CARS | 1508 | 550 | 2185 |
| TRAINS | 1 | 3 | 1 |
| DIESEL | 1772 | 2918 | 295 |
| GAS | 6855 | 4233 | 1526 |
| CARS | 6855 | 2501 | 10283 |
| TRAINS | 6 | 16 | 2 |
| TOTAL | | | |
| DIESEL | 2162 | 3564 | 360 |
| GAS | 8363 | 5164 | 1855 |
| CARS | 8363 | 3051 | 14323 |
| TRAINS | 7 | 19 | 3 |

Phase I (1975-1985)

Alternat

| LAND USE | ACRES | TRIP FACTOR | TOTAL NUMBER OF TRIPS | TRUCKS | | |
|------------------|-------|-------------|-----------------------|--------|------|---------|
| | | | | DIESEL | GAS | PROPANE |
| CARGO TERMINAL 1 | 5. | 224. | 1120. | 134. | 86. | 0. |
| CARGO TERMINAL 2 | 37. | 224. | 8288. | 1007. | 600. | 3. |
| CARGO TERMINAL 3 | 35. | 224. | 7840. | 953. | 605. | 3. |

Alternative G - (Table 1 Continued) 1 of 2

| TRUCKS | CARS | | TRAINS | AVERAGE VEHICLE MILES PER DAY | MILES PER GALLON | GALLONS OF FUEL USED | GRAMS OF POLLUTANTS GALION OF | |
|--------|------|---------|--------|--|------------------------|----------------------------|-------------------------------------|-----|
| | GAS | PROPANE | | | | | CO | NOX |
| A6. | 0. | 692. | .13 | 393. | 4 | 98. | 102 | 168 |
| | | | | 250. | 4 | 63. | 617 | 381 |
| | | | | 1. | (NOTE 2) | | | |
| | | | | 2540. | 15 | 172. | 1973 | 82 |
| | | | | 0 | .75 | 1. | 59 | 167 |
| 600. | 3. | 6602. | .99 | 2937. | 4 | 734. | 102 | 168 |
| | | | | 1866. | 4 | 447. | 617 | 381 |
| | | | | 10. | (NOTE 2) | | | |
| | | | | 19256. | 15 | 1284. | 1973 | 82 |
| | | | | 3. | .75 | 4. | 59 | 167 |
| 605. | 3. | 6245. | 94. | 1624. | 4 | 406. | 102 | 168 |
| | | | | 1032. | 4 | 258. | 617 | 381 |
| | | | | 5. | (NOTE 2) | | | |
| | | | | 10645. | 15 | 710. | 1973 | 82 |
| | | | | 2. | .75 | 2. | 59 | 167 |

S
L
D

| | GRAMS OF POLLUTANTS PER GALION OF FUEL | | | TOTAL POUNDS GENERATED | | |
|--|--|-----|----|------------------------|-----|----------------|
| | -----I | | | -----I | | |
| | CO | NOX | HC | CO | NOX | HC (NOTE 1) |

| | | | | | | |
|-------|------|-----|-----|------|------|------|
| 98. | 102 | 168 | 17 | 22. | 36. | 4. |
| 63. | 617 | 381 | 120 | 85. | 53. | 19. |
| 172. | 1973 | 82 | 304 | 85. | 31. | 132. |
| 1. | 59 | 167 | 43 | 0. | 0. | 0. |
| 734. | 102 | 168 | 17 | 165. | 272. | 28. |
| 447. | 617 | 381 | 129 | 635. | 392. | 104. |
| 1284. | 1973 | 82 | 304 | 635. | 232. | 982. |
| 4. | 59 | 167 | 43 | 0. | 1. | 0. |
| | 102 | 168 | 17 | 31. | 150. | 15. |
| | 617 | 381 | 129 | 351. | 217. | 84. |
| 406. | 1973 | 82 | 306 | 351. | 128. | 589. |
| 258. | 59 | 167 | 43 | 0. | 1. | 0. |
| 710. | | | | | | |
| 2. | | | | | | |

^ } 3

Phase II and III - (1985-2095)

| LAND USE | ACRES | TRIP FACTOR | TOTAL NUMBER OF TRIPS | Alternative G - TRUCKS | | | CARS |
|------------|-------|-------------|-----------------------|------------------------|-------|---------|--------|
| | | | | DIESEL | GAS | PROPANE | |
| LIGHT IND. | 40. | 448. | 17920. | 2175. | 1385. | 7. | 14275. |
| TANK FARM | 46. | 0. | 12. | 0 | 0 | 0 | 12. |
| CARGO TMNL | 4 60. | 224. | 14336. | 1735. | 1110. | 1. | 11421 |
| CARGO TMNL | 5 60. | 224. | 14336. | 1735. | 1110. | 1. | 11421 |
| CARGO TMNL | 6 60. | 224. | 14336. | 1735. | 1110. | 1. | 11421 |
| | 3 55. | | | | | | 11421 |

NOTE 1: INCLUDES 8 GRAMS OF HC PER GASOLINE VEHICLE TRIP EMITTED
 2: PROPANE VEHICLES ARE NON-POLLUTING

| PHASE I TOTALS | | | |
|----------------|-----|-----|------|
| DIESEL | 187 | 308 | 32 |
| GAS | 720 | 445 | 163 |
| CARS | 720 | 263 | 1114 |
| TRAINS | 0 | 1 | 0 |

Alternative G -(Table) 2 of 2

| OPANE | CARS | TRAINS | AVERAGE VEHICLE MILES PER DAY | MILES PER GALLON | GALLONS OF FUEL USED | GRAMS OF POLLUTANTS PERT GALLON OF FUEL | | |
|-------|--------|--------|--|---------------------------------|-------------------------------|---|-------------------------|--------------------|
| | | | | | | CO | NOX | HC |
| 7. | 10275. | 2.15 | 4893. 4389. 23. 45231. 7. | 4 4 (NOTE 2) 15 .75 | 1723. 1097. 3015. 9. | 102 617 1973 59 | 148 381 82 167 | 1 12 31 4 |
| 0 | 12. | 0 | 0 0 0 38. 0 | 4 4 (NOTE 2) 15 .75 | 0 0 3. 0 | 102 617 1973 59 | 148 381 82 167 | 1 12 31 4 |
| 1. | 11421. | 1.72 | 5337. 3414. 4. 35101. 5. | 4 4 (NOTE 2) 15 .75 | 1334. 853. 2343. 7. | 102 617 1973 59 | 148 381 82 167 | 1 12 31 4 |
| 1. | 11421. | 1.72 | 4749. 3050. 4. 31398. 5. | 4 4 (NOTE 2) 15 .75 | 1192. 763. 2003. 6. | 102 617 1973 59 | 148 381 82 167 | 1 12 31 4 |
| 1. | 11421. | 1.72 | 5426. 3471. 4. 35725. 5. | 4 4 (NOTE 2) 15 .75 | 1356. 868. 2382. 7. | 102 617 1973 59 | 148 381 82 167 | 1 12 31 4 |

TRIP EMITTED AS VAPORS AFTER VEHICLE SHUT DOWN (EVAPORATIVE EMISSIONS)

| PHASE II & III TOTALS | | | | | TOTAL ALL PHASES | | | |
|-----------------------|--------|------|------|------|------------------|------|------|------|
| 32 | DIESEL | 1352 | 2226 | 226 | DIESEL | 1539 | 2534 | 258 |
| 163 | GAS | 5222 | 3226 | 1184 | GAS | 5942 | 3671 | 1347 |
| 1114 | CARS | 5222 | 1906 | 8081 | CARS | 5942 | 2169 | 9195 |
| 0 | TRAINS | 4 | 13 | 4 | TRAINS | 4 | 14 | 4 |

2

GRAMS OF
POLLUTANTS PERTOTAL
GALLON OF FUEL

TOTAL POUNDS GENERATED

| [-----] | | | | | |
|---------|-----|-----|-------|------|-------|
| CO | NOX | HC | CO | NOX | HC |
| 102 | 148 | 17 | 388. | 638. | 45. |
| 617 | 381 | 129 | 1493. | 922. | 346. |
| 1973 | 82 | 306 | 1493. | 545. | 2286. |
| 50 | 167 | 43 | 1. | 3. | 1. |
| 102 | 148 | 17 | 0 | 0 | 0 |
| 617 | 381 | 129 | 0 | 0 | 0 |
| 1973 | 82 | 306 | 0 | 0. | 2. |
| 50 | 167 | 43 | 0 | 0 | 0 |
| 102 | 148 | 17 | 300. | 494. | 50. |
| 617 | 381 | 120 | 1141. | 717. | 262. |
| 1973 | 82 | 306 | 1141. | 424. | 1782. |
| 50 | 167 | 43 | 1. | 3. | 1. |
| 102 | 148 | 17 | 268. | 442. | 45. |
| 617 | 381 | 120 | 1037. | 641. | 246. |
| 1973 | 82 | 306 | 1037. | 378. | 1614. |
| 50 | 167 | 43 | 1. | 3. | 1. |
| 102 | 148 | 17 | 305. | 502. | 51. |
| 617 | 381 | 120 | 1180. | 729. | 266. |
| 1973 | 82 | 306 | 1180. | 431. | 1808. |
| 50 | 167 | 43 | 1. | 3. | 1. |

(FIVE EMISSIONS)

PHASES

| | | |
|---|------|------|
| D | 2534 | 258 |
| E | 3671 | 1347 |
| F | 2169 | 9195 |
| | 14 | 4 |

1

3

Table 1 (Conti

| Phase II and III (1985-2005) | | | TOTAL NUMBER OF TRIPS | TRUCKS | | | CARS |
|------------------------------|------------|----------------|--------------------------------|--------|-------|---------|--------|
| LAND USE | ACRES | TRIP FACTOR | | DIESEL | GAS | PROPANE | |
| LIGHT INDUST | 40. | 448. | 17920. | 2177. | 1391. | 2. | 14275. |
| TANK FARM | 67. | 0. | 12. | 0 | 0 | 0 | 12. |
| CARGO TMNL 1 | 50. | 224. | 11200. | 1361. | 865. | 4. | 8922. |
| CARGO TMNL 2 | 225. | 224. | 50400. | 6103. | 3901. | 25. | 40159. |
| CARGO TMNL 3 | 40. | 224. | 8960. | 1084. | 694. | 1. | 7138. |
| CARGO TMNL 4 | 5. | 224. | 1120. | 136. | 87. | 0. | 892. |
| | <u>423</u> | | | | | | |

NOTE 1: INCLUDES 8 GRAMS OF HC PER GASOLINE VEHICLE TRIP OMITTED AS VAPOR
 2: PROPANE VEHICLES ARE NON-POLLUTING

Table 1 (Continued) Alternative H

| ROUTE NAME | CARS | TRAINS | AVERAGE VEHICLE MILES PER DAY | MILES PER GALLON | GALLONS OF FUEL USED | GRAMS OF POLLUTANTS PER GALLON OF FUEL | | | TOTAL CO | |
|------------|------|--------|-------------------------------|------------------|----------------------|--|-----|-----|----------|--|
| | | | | | | CO | NOX | HC | | |
| 14275. | | 2.15 | 7954 _A | 4 | 1989 _A | 102 | 168 | 17 | | |
| | | | 5080 _A | 4 | 1270. | 617 | 381 | 129 | | |
| | | | 7 _A | (NOTE 2) | | | | | | |
| | | | 52153 _A | 15 | 3477 _A | 1973 | 82 | 306 | | |
| | | | 8. | .75 | 10. | 59 | 167 | 43 | | |
| 12. | | 0 | 0 | 4 | 0 | 102 | 168 | 17 | | |
| | | | 0 | 4 | 0 | 617 | 381 | 129 | | |
| | | | 0 | (NOTE 2) | | | | | | |
| | | | 42. | 15 | 3. | 1973 | 82 | 306 | | |
| | | | 0 | .75 | 0 | 59 | 167 | 43 | | |
| 8922. | | 1.34 | 3655 _A | 4 | 914 _A | 102 | 168 | 17 | | |
| | | | 2322 _A | 4 | 581. | 617 | 381 | 129 | | |
| | | | 12 _A | (NOTE 2) | | | | | | |
| | | | 23965 _A | 15 | 1598 _A | 1973 | 82 | 306 | | |
| | | | 4. | .75 | 5. | 59 | 167 | 43 | | |
| 40159. | | 3.63 | 23235 _A | 4 | 5809 _A | 102 | 168 | 17 | | |
| | | | 14850 _A | 4 | 3713. | 617 | 381 | 129 | | |
| | | | 96 _A | (NOTE 2) | | | | | | |
| | | | 152877 _A | 15 | 10192 _A | 1973 | 82 | 306 | | |
| | | | 14. | .75 | 18. | 59 | 167 | 43 | | |
| 7138. | | 1.07 | 3686 _A | 4 | 921 _A | 102 | 168 | 17 | | |
| | | | 2358 _A | 4 | 589. | 617 | 381 | 129 | | |
| | | | 3 _A | (NOTE 2) | | | | | | |
| | | | 24268 _A | 15 | 1618 _A | 1973 | 82 | 306 | | |
| | | | 4. | .75 | 5. | 59 | 167 | 43 | | |
| 892. | | .13 | 461 _A | 4 | 115 _A | 102 | 168 | 17 | | |
| | | | 295 _A | 4 | 74. | 617 | 381 | 129 | | |
| | | | 0 _A | (NOTE 2) | | | | | | |
| | | | 3033 _A | 15 | 202 _A | 1973 | 82 | 306 | | |
| | | | 0. | .75 | 1. | 59 | 167 | 43 | | |

EMITTED AS VAPORS AFTER VEHICLE SHUT DOWN (EVAPORATIVE EMISSIONS)

DIESEL
GAS
CARS
TRAIN

| 28 CON | GALLONS OF FUEL USED | GRAMS OF POLLUTANTS PER GALION OF FUEL | | | TOTAL POUNDS GENERATED | | |
|-----------|----------------------------|--|------------|-----------|----------------------------|----------------|---------------------------|
| | | CO | NOX | HC | CO | NOX | HC (NOTE 1) |
| 2) | 1989 ₂ 1270. | 102 617 | 168 381 | 17 129 | 447 ₂ 1778. | 737. 1067. | 75 ₂ 386. |
| | 3477 ₂ 10. | 1973 59 | 82 167 | 306 43 | 1728 ₂ 1. | 629. 4. | 2597 ₂ 1. |
| 2) | 0 0 | 102 617 | 168 381 | 17 129 | 0 0 | 0 0 | 0 0 |
| | 3. 0 | 1973 59 | 82 167 | 306 43 | 0 0 | 1. 0 | 2. 0 |
| 2) | 914 ₂ 581. | 102 617 | 168 381 | 17 129 | 205 ₂ 790. | 338. 488. | 74 ₂ 180. |
| | 1598 ₂ 5. | 1973 59 | 82 167 | 306 43 | 790 ₂ 1. | 289. 2. | 1235 ₂ 0. |
| 2) | 5809 ₂ 3713. | 102 617 | 168 381 | 17 129 | 1306 ₂ 5050. | 2151. 3118. | 218 ₂ 1125. |
| | 10192 ₂ 18. | 1973 59 | 82 167 | 306 43 | 5050 ₂ 2. | 1842. 7. | 7584 ₂ 2. |
| 2) | 921 ₂ 589. | 102 617 | 168 381 | 17 129 | 207 ₂ 802. | 341. 495. | 35 ₂ 180. |
| | 1618 ₂ 5. | 1973 59 | 82 167 | 306 43 | 802 ₂ 1. | 292. 2. | 1217 ₂ 0. |
| 2) | 115 ₂ 74. | 102 617 | 168 381 | 17 129 | 26 ₂ 100. | 43. 62. | 4 ₂ 22. |
| | 202 ₂ 1. | 1973 59 | 82 167 | 306 43 | 100 ₂ 0. | 37. 0. | 182 ₂ 0. |

OWN (EVAPORATIVE EMISSIONS)

| | | | |
|--------|------|------|-------|
| DIESEL | 2191 | 3610 | 366 |
| GAS | 8470 | 5230 | 1893 |
| CARS | 8470 | 3090 | 12787 |
| TRAINS | 5 | 15 | 3 |

2

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3

TABLE
 Los Angeles-Long Beach Harbor
 Summary of Pollutants From Phase I
 Alternative

Alternative

| <u>PHASE I</u> (1975-85) | <u>GASOLINE POWERED</u> <u>TRUCKS</u> | <u>DIESEL POWERED</u> <u>TRUCKS</u> | <u>AUTOMOBILES SMALL</u> <u>TRUCKS AND OTHER</u> <u>SMALL VEHICLES</u> |
|-----------------------------|--|--|--|
| | Internal External | Internal External | Internal External |
| Total | | | |

Alternative

| <u>PHASE I</u> (1975-85) | Internal External | Internal External | Internal External |
|-----------------------------|----------------------|----------------------|----------------------|
| | Total | | |

1

TABLE 2
 Los Angeles-Long Beach Harbors-Interim Project
 Summary of Pollutants From Future Traffic By Decade
 Alternative Plans

Alternative A

| DIESEL POWERED TRUCKS | AUTOMOBILES SMALL TRUCKS AND OTHER SMALL VEHICLES | TRAINS | SPECIAL PURPOSE EQUIPMENT | TOTAL POUNDS | | |
|--------------------------|---|----------|------------------------------|--------------|----------------------|--------|
| | | | | CO/DAY | NO _x /DAY | HC/DAY |
| | | | | 3,407 | 2,103 | 762 |
| Internal | | | | 67,104 | 41,437 | 4,030 |
| External | | | | 879 | 1,448 | 146 |
| | | | | 17,323 | 28,532 | 2,887 |
| | Internal | | | 3,407 | 1,239 | 5,134 |
| | External | | | 167,754 | 6,972 | 26,017 |
| | | Internal | | 2 | 6 | 1 |
| | | External | | 15 | 43 | 11 |
| | | | Internal | 3,064 | 1,099 | 179 |
| | | | | 256,891 | 82,879 | 49,167 |

Alternative C

| | | | | | | |
|----------|----------|----------|----------|---------|--------|--------|
| | | | | 1,604 | 991 | 361 |
| Internal | | | | 55,512 | 34,279 | 11,606 |
| External | | | | 414 | 500 | 59 |
| | | | | 14,330 | 23,602 | 2,388 |
| | Internal | | | 1,604 | 583 | 2,436 |
| | External | | | 138,775 | 5,768 | 21,523 |
| | | Internal | | 1 | 3 | 1 |
| | | External | | 437 | 1,236 | 318 |
| | | | Internal | 1,748 | 539 | 88 |
| | | | | 214,425 | 67,501 | 38,780 |

TABLE 2
 Los Angeles-Long Beach Harbors-Interim Project
 Summary of Pollutants From Future Traffic By Decade
 Alternative Plans

Alternative A

| <u>DIESEL POWERED TRUCKS</u> | <u>AUTOMOBILES SMALL TRUCKS AND OTHER SMALL VEHICLES</u> | <u>TRAINS</u> | <u>SPECIAL PURPOSE EQUIPMENT</u> | <u>TOTAL POUNDS</u> | | |
|------------------------------|--|---------------|----------------------------------|---------------------|----------------|---------------|
| | | | | <u>CO/DAY</u> | <u>NO./DAY</u> | <u>HC/DAY</u> |
| | | | | 3,407 | 2,103 | 762 |
| Internal | | | | 67,104 | 41,437 | 4,030 |
| External | | | | 879 | 1,448 | 146 |
| | Internal | | | 17,323 | 28,532 | 2,887 |
| | External | | | 3,407 | 1,239 | 5,134 |
| | | Internal | | 167,754 | 6,972 | 26,017 |
| | | External | | 2 | 6 | 1 |
| | | | Internal | 15 | 43 | 11 |
| | | | | 3,064 | 1,099 | 179 |
| | | | | <u>256,891</u> | <u>82,879</u> | <u>49,167</u> |

Alternative C

| | | | | | | |
|----------|----------|----------|----------|----------------|---------------|---------------|
| | | | | 1,604 | 991 | 361 |
| Internal | | | | 55,512 | 34,279 | 11,606 |
| External | | | | 414 | 500 | 59 |
| | Internal | | | 14,330 | 23,602 | 2,388 |
| | External | | | 1,604 | 583 | 2,436 |
| | | Internal | | 138,775 | 5,768 | 21,523 |
| | | External | | 1 | 3 | 1 |
| | | | Internal | 437 | 1,236 | 318 |
| | | | | 1,748 | 539 | 88 |
| | | | | <u>214,425</u> | <u>67,501</u> | <u>38,780</u> |

2

TABLE 2
 Los Angeles-Long Beach Harbors-Int
 Summary of Pollutants From Future Tr
 Alternative Plans (

Alternative D

| <u>PHASE I</u> (1975-85) | <u>GASOLINE POWERED TRUCKS</u> | <u>DIESEL POWERED TRUCKS</u> | <u>AUTOMOBILES SMALL TRUCKS AND OTHER SMALL VEHICLES</u> | <u>TRA</u> |
|-----------------------------|--------------------------------|------------------------------|--|----------------------|
| | | Internal External | Internal External | Internal External |
| Total | | | | |

Alternative E

| | | | | |
|-----------------------------|----------------------|----------------------|----------------------|---------------|
| <u>PHASE I</u> (1975-85) | Internal External | Internal External | Internal External | Inter Exte |
| Total | | | | |

Alternative F

| | | | | |
|-----------------------------|----------------------|----------------------|----------------------|--|
| <u>PHASE I</u> (1975-85) | Internal External | Internal External | Internal External | |
|-----------------------------|----------------------|----------------------|----------------------|--|

TABLE 2
 Los Angeles-Long Beach Harbors-Interim Project
 Summary of Pollutants From Future Traffic By Decade
 Alternative Plans (Continued)

Alternative D

| DIESEL POWERED TRUCKS | AUTOMOBILES SMALL TRUCKS AND OTHER SMALL VEHICLES | TRAINS | SPECIAL PURPOSE EQUIPMENT | TOTAL POUNDS | | |
|-----------------------|---|----------|---------------------------|----------------|----------------------|---------------|
| | | | | CO/DAY | NO _x /DAY | HC/DAY |
| | | | | 2,231 | 1,377 | 491 |
| Internal | | | | 31,773 | 19,620 | 6,643 |
| Internal | | | | 577 | 950 | 96 |
| | | | | 8,218 | 13,536 | 1,370 |
| | Internal | | | 2,231 | 814 | 3,279 |
| | External | | | 79,698 | 3,312 | 12,361 |
| | | Internal | | 2 | 4 | 1 |
| | | External | | 7 | 20 | 5 |
| | | | Internal | 1,748 | 539 | 88 |
| | | | | <u>126,585</u> | <u>40,172</u> | <u>24,334</u> |

Alternative E

| | | | | | | |
|----------|----------|----------|----------|----------------|---------------|---------------|
| | | | | 2,482 | 1,533 | 566 |
| Internal | | | | 64,876 | 40,061 | 13,564 |
| Internal | | | | 643 | 1,058 | 107 |
| | | | | 16,787 | 27,648 | 2,798 |
| | Internal | | | 2,482 | 1,533 | 566 |
| | External | | | 162,554 | 6,756 | 25,211 |
| | | Internal | | 2 | 5 | 1 |
| | | External | | 15 | 41 | 11 |
| | | | Internal | 2,656 | 819 | 133 |
| | | | | <u>252,497</u> | <u>79,454</u> | <u>42,957</u> |

Alternative F

| | | | | | | |
|----------|----------|--|--|--------|--------|-------|
| | | | | 1,508 | 931 | 329 |
| Internal | | | | 17,329 | 10,701 | 3,623 |
| Internal | | | | 390 | 646 | 65 |
| | | | | 4,485 | 7,388 | 748 |
| | Internal | | | 1,508 | 550 | 2,185 |
| | External | | | 43,473 | 1,807 | 6,742 |

2

TABLE 2
 Los Angeles-Long Beach Harbors-Interim Plan
 Summary of Pollutants From Future Traffic By
 Alternative Plans (Continued)

Alternative F

| <u>PHASE I</u> | <u>GASOLINE POWERED TRUCKS</u> | <u>DIESEL POWERED TRUCKS</u> | <u>AUTOMOBILES SMALL TRUCKS AND OTHER SMALL VEHICLES</u> | <u>TRAINS</u> |
|--|--------------------------------|------------------------------|--|----------------------|
| | | | | Internal External |
| Sub-Total | | | | |
| <u>PHASE II & III</u> (1985-2005) | Internal External | | | |
| | | Internal External | | |
| | | | Internal External | |
| | | | | Internal External |
| Sub-Total | | | | |
| Total | | | | |

Alternative G

| | | | | |
|-----------------------------|----------------------|----------------------|----------------------|----------------------|
| <u>PHASE I</u> (1975-85) | Internal External | | | |
| | | Internal External | | |
| | | | Internal External | |
| | | | | Internal External |

TABLE 2
 Los Angeles-Long Beach Harbors-Interim Project
 Summary of Pollutants From Future Traffic By Decade
 Alternative Plans (Continued)

Alternative F

| POWERED VESSELS | AUTOMOBILES SMALL TRUCKS AND OTHER SMALL VEHICLES | TRAINS | SPECIAL PURPOSE EQUIPMENT | TOTAL POUNDS | | |
|--------------------|---|----------|------------------------------|--------------|----------------------|---------|
| | | | | CO/DAY | NO _x /DAY | HC/DAY |
| | | Internal | | 1 | 3 | 1 |
| | | External | | 4 | 11 | 3 |
| | | | Internal | 953 | 294 | 48 |
| | | | | 69,651 | 22,331 | 13,744 |
| | | | | 6,855 | 4,233 | 1,526 |
| Internal | | | | 124,639 | 76,965 | 26,059 |
| External | | | | 1,772 | 2,918 | 295 |
| | | | | 32,212 | 53,055 | 5,368 |
| | Internal | | | 6,855 | 2,501 | 10,283 |
| | External | | | 312,564 | 12,991 | 48,477 |
| | | Internal | | 6 | 16 | 2 |
| | | External | | 28 | 80 | 21 |
| | | | Internal | 6,855 | 2,114 | 344 |
| | | | | 490,191 | 154,873 | 92,375 |
| | | | | 559,842 | 177,204 | 106,119 |

Alternative G

| | | | | | | |
|----------|----------|----------|--|--------|--------|-------|
| | | | | 720 | 445 | 163 |
| Internal | | | | 17,289 | 10,676 | 3,615 |
| External | | | | 187 | 308 | 32 |
| | | | | 4,498 | 7,408 | 750 |
| | Internal | | | 720 | 263 | 1,114 |
| | External | | | 43,464 | 1,806 | 6,741 |
| | | Internal | | 0 | 1 | 0 |
| | | External | | 4 | 11 | 3 |

TABLE 2
 Los Angeles-Long Beach Harbors-
 Summary of Pollutants From Future T
 Alternative Plans

Alternative G

| <u>PHASE I</u> | <u>GASOLINE POWERED TRUCKS</u> | <u>DIESEL POWERED TRUCKS</u> | <u>AUTOMOBILES SMALL TRUCKS AND OTHER SMALL VEHICLES</u> | <u>TR</u> |
|---------------------------------------|--------------------------------|------------------------------|--|---------------|
| Sub-Total | | | | |
| <u>PHASE II AND III (1985-2005)</u> | Internal External | Internal External | Internal External | Inte Ext |
| Sub-Total | | | | |
| Total | | | | |
| | | | | Alternative H |
| <u>PHASE II & III (1985-2005)</u> | Internal External | Internal External | Internal External | Int Ext |
| Total | | | | |

TABLE 2
 Los Angeles-Long Beach Harbors-Interim Project
 Summary of Pollutants From Future Traffic By Decade
 Alternative Plans (Continued)

Alternative G

| DIESEL POWERED TRUCKS | AUTOMOBILES SMALL TRUCKS AND OTHER SMALL VEHICLES | TRAINS | SPECIAL PURPOSE EQUIPMENT | TOTAL POUNDS | | |
|--------------------------|---|----------|------------------------------|--------------|----------------------|---------|
| | | | | CO/DAY | NO _x /DAY | HC/DAY |
| | | | Internal | 953 | 294 | 48 |
| | | | | 67,835 | 21,212 | 12,466 |
| | | | | 5,222 | 3,226 | 1,184 |
| Internal | | | | 126,622 | 78,190 | 26,474 |
| Internal | | | | 1,352 | 2,226 | 226 |
| | Internal | | | 32,789 | 54,005 | 5,465 |
| | External | | | 5,222 | 1,906 | 8,081 |
| | | Internal | | 317,794 | 13,208 | 49,288 |
| | | External | | 4 | 13 | 4 |
| | | | Internal | 29 | 81 | 21 |
| | | | Internal | 6,061 | 1,869 | 304 |
| | | | | 495,095 | 154,724 | 91,047 |
| | | | | 562,930 | 175,936 | 103,513 |

Alternative H

| | | | | | | |
|----------|----------|----------|----------|---------|---------|---------|
| | | | | 8,470 | 5,230 | 1,893 |
| Internal | | | | 165,116 | 101,960 | 34,521 |
| Internal | | | | 2,191 | 3,610 | 366 |
| | Internal | | | 42,742 | 90,398 | 7,124 |
| | External | | | 8,470 | 3,090 | 12,787 |
| | | Internal | | 414,084 | 17,210 | 64,222 |
| | | External | | 5 | 15 | 3 |
| | | | Internal | 29 | 82 | 21 |
| | | | Internal | 8,172 | 2,520 | 410,410 |
| | | | | 500,678 | 204,115 | 121,347 |

1 2

TABLE 3
 Los Angeles-Long Beach Harbors Masters Plans, Land Use Development, Traffic and Pollutants Generated by Phase I (1975-1985)

| LAND USE | ACRES | TRIP FACTOR | TOTAL NUMBER OF TRIPS | TRUCKS | | | CARS | TRAILERS |
|-----------------|-------|-------------|-----------------------|--------|-------|---------|--------|----------|
| | | | | DIESEL | GAS | PROPANE | | |
| MARTNA 1A 1 | 12. | 59. | 708. | 0 | 0 | 0 | 708. | 0 |
| LR MARTNA PH. 1 | 60. | 59. | 3540. | 0 | 0 | 0 | 3540. | 0 |
| ENERGY 1A 1 | 115. | 224. | 25760. | 3125. | 1868. | 142. | 20518. | 3.0 |
| TANK FARM | 135. | 0. | 12. | 0 | 0 | 0 | 12. | 0 |
| CANNERY 1A 1 | 58. | 224. | 12992. | 1577. | 1009. | 0 | 10351. | 1. |
| LY TND 1A 1 | 115. | 448. | 51520. | 6260. | 3998. | 5. | 41041. | 6 |

rs Masters Plans, Land
 utants Generated by Decades

| PLANE | CARS | TRAINS | AVERAGE VEHICLE MILES PER DAY | MILES PER GALLON | GALLONS OF FUEL USED | GRAMS OF POLLUTANTS GALLON OF FUEL USED | |
|-------|--------|--------|---|---------------------------------|-------------------------------------|--|-------------------------|
| | | | | | | CO | NOX |
| 0 | 708. | 0 | 0 0 0 2279. 0 | 4 4 (NOTE 2) 15 .75 | 0 0 0 152. 0 | 102 617 1973 50 | 168 381 82 167 |
| 0 | 3540. | 0 | 0 0 0 10168. 0 | 4 4 (NOTE 2) 15 .75 | 0 0 0 678. 0 | 102 617 1973 50 | 168 381 82 167 |
| 0 | 20518. | 3.09 | 11394. 6810. 517. 74819. 11. | 4 4 (NOTE 2) 15 .75 | 2849. 1703. 0 8988. 15. | 102 617 1973 50 | 168 381 82 167 |
| 0 | 12. | 0 | 0 0 0 41. 0 | 4 4 (NOTE 2) 15 .75 | 0 0 0 3. 0 | 102 617 1973 50 | 168 381 82 167 |
| 0 | 10351. | 1.55 | 5694. 3644. 0 37366. 6. | 4 4 (NOTE 2) 15 .75 | 1423. 911. 0 2401. 7. | 102 617 1973 50 | 168 381 82 167 |
| 0 | 41081. | 6.18 | 17764. 11346. 19. 116470. 18. | 4 4 (NOTE 2) 15 .75 | 4441. 2836. 0 7765. 23. | 102 617 1973 50 | 168 381 82 167 |

| GRAMS OF POLLUTANTS PER GALLON OF FUEL | | | TOTAL POUNDS GENERATED | | |
|--|-----|-----|------------------------|-------|----------------|
| -----I | | | -----I | | |
| CO | NOX | HC | CO | NOX | HC (NOTE 1) |
| 102 | 168 | 17 | 0 | 0 | 0 |
| 617 | 381 | 129 | 0 | 0 | 0 |
| 1973 | 82 | 306 | 0 | 27. | 115. |
| 50 | 167 | 43 | 0 | 0 | 0 |
| 102 | 168 | 17 | 0 | 0 | 0 |
| 617 | 381 | 129 | 0 | 0 | 0 |
| 1973 | 82 | 306 | 0 | 123. | 520. |
| 50 | 167 | 43 | 0 | 0 | 0 |
| 102 | 168 | 17 | 641. | 1055. | 107. |
| 617 | 381 | 129 | 2316. | 1430. | 517. |
| 1973 | 82 | 306 | 2316. | 902. | 3727. |
| 50 | 167 | 43 | 2. | 6. | 1. |
| 102 | 168 | 17 | 0 | 0 | 0 |
| 617 | 381 | 129 | 0 | 0 | 0 |
| 1973 | 82 | 306 | 0 | 0. | 2. |
| 50 | 167 | 43 | 0 | 0 | 0 |
| 102 | 168 | 17 | 320. | 527. | 53. |
| 617 | 381 | 129 | 1239. | 765. | 277. |
| 1973 | 82 | 306 | 1239. | 450. | 1063. |
| 50 | 167 | 43 | 1. | 3. | 1. |
| 102 | 168 | 17 | 999. | 1685. | 160. |
| 617 | 381 | 129 | 3858. | 2383. | 877. |
| 1973 | 82 | 306 | 3858. | 1408. | 4062. |
| 50 | 167 | 43 | 3. | 9. | 2. |

3

TABLE 3 (Continued)

| LAND USE | ACRES | TRIP FACTOR | TOTAL NUMBER OF TRIPS | TRUCKS | | |
|----------------|-------|-------------|-----------------------|--------|-------|---------|
| | | | | DIESEL | GAS | PROPANE |
| GEN IND 1A BHI | 222. | 356. | 79032. | 9602. | 6125. | 16. |
| IND D.W.PH 1 | 30A. | 356. | 109648. | 13322. | 8520. | 77. |
| HEAVY IND 1A1 | 44. | 224. | 9856. | 119A. | 765. | 0 |
| CARGO 1A 1 | 9A. | 224. | 21952. | 2663. | 1706. | 0 |
| CARGO 1A1 | 1A. | 224. | 4032. | 488. | 313. | 4. |
| BULK CGO 1A 1 | 15A. | 224. | 38372. | 421A. | 2680. | 14. |

NOTE 1: INCLUDES 8 GRAMS OF HC PER GASOLINE VEHICLE TRIP ENTER
 2: PROPANE VEHICLES ARE NON-POLLUTING



TABLE 3 (Continued) Phase II (1985-1995)

| TRUCKS GAS PROPANE | CARS | TRAINS | AVERAGE VEHICLE MILES PER DAY | MILES PER GALLON | GALLONS OF FUEL USED | GRAM POLLUTANT GALLON | |
|-----------------------|--------------|--------|--|---------------------------------|------------------------------|-----------------------------|----------------|
| | | | | | | CO | NO |
| 6125 | 16. 62957 | 9.48 | 60735 38740 100 398202 60 | 4 4 (NOTE 2) 15 .75 | 15184 9685 24547 80 | 102 617 1073 50 | 14 34 10 |
| 8520 | 77. 77401 | 13.15 | 59950 38338 345 348302 59 | 4 4 (NOTE 2) 15 .75 | 14988 9585 23220 79 | 102 617 1073 50 | 14 34 10 |
| 745 | 0 7851 | 1.18 | 3793 2421 0 28849 4 | 4 4 (NOTE 2) 15 .75 | 948 605 1657 5 | 102 617 1073 50 | 14 34 10 |
| 1706 | 0 17491 | 2.63 | 8336 5340 0 58759 8 | 4 4 (NOTE 2) 15 .75 | 2094 1335 3651 11 | 102 617 1073 50 | 14 34 10 |
| 313 | 4. 3212 | .48 | 1385 897 17 9197 1 | 4 4 (NOTE 2) 15 .75 | 346 224 613 2 | 102 617 1073 50 | 14 34 10 |
| 2600 | 18. 27661 | 4.16 | 15355 9757 51 100608 15 | 4 4 (NOTE 2) 15 .75 | 3839 2459 6713 20 | 102 617 1073 50 | 14 34 10 |

TRUCK TRIP OMITTED AS VAPORS AFTER VEHICLE SHUT DOWN (EVAPORATIVE EMISSIONS)

2

| | GRAMS OF POLLUTANTS PER TOTAL GALLON OF FUEL | | | TOTAL POUNDS GENERATED | | |
|------|--|-----|-------|---------------------------|-------|----------------|
| | [.....] | | | [.....] | | |
| | CO | NOX | HC | CO | NOX | HC (NOTE 1) |
| 102 | 168 | 17 | 3418 | 5624 | 569 | |
| 617 | 381 | 129 | 13174 | 8135 | 2862 | |
| 1973 | 82 | 306 | 13174 | 4789 | 19019 | |
| 59 | 167 | 83 | 10 | 29 | 8 | |
| 102 | 168 | 17 | 3370 | 5551 | 562 | |
| 617 | 381 | 129 | 13037 | 8051 | 2876 | |
| 1973 | 82 | 306 | 13037 | 8198 | 17030 | |
| 59 | 167 | 83 | 10 | 29 | 7 | |
| 102 | 168 | 17 | 213 | 351 | 76 | |
| 617 | 381 | 129 | 823 | 508 | 186 | |
| 1973 | 82 | 306 | 823 | 299 | 1256 | |
| 59 | 167 | 83 | 1 | 2 | 0 | |
| 102 | 168 | 17 | 469 | 772 | 78 | |
| 617 | 381 | 129 | 1816 | 1121 | 410 | |
| 1973 | 82 | 306 | 1816 | 660 | 2771 | |
| 59 | 167 | 83 | 1 | 8 | 1 | |
| 102 | 168 | 17 | 78 | 128 | 13 | |
| 617 | 381 | 129 | 103 | 188 | 69 | |
| 1973 | 82 | 306 | 305 | 111 | 470 | |
| 59 | 167 | 83 | 0 | 1 | 0 | |
| 102 | 168 | 17 | 863 | 1422 | 168 | |
| 617 | 381 | 129 | 3318 | 2049 | 741 | |
| 1973 | 82 | 306 | 3318 | 1213 | 5016 | |
| 59 | 167 | 83 | 3 | 7 | 25 | |

TIVE EMISSIONS)

TOTAL

| | | | |
|--------|--------|--------|--------|
| DIESEL | 10367. | 17075. | 1728. |
| GAS | 39886. | 24630. | 8815. |
| CARS | 39886. | 14186. | 17751. |
| TRAINS | 31. | 90. | 22. |

1

3

Table 3 (Continued) Phase

| LAND USE | ACRES | TRIP FACTOR | TOTAL NUMBER OF TRIPS | TRUCKS | | | CAR |
|----------------------|-------|-------------|-----------------------|--------|--------|---------|---------|
| | | | | DYSEL | GAS | PROPANE | |
| LA MARINA PH. 2 160. | | 89. | 9440. | 0 | 0 | 0 | 9440. |
| OIL TERMINAL 201. | | 0. | 54. | 0 | 0 | 0 | 54. |
| GEN IND LA PH 2 518. | | 366. | 184408. | 22332. | 14273. | 0 | 144475. |
| WATER CAN LA 2 248. | | 224. | 54880. | 6646. | 4248. | 0 | 43591. |
| | | 0 | 0 | 0 | 0 | 0 | 0 |

NOTE 1: INCLUDES A GRAM OF HC PER GASOLINE VEHICLE TRIP ENTTED A
 2: PROPANE VEHICLES ARE NON-POLLUTING

3 (Continued) Phase II (1985-1995)

| VEHICLES GAS PROPANE | CARS | TRAINS | AVERAGE | | GALLONS OF FUEL USED | GRAND TOTAL GALLONS |
|-------------------------|---------|--------|-----------------------------|------------------------|----------------------------|---------------------------|
| | | | VEHICLE MILES PER DAY | MILES PER GALLON | | |
| 0 | 0 | | 0 | 4 | 0 | 102 |
| | | | 0 | 4 | 0 | 617 |
| | | | 0 | (NOTE 2) | | |
| | 9440. | | 35843. | 15 | 2390. | 1973 |
| | | 0 | 0 | .75 | 0 | 59 |
| -0 | | | 0 | 4 | 0 | 102 |
| | | | 0 | 4 | 0 | 617 |
| | | | 0 | (NOTE 2) | | |
| | 54. | | 301. | 15 | 20. | 1973 |
| | | -0 | 0 | .75 | 0 | 59 |
| 193. | | | 135722. | 4 | 33030. | 102 |
| | | | 86745. | 4 | 21646. | 617 |
| | | | 0 | (NOTE 2) | | |
| | 144475. | | 890203. | 15 | 59347. | 1973 |
| | | 22.13 | 134. | .75 | 179. | 59 |
| 248. | | | 28844. | 4 | 7211. | 102 |
| | | | 18435. | 4 | 4609. | 617 |
| | | | 0 | (NOTE 2) | | |
| | 43591. | | 189186. | 15 | 12612. | 1973 |
| | | 6.59 | 28. | .75 | 38. | 59 |
| -0 | | | 0 | 4 | 0 | 102 |
| | | | 0 | 4 | 0 | 617 |
| | | | 0 | (NOTE 2) | | |
| | -0 | | 0 | 15 | 0 | 1973 |
| | | -0 | 0 | .75 | 0 | 59 |

PLEASE PRINT EMISSIONS AS VAPORS AFTER VEHICLE SHUT DOWN (EVAPORATIVE EMISSIONS)

1

✓

| GRAMS OF POLLUTANTS PER GALION OF FUEL | | | TOTAL POUNDS GENERATED | | |
|--|-----|----|------------------------|-----|----------------|
| CO | NOX | HC | CO | NOX | HC (NOTE 1) |

| | | | | | |
|------|-----|-----|--------|--------|--------|
| 102 | 168 | 17 | 0 | 0 | 0 |
| 617 | 381 | 129 | 0 | 0 | 0 |
| 1973 | 82 | 306 | 0 | 432. | 1779. |
| 59 | 167 | 43 | 0 | 0 | 0 |
| 102 | 168 | 17 | 0 | 0 | 0 |
| 617 | 381 | 129 | 0 | 0 | 0 |
| 1973 | 82 | 306 | 0 | 4. | 14. |
| 59 | 167 | 43 | 0 | 0 | 0 |
| 102 | 168 | 17 | 7430. | 12547. | 1272. |
| 617 | 381 | 129 | 29499. | 18216. | 4419. |
| 1973 | 82 | 306 | 29499. | 10729. | 42620. |
| 59 | 167 | 43 | 23. | 69. | 17. |
| 102 | 168 | 17 | 1622. | 2671. | 270. |
| 617 | 381 | 129 | 6269. | 3871. | 1386. |
| 1973 | 82 | 306 | 6269. | 2280. | 9277. |
| 59 | 167 | 43 | 5. | 14. | 4. |
| 102 | 168 | 17 | 0 | 0 | 0 |
| 617 | 381 | 129 | 0 | 0 | 0 |
| 1973 | 82 | 306 | 0 | 0 | 0 |
| 59 | 167 | 43 | 0 | 0 | 0 |

TOTAL

(EMISSIONS)

| | | | |
|--------|-------|-------|-------|
| DIESEL | 9258 | 15238 | 1542 |
| GAS | 35768 | 22087 | 7805 |
| CARS | 35768 | 13445 | 53690 |
| TRAINS | 28 | 83 | 21 |

3

Table 3 (Continued) Phase III

| LAND USE | ACRES | TRIP FACTOR | TOTAL NUMBER OF TRIPS | TRUCKS | | | CARS |
|------------------|-------|-------------|-----------------------|--------|-------|---------|--------|
| | | | | DIESEL | GAS | PROPANE | |
| LR MARTINA PH. 3 | 60. | 59. | 3540. | 0 | 0 | 0 | 3540. |
| GEN IND LR PH 3 | 143. | 356. | 50908. | 6165. | 3980. | 5. | 40411. |
| RULY CGO LA 3 | 190. | 224. | 42560. | 5150. | 3294. | 4. | 33784. |
| | =0 | =0 | 0 | =0 | =0 | =0 | =0 |
| | =0 | =0 | 0 | =0 | =0 | =0 | =0 |

NOTE 1: INCLUDES A GRAM OF HC PER GASOLINE VEHICLE TRIP EMITTED AS V
 2: PROPANE VEHICLES ARE NON-POLLUTING

1

Continued) Phase III (1995-2005)

| PROANE | CARS | TRAINS | AVERAGE VEHICLE MILES PER DAY | | | GALLONS OF FUEL USED | GRAMS OF POLLUTANTS PER GALLON OF FUEL | | |
|-----------|------|--------|-------------------------------|------------------|--------|----------------------|--|-----|----|
| | | | MILES PER DAY | MILES PER GALLON | | | CO | NOX | HC |
| 0 | | | 0 | 4 | 0 | 102 | 168 | | |
| | | | 0 | 4 | 0 | 617 | 381 | | |
| | | | 0 | (NOTE 2) | | | | | |
| 3580. | | | 13200. | 15 | 846. | 1973 | 82 | | |
| | | 0 | 0 | .75 | 0 | 59 | 167 | | |
| | | | 45251. | 4 | 11313. | 102 | 168 | | |
| | | | 28922. | 4 | 7230. | 617 | 381 | | |
| | | | 17. | (NOTE 2) | | | | | |
| 40411. | | | 296615. | 15 | 19774. | 1973 | 82 | | |
| | | 6.62 | 49. | .75 | 68. | 59 | 167 | | |
| | | | 27422. | 4 | 6856. | 102 | 168 | | |
| | | | 17541. | 4 | 4385. | 617 | 381 | | |
| | | | 23. | (NOTE 2) | | | | | |
| 4. 33784. | | | 179900. | 15 | 11993. | 1973 | 82 | | |
| | | 5.53 | 29. | .75 | 41. | 59 | 167 | | |
| | | | 0 | 4 | 0 | 102 | 168 | | |
| | | | 0 | 4 | 0 | 617 | 381 | | |
| | | | 0 | (NOTE 2) | | | | | |
| -0 | -0 | | 0 | 15 | 0 | 1973 | 82 | | |
| | | -0 | 0 | .75 | 0 | 59 | 167 | | |
| | | | 0 | 4 | 0 | 102 | 168 | | |
| | | | 0 | 4 | 0 | 617 | 381 | | |
| | | | 0 | (NOTE 2) | | | | | |
| -0 | -0 | | 0 | 15 | 0 | 1973 | 82 | | |
| | | -0 | 0 | .75 | 0 | 59 | 167 | | |

EMITTED AS VAPORS AFTER VEHICLE SHUT DOWN (EVAPORATIVE EMISSIONS)

2

| | GRAMS OF POLLUTANTS PER GALLON OF FUEL | | | TOTAL POUNDS GENERATED | | |
|---|--|-----|-----|------------------------|-------|-------------|
| | CO | NOX | HC | CO | NOX | HC (NOTE 1) |
| 0 | 102 | 168 | 17 | 0 | 0 | 0 |
| 0 | 617 | 381 | 129 | 0 | 0 | 0 |
| 0 | 1973 | 82 | 306 | 0 | 160. | 660. |
| 0 | 59 | 167 | 43 | 0 | 0 | 0 |
| 0 | 102 | 168 | 17 | 2544. | 4190. | 424. |
| 0 | 617 | 381 | 129 | 9835. | 6073. | 2126. |
| 0 | 1973 | 82 | 306 | 9835. | 3575. | 14053. |
| 0 | 59 | 167 | 43 | 9. | 25. | 6. |
| 0 | 102 | 168 | 17 | 1542. | 2539. | 257. |
| 0 | 617 | 381 | 129 | 5965. | 3684. | 1305. |
| 0 | 1973 | 82 | 306 | 5965. | 2168. | 8687. |
| 0 | 59 | 167 | 43 | 5. | 15. | 4. |
| 0 | 102 | 168 | 17 | 0 | 0 | 0 |
| 0 | 617 | 381 | 129 | 0 | 0 | 0 |
| 0 | 1973 | 82 | 306 | 0 | 0 | 0 |
| 0 | 59 | 167 | 43 | 0 | 0 | 0 |
| 0 | 102 | 168 | 17 | 0 | 0 | 0 |
| 0 | 617 | 381 | 129 | 0 | 0 | 0 |
| 0 | 1973 | 82 | 306 | 0 | 0 | 0 |
| 0 | 59 | 167 | 43 | 0 | 0 | 0 |

TOTAL

| | | | |
|--------|-------|------|-------|
| DIESEL | 4086 | 6729 | 681 |
| GAS | 15800 | 9757 | 3431 |
| CARS | 15800 | 5903 | 23400 |
| TRAINS | 14 | 40 | 10 |

3

VE EMISSIONS)

TABLE 4
Los Angeles-Long Beach Harbors Master Plan
Summary of Pollutants From Future Traffic By

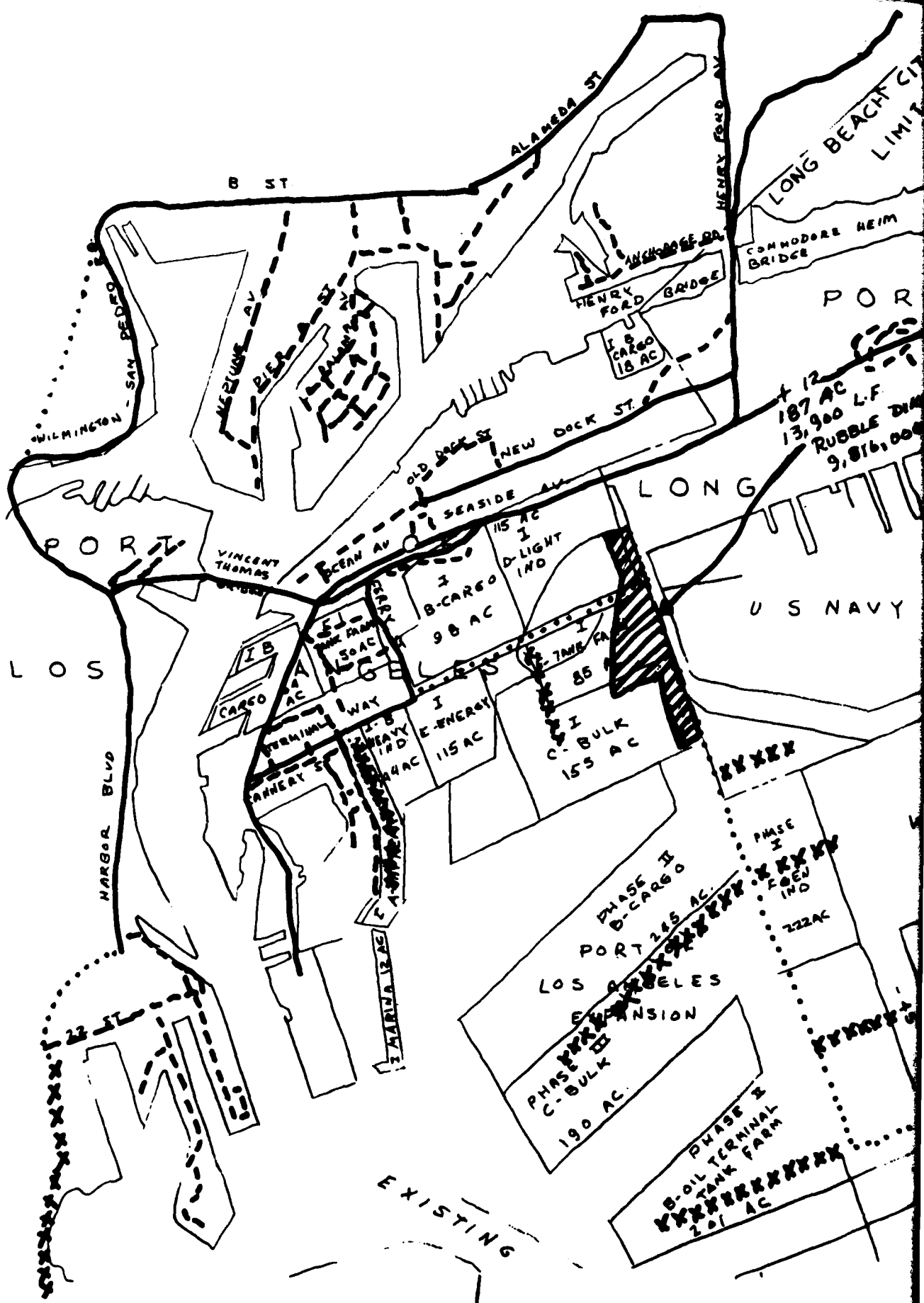
| PHASE I (1975-85) | SOURCE | TOTAL POUNDS | | | PHASE III (1995-2005) | G |
|-----------------------|---|--------------|----------------------|---------|--------------------------|---|
| | | CO/DAY | NO _x /DAY | HC/DAY | | |
| | Gasoline Powered Trucks | | | | | |
| | Internal | 39,886 | 24,630 | 8,815 | | |
| | External | 642,334 | 396,644 | 134,297 | | |
| | Diesel Powered Trucks | | | | | D |
| | Internal | 10,367 | 17,075 | 1,728 | | |
| | External | 167,051 | 275,142 | 27,842 | | |
| | Automobile, Small Trucks, and Other Small Vehicles | | | | | A |
| | Internal | 39,886 | 14,186 | 57,751 | | a |
| | External | 1,581,802 | 65,741 | 245,328 | | |
| | Trains | | | | | T |
| | Internal | 31 | 90 | 22 | | |
| | External | 92 | 268 | 66 | | |
| | Special Purpose Equipment | 27,175 | 8,379 | 1,365 | | S |
| | Sub-Total | 2,508,624 | 802,155 | 477,214 | | |
| PHASE II (1985-95) | Gasoline Powered Trucks | | | | | |
| | Internal | 35,768 | 22,087 | 7,805 | | |
| | External | 440,879 | 272,245 | 92,177 | | |
| | Diesel Powered Trucks | | | | | |
| | Internal | 9,258 | 15,238 | 1,542 | | |
| | External | 114,035 | 187,822 | 19,006 | | |
| | Automobile Small Trucks and Other Small Vehicles | | | | | |
| | Internal | 35,768 | 13,445 | 53,690 | | |
| | External | 1,157,373 | 48,102 | 179,501 | | |
| | Trains | | | | | |
| | Internal | 28 | 83 | 21 | | |
| | External | 85 | 249 | 62 | | |
| | Special Purpose Equipment | 12,311 | 5,341 | 870 | | |
| | Sub-Total | 1,805,505 | 564,612 | 354,674 | | |

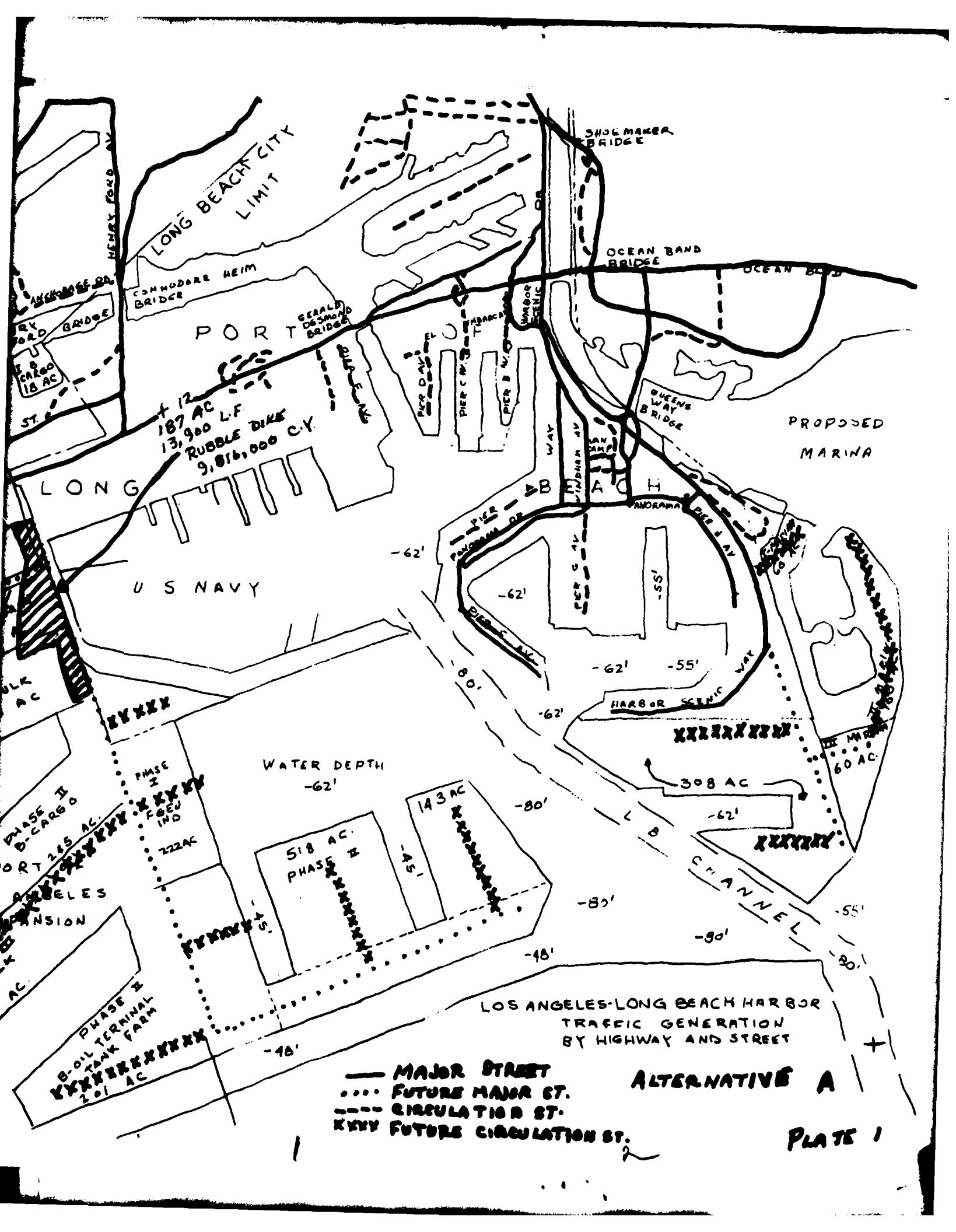
TABLE 4

Los Angeles-Long Beach Harbors Master Plans
 Inventory of Pollutants From Future Traffic By Decade

| TOTAL POUNDS | | | PHASE III (1995-2005) | SOURCE | TOTAL POUNDS | | |
|--------------|---------|--------|--|-----------|--------------|---------|--|
| NO./DAY | HC/DAY | CO/DAY | | | NO./DAY | HC/DAY | |
| 24,630 | 8,815 | | Gasoline Powered Trucks | | | | |
| 396,644 | 134,297 | | Internal | 15,800 | 9,757 | 3,431 | |
| | | | External | 172,211 | 106,341 | 36,005 | |
| | | | Diesel Powered Trucks | | | | |
| 17,075 | 1,728 | | Internal | 4,086 | 6,729 | 681 | |
| 275,142 | 27,842 | | External | 44,523 | 73,333 | 7,421 | |
| | | | Automobile, Small Trucks and Other Small Vehicles | | | | |
| 14,186 | 57,751 | | Internal | 15,800 | 5,903 | 23,400 | |
| 65,741 | 245,328 | | External | 450,822 | 18,737 | 69,920 | |
| | | | Trains | | | | |
| 90 | 22 | | Internal | 14 | 40 | 10 | |
| 268 | 66 | | External | 42 | 119 | 31 | |
| 8,379 | 1,365 | | Special Purpose Equipment | 7,559 | 2,331 | 380 | |
| 802,155 | 477,214 | | Sub-Total | 710,857 | 223,290 | 141,279 | |
| | | | Total | 5,024,986 | 1,590,057 | 973,167 | |
| 22,087 | 7,805 | | | | | | |
| 272,245 | 92,177 | | | | | | |
| 15,238 | 1,542 | | | | | | |
| 187,822 | 19,006 | | | | | | |
| 13,445 | 53,690 | | | | | | |
| 48,102 | 179,501 | | | | | | |
| 83 | 21 | | | | | | |
| 249 | 62 | | | | | | |
| 5,341 | 870 | | | | | | |
| 564,612 | 354,674 | | | | | | |

2





LONG BEACH CITY
LIMIT

COMMODORE HEIM
BRIDGE

PORT

187 AC
13,900 LF
RUBBLE DIKE
9,816,000 C.Y.

U S NAVY

WATER DEPTH
-62'

518 AC
PHASE II

143 AC

308 AC

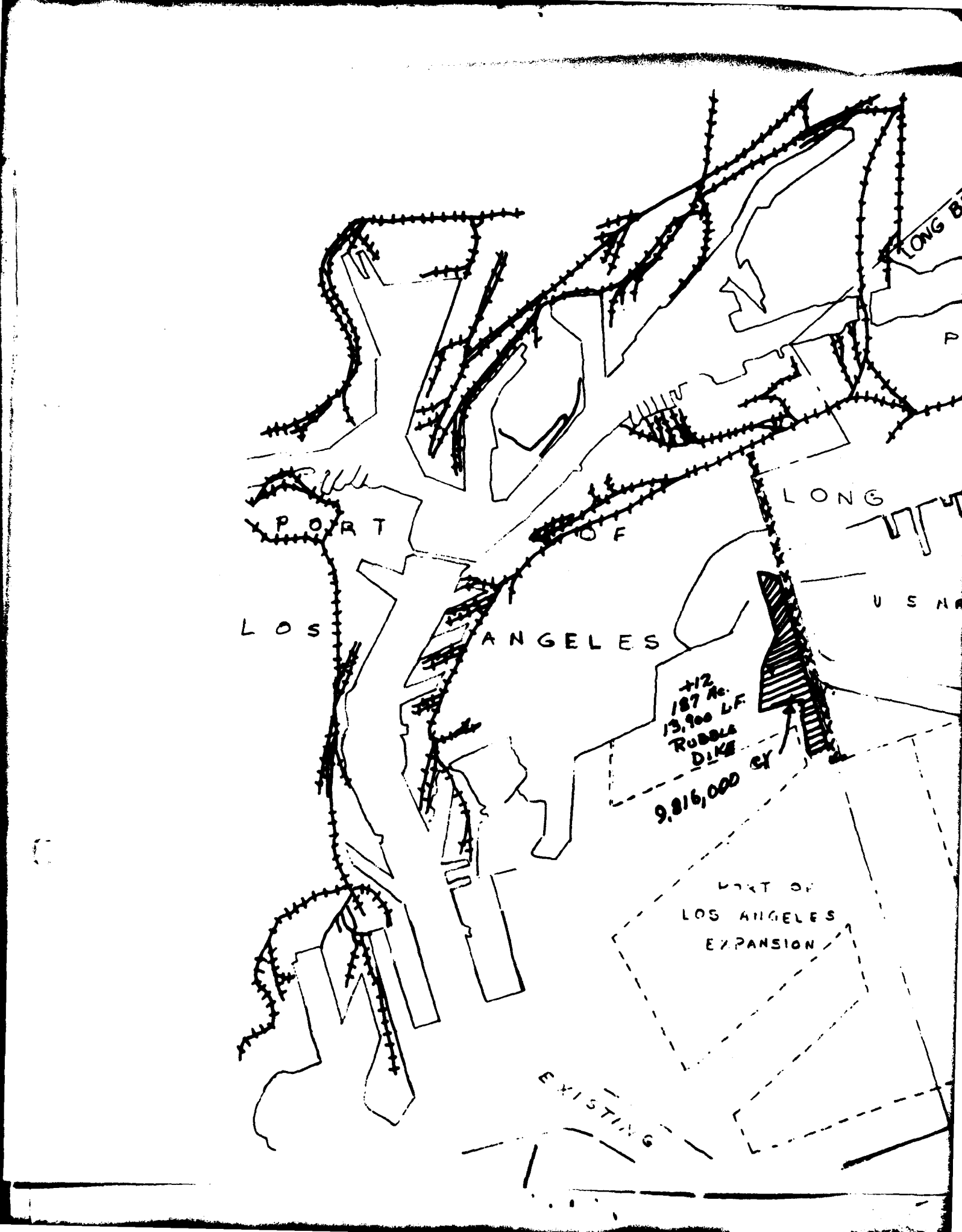
60 AC

LOS ANGELES-LONG BEACH HARBOR
TRAFFIC GENERATION
BY HIGHWAY AND STREET

- MAJOR STREET
- FUTURE MAJOR ST.
- CIRCULATION ST.
- KEYY FUTURE CIRCULATION ST.

ALTERNATIVE A

PLATE 1



PORT

LOS ANGELES

LONG B

LONG

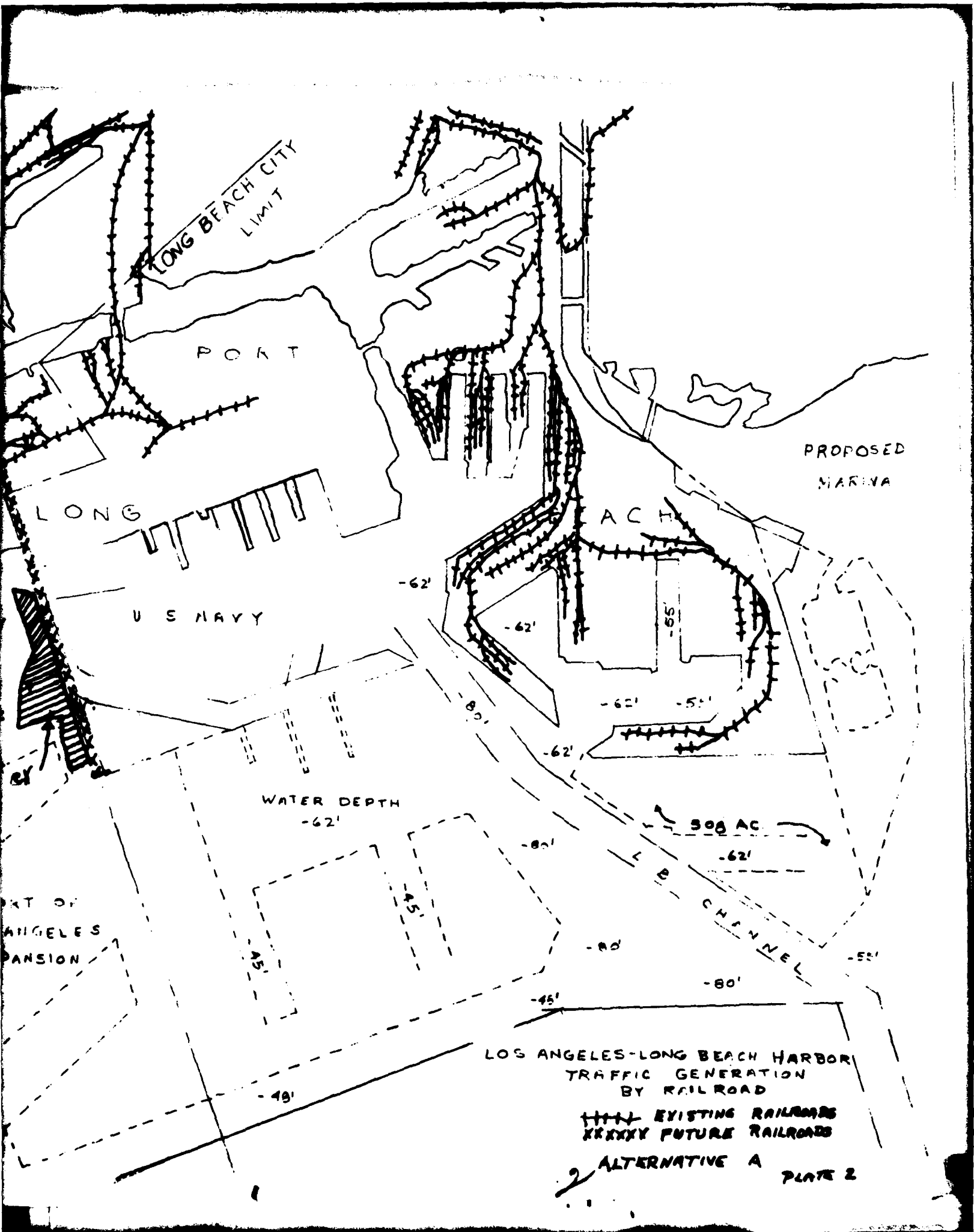
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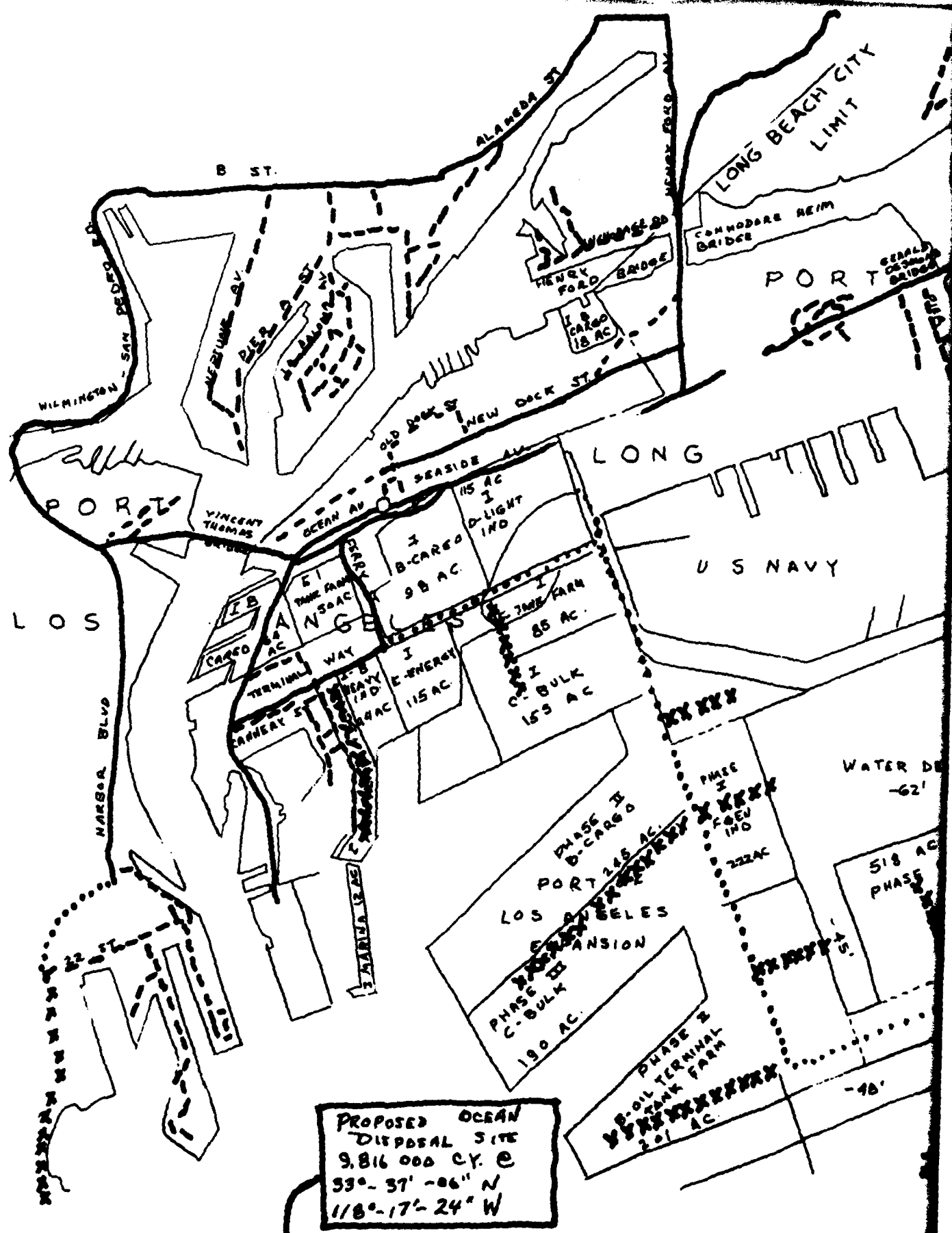
12.187 Ac.
13,900 LF.
RUBBLE
DIKE

9,816,000 CF

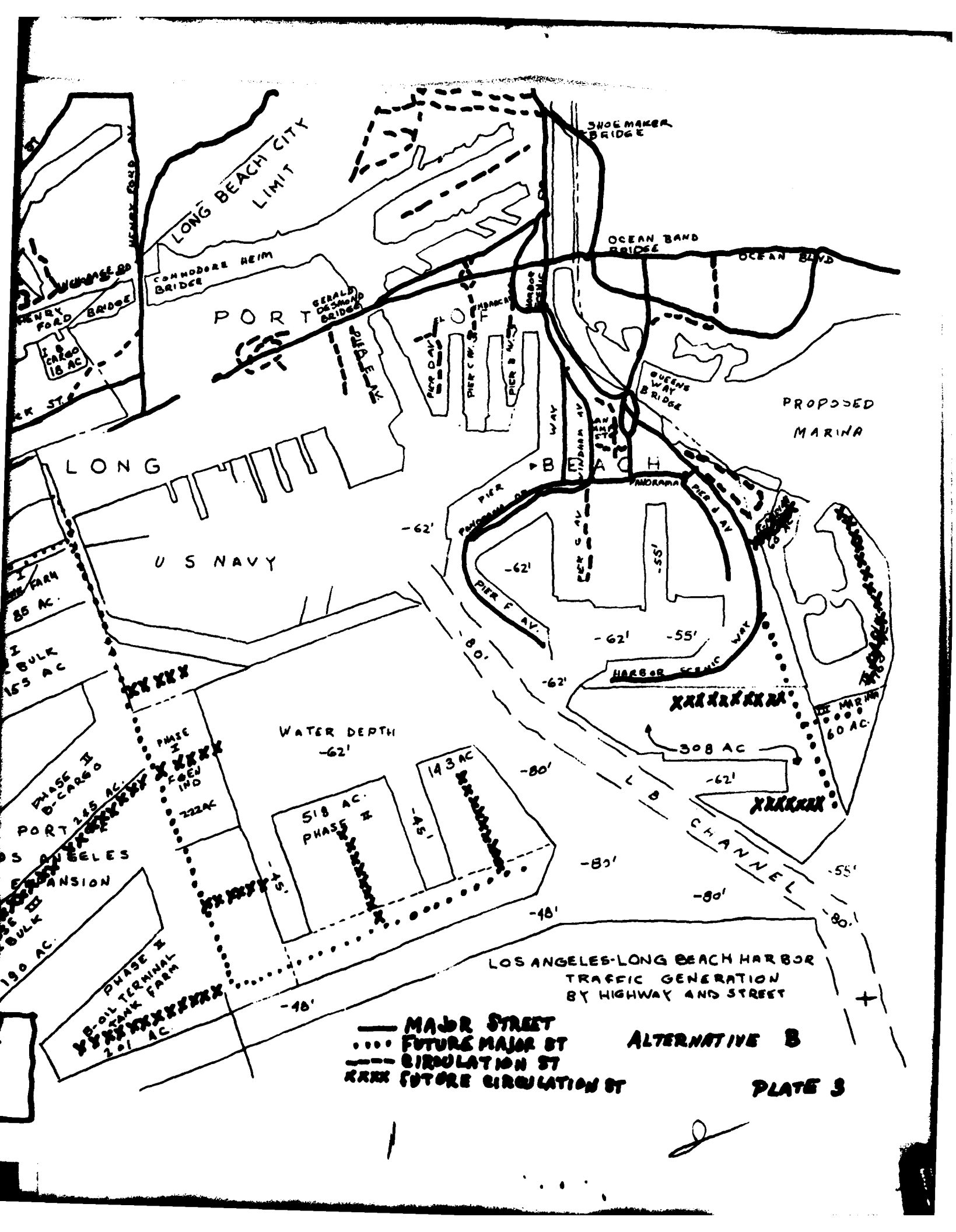
PART OF
LOS ANGELES
EXPANSION

EXISTING





PROPOSED OCEAN
 DISPOSAL SITE
 9,816,000 CY. @
 33°-37'-06" N
 118°-17'-24" W



LONG BEACH CITY
LIMIT

PORT

LONG

BEACH

U S NAVY

PROPOSED
MARINA

WATER DEPTH
-62'

LOS ANGELES-LONG BEACH HARBOR
TRAFFIC GENERATION
BY HIGHWAY AND STREET

- MAJOR STREET
- FUTURE MAJOR ST CIRCULATION ST
- - - - FUTURE CIRCULATION ST

ALTERNATIVE B

PLATE 3

18 AC
CARGO

85 AC

155 AC
BULK

PHASE II
PORT 215 AC
B-CARGO

190 AC
BULK

PHASE II
B-OIL TERMINAL
201 AC
TRUNK FARM

PHASE II
FOUN IND
222 AC

518 AC
PHASE II

143 AC

308 AC

60 AC

-62'

-62'

-62'

-55'

-62'

-80'

-80'

-80'

-80'

-55'

-80'

-40'

-40'

-45'

-80'

-80'

-55'

-80'

HENRY FORD BRIDGE

COMMODORE HEIM BRIDGE

GERALD D. CASANOVA BRIDGE

PIER 1
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PIER 98
PIER 99
PIER 100

SHOE MAKER BRIDGE

OCEAN BAND BRIDGE

OCEAN BLVD

QUEENS WAY BRIDGE

MORAGA

HARBOR SCALE WAY

CHANNEL

HENRY FORD BRIDGE

COMMODORE HEIM BRIDGE

GERALD D. CASANOVA BRIDGE

SHOE MAKER BRIDGE

OCEAN BAND BRIDGE

OCEAN BLVD

QUEENS WAY BRIDGE

MORAGA

HARBOR SCALE WAY

CHANNEL

HENRY FORD BRIDGE

COMMODORE HEIM BRIDGE

GERALD D. CASANOVA BRIDGE

SHOE MAKER BRIDGE

OCEAN BAND BRIDGE

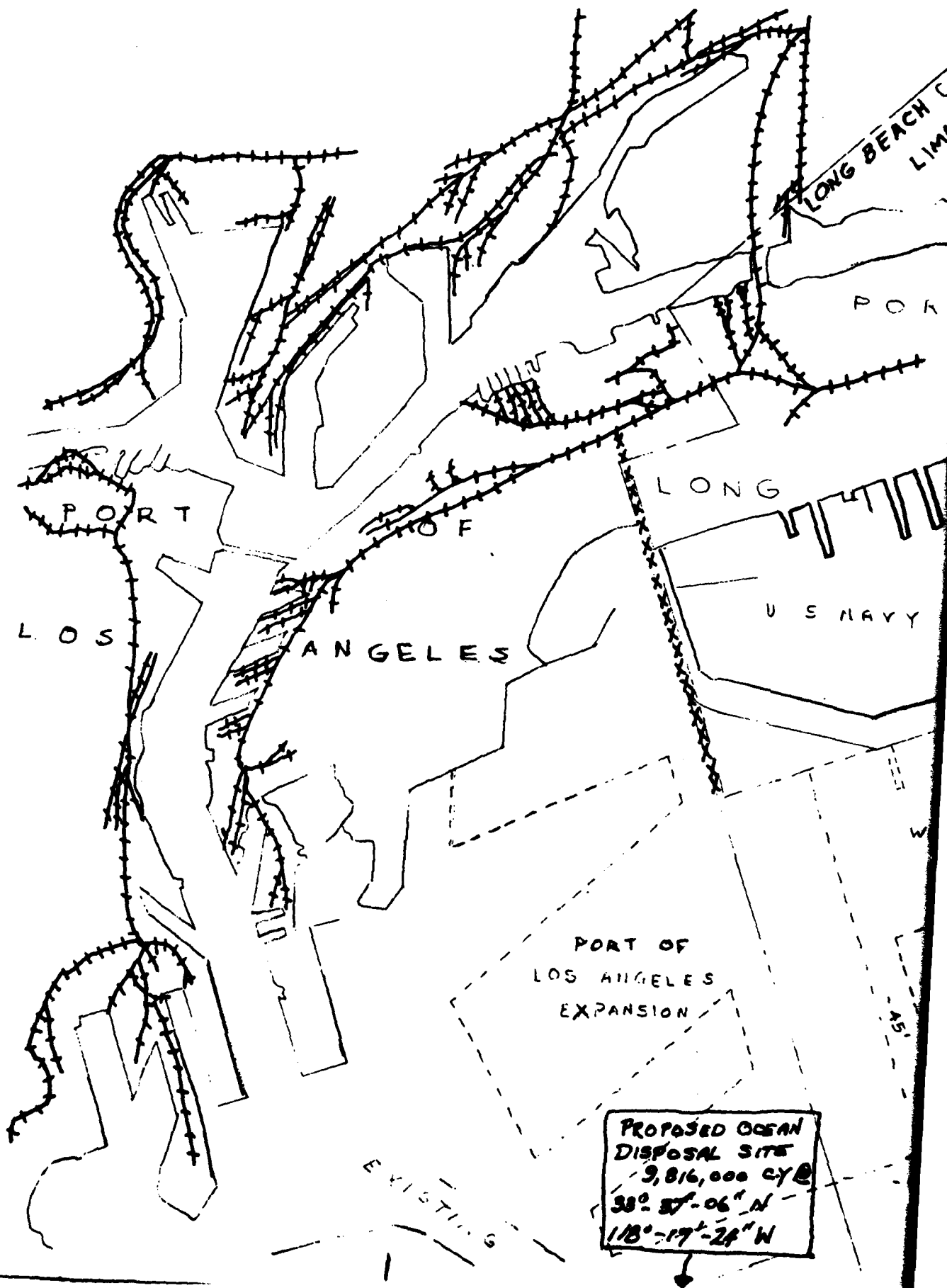
OCEAN BLVD

QUEENS WAY BRIDGE

MORAGA

HARBOR SCALE WAY

CHANNEL



PORT

LOS

ANGELES

LONG

U S NAVY

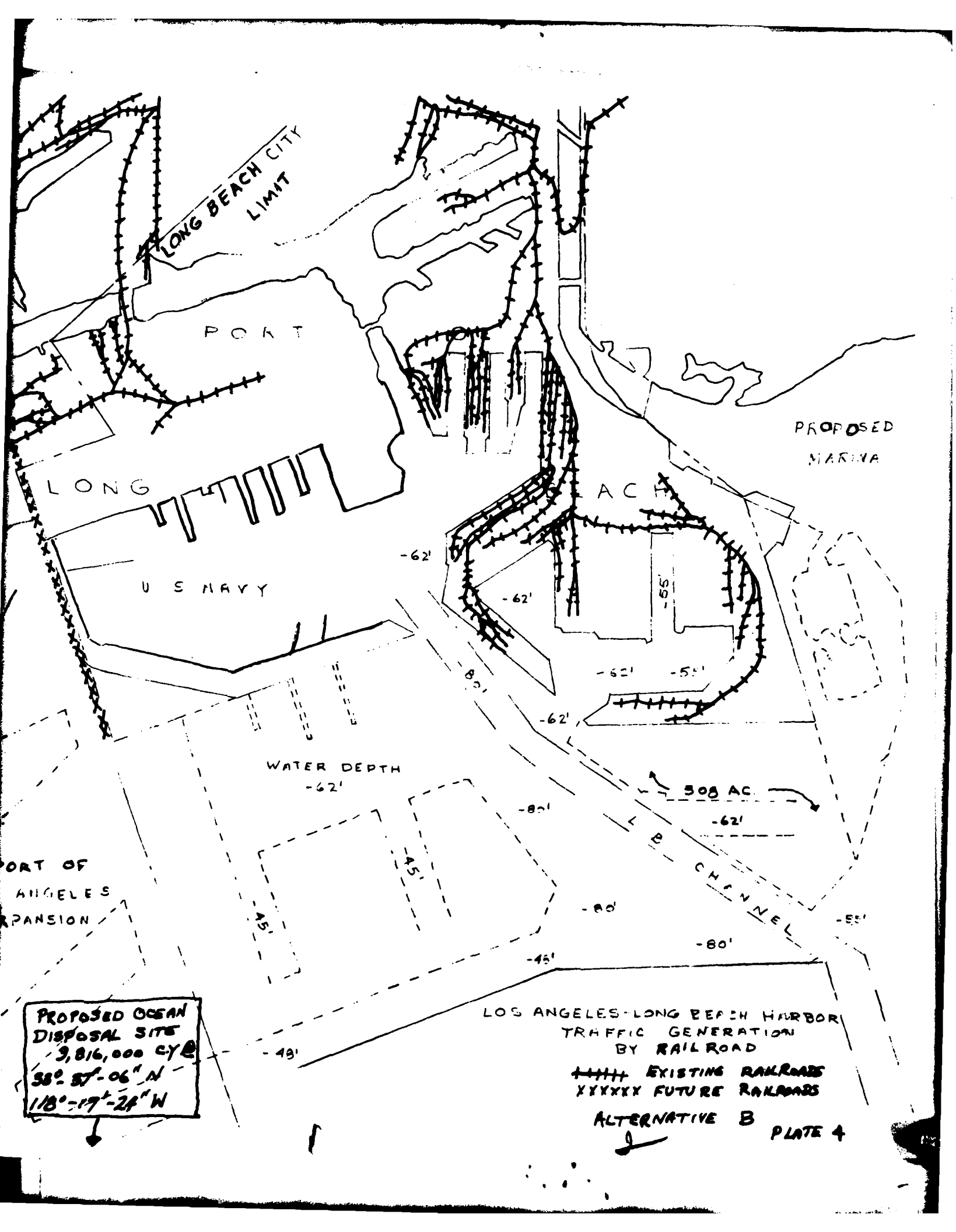
LONG BEACH C
LIM...

PORT

PORT OF
LOS ANGELES
EXPANSION

EXISTING

PROPOSED OCEAN
DISPOSAL SITE
9,816,000 CY @
38° 57' -06" N
118° -17' -24" W



LONG BEACH CITY
LIMIT

PORT

PROPOSED
MARINA

LONG

BEACH

U S NAVY

-62'

-62'

-55'

-62'

-55'

-62'

WATER DEPTH

-62'

80'

308 AC

-62'

PORT OF
ANGELES
EXPANSION

45'

-80'

CHANNEL

-80'

-80'

-55'

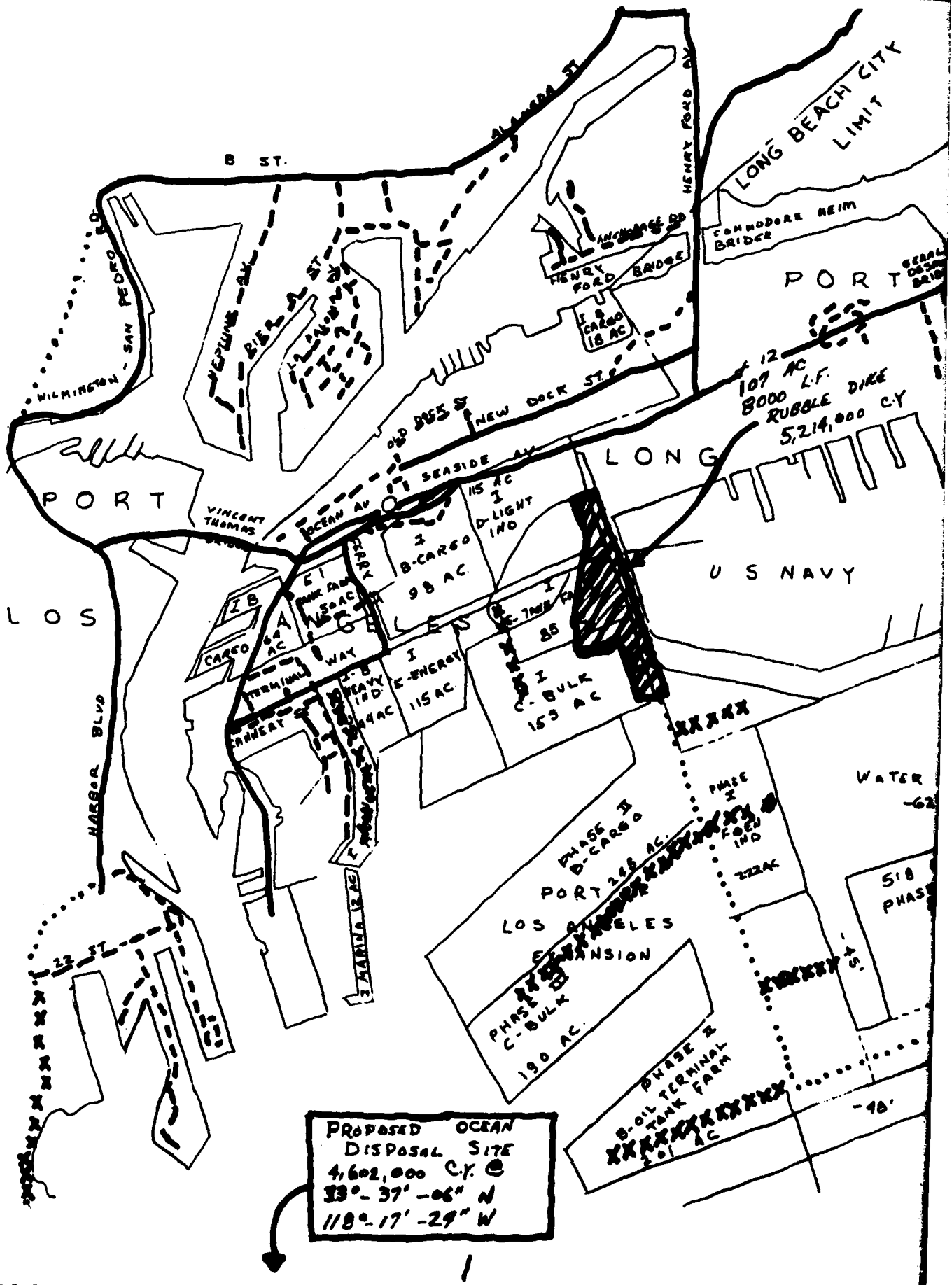
-45'

PROPOSED OCEAN
DISPOSAL SITE
3,816,000 CY @
38° 57' - 06" N
118° - 17' - 24" W

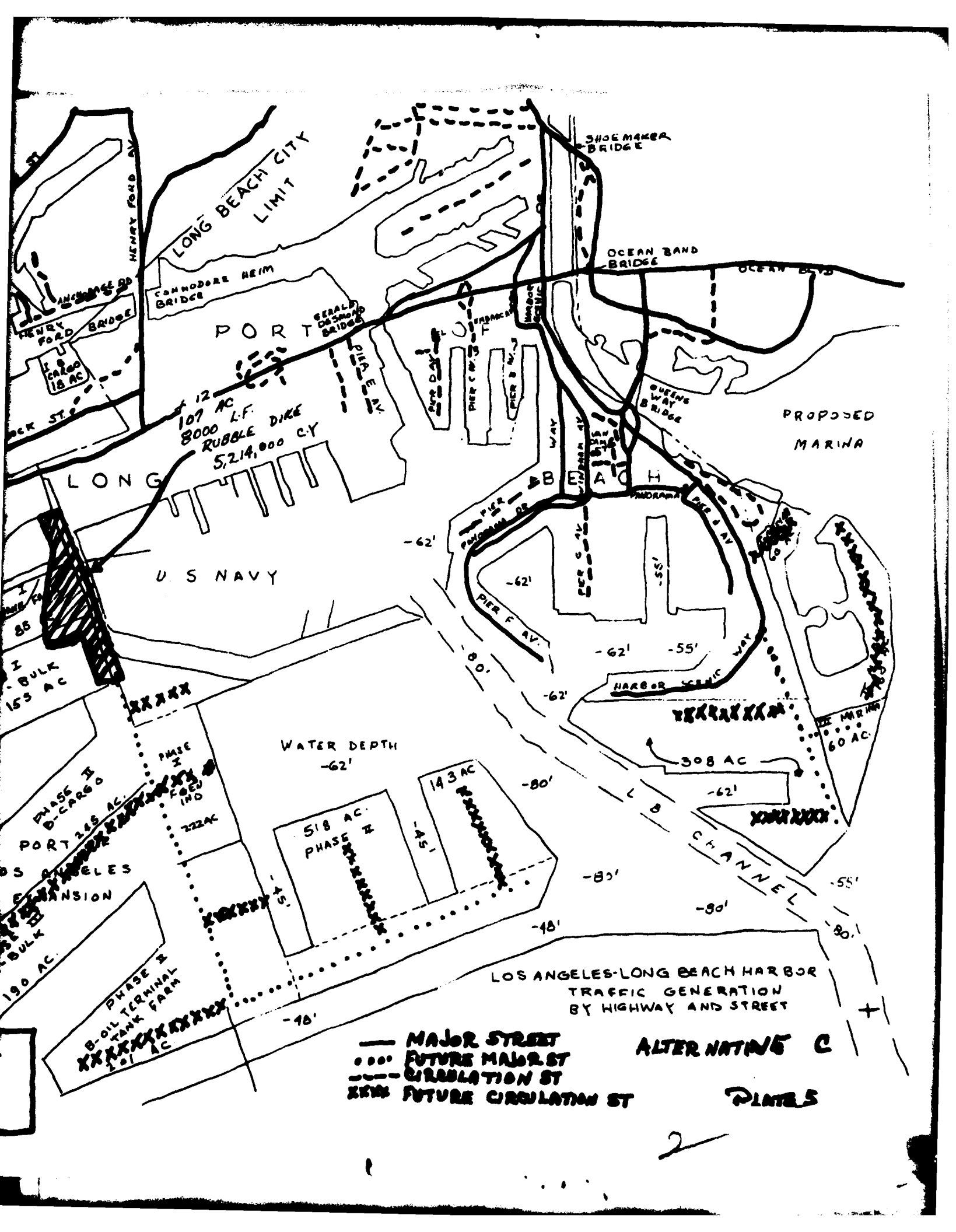
LOS ANGELES - LONG BEACH HARBOR
TRAFFIC GENERATION
BY RAILROAD

++++ EXISTING RAILROADS
XXXXXX FUTURE RAILROADS

ALTERNATIVE B
PLATE 4



PROPOSED OCEAN
 DISPOSAL SITE
 4,602,000 CY @
 33°-37'-06" N
 118°-17'-29" W



LONG BEACH CITY
LIMIT

COMMODORE HEIM
BRIDGE

PORT

107 AC
8000 L.F.
RUBBLE DIKE
5,214,000 C.Y.

LONG

U S NAVY

SHOE MAKER
BRIDGE

OCEAN BAND
BRIDGE

OCEAN BLVD

QUEENS
WAY
BRIDGE

PROPOSED
MARINA

BEACH

-62'

-62'

-62'

-55'

-62'

-62'

-80'

-80'

-62'

-62'

-80'

-90'

-55'

-80'

WATER DEPTH
-62'

518 AC
PHASE II

143 AC

308 AC

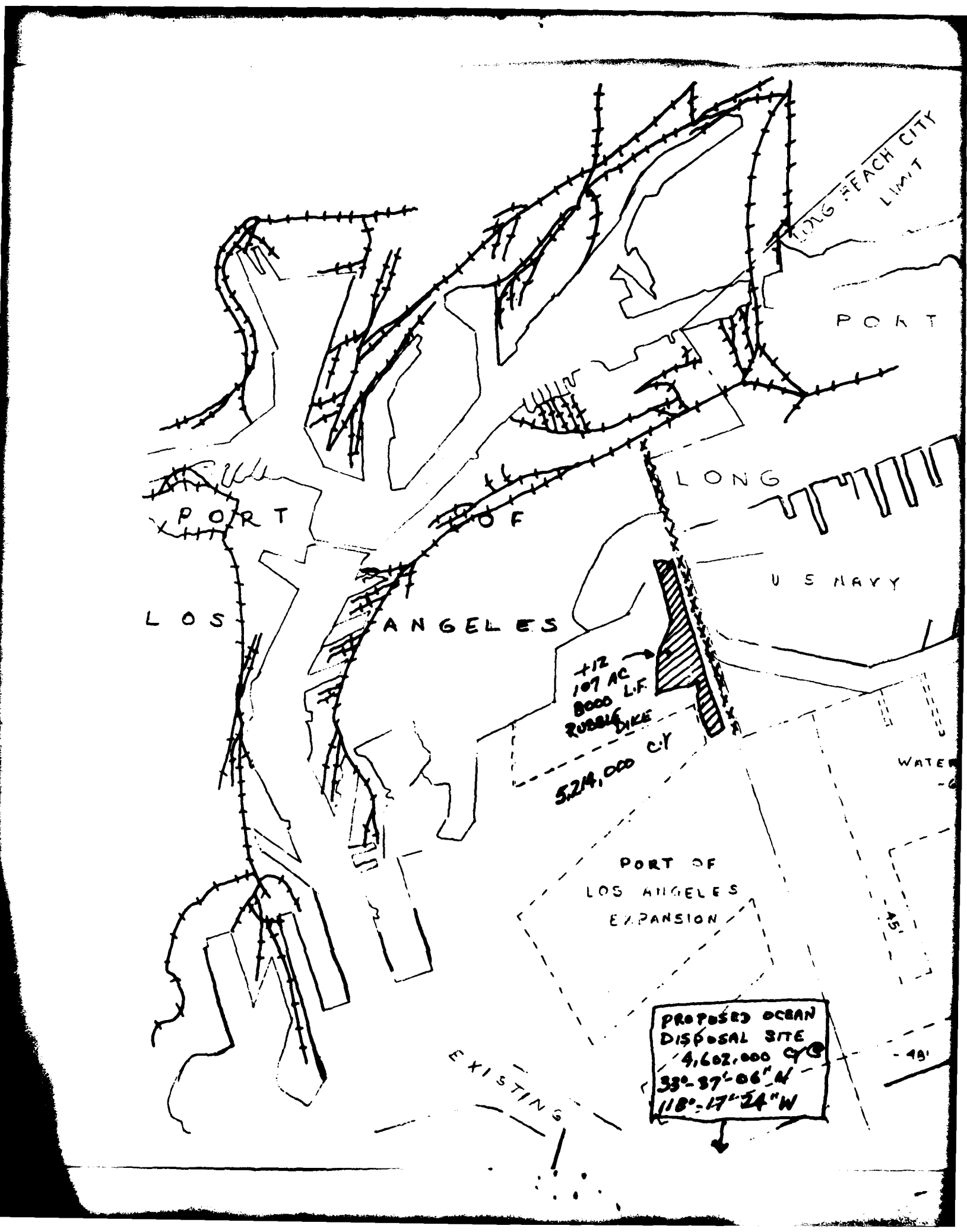
60 AC

LOS ANGELES-LONG BEACH HARBOR
TRAFFIC GENERATION
BY HIGHWAY AND STREET

- MAJOR STREET
- FUTURE MAJOR ST
- CIRCULATION ST
- XXXXX FUTURE CIRCULATION ST

ALTERNATIVE C

PLATE 5



PORT

LOS

ANGELES

PORT OF

LONG

U.S. NAVY

LONG BEACH CITY
LIMIT

PORT

+12
107 AC
8000 L.F.
RUBBLE
DIKE

5,214,000 CY

PORT OF
LOS ANGELES
EXPANSION

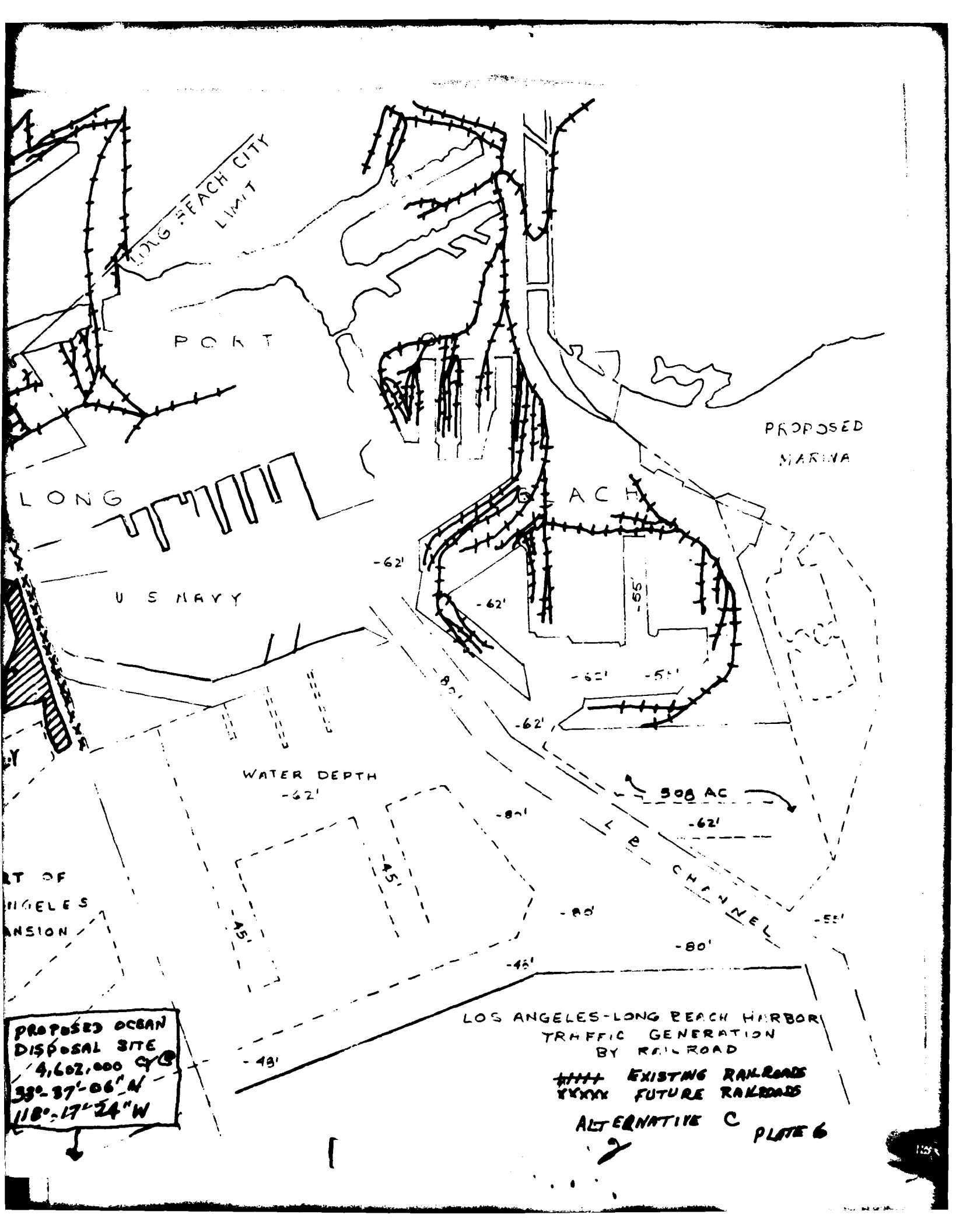
WATER

EXISTING

PROPOSED OCEAN
DISPOSAL SITE
4,602,000 CY
33°-37'-06" N
118°-17'-24" W

AS

49'

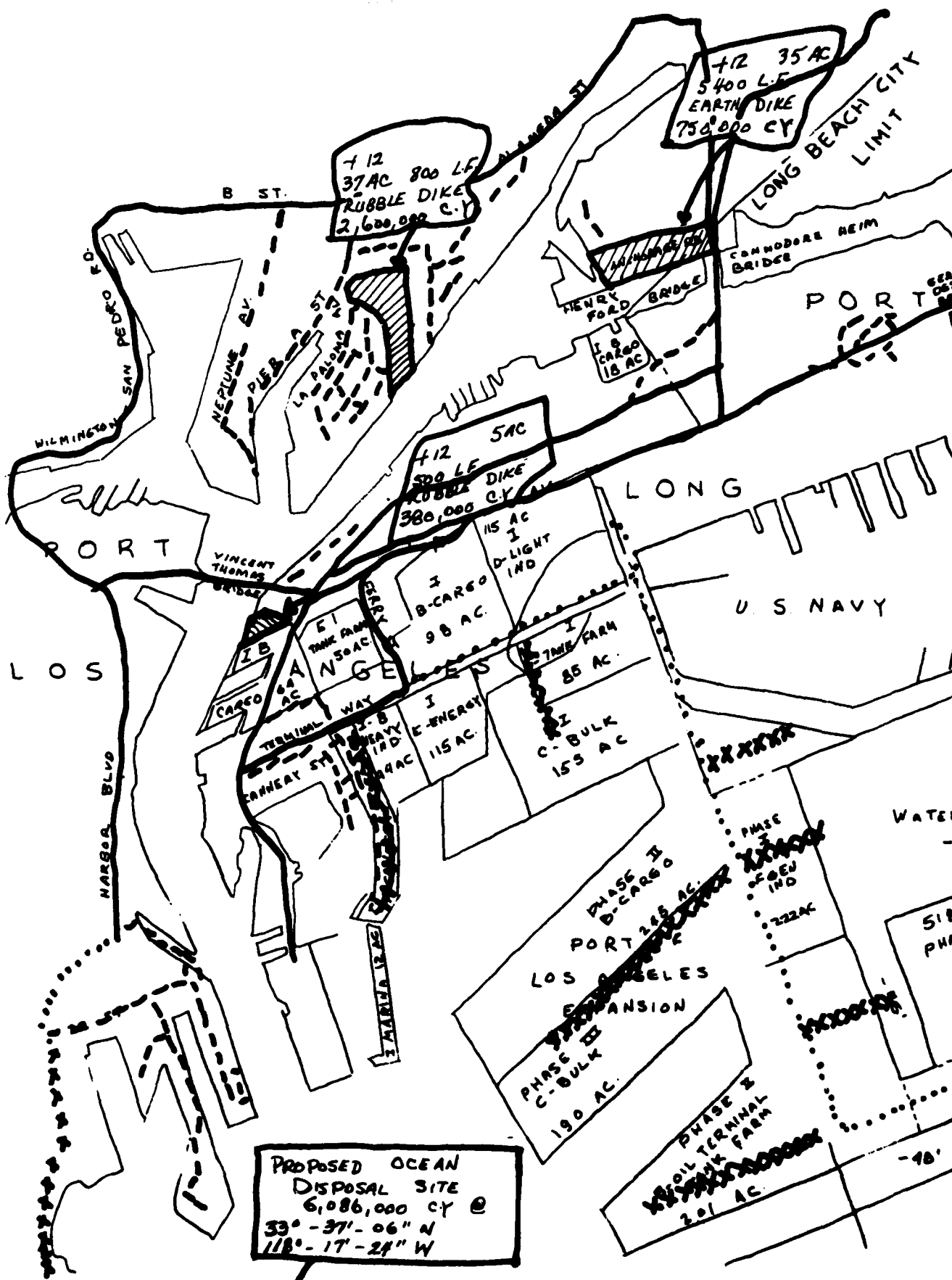


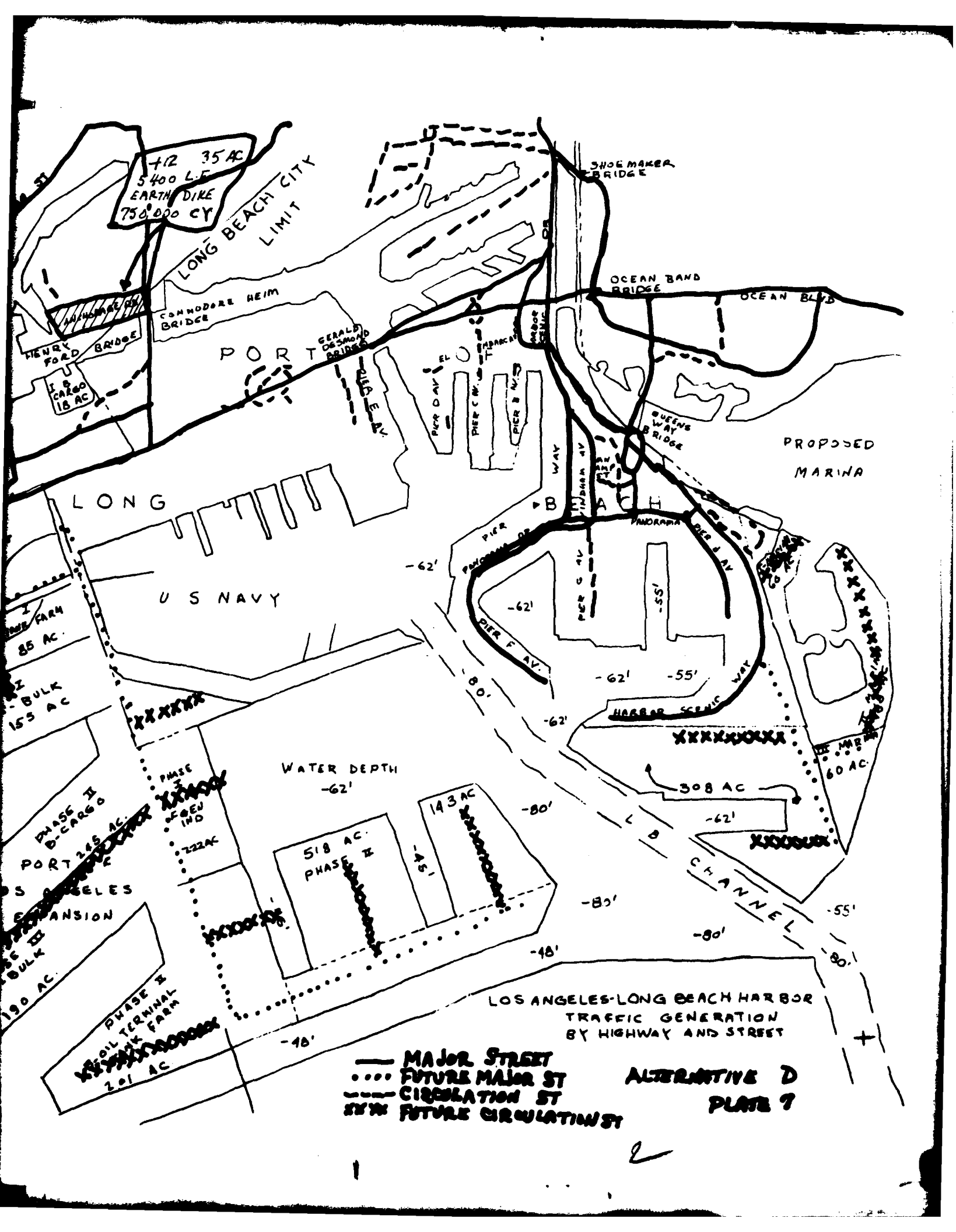
PROPOSED OCEAN
DISPOSAL SITE
4,602,000 CY
33°-37'-06" N
118°-17'-24" W

LOS ANGELES-LONG BEACH HARBOR
TRAFFIC GENERATION
BY RAILROAD

==== EXISTING RAILROADS
XXXX FUTURE RAILROADS

ALTERNATIVE C
PLATE 6





+12 35 AC
5400 L.F.
EARTH DIKE
750,000 CY

LONG BEACH CITY
LIMIT

HENRY FORD BRIDGE
18 AC

COMMODORE HEIM
BRIDGE

PORT

GERALD
DESMOND
BRIDGE

SHOE MAKER
BRIDGE

OCEAN BAND
BRIDGE

OCEAN BLVD

QUEENS
WAY
BRIDGE

PROPOSED
MARINA

LONG

LONG BEACH

U S NAVY

85 AC

155 AC

-62'

-62'

-62'

-55'

-80'

-62'

WATER DEPTH
-62'

-80'

-62'

308 AC

60 AC

PHASE II
D-CARGO
245 AC

PHASE I
A-CARGO
140 AC

518 AC
PHASE II

143 AC

CHANNEL

SEAS
EXPANSION

190 AC

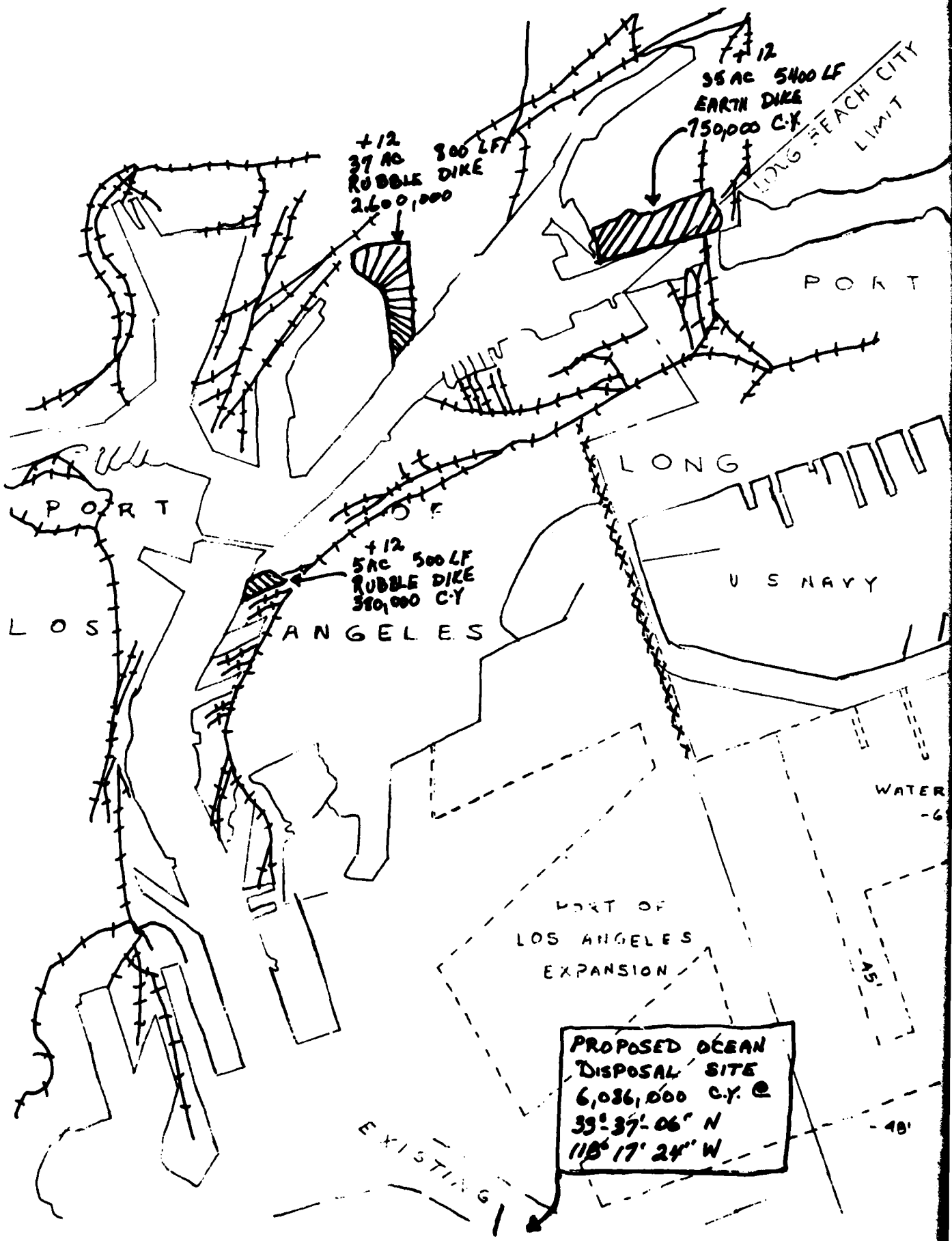
PHASE II
OIL TERMINAL
201 AC

LOS ANGELES-LONG BEACH HARBOR
TRAFFIC GENERATION
BY HIGHWAY AND STREET

- MAJOR STREET
- FUTURE MAJOR ST
- - - CIRCULATION ST
- XXXX FUTURE CIRCULATION ST

ALTERNATIVE D
PLATE 7

2



+12
37 AC 800 LF
RUBBLE DIKE
2,600,000

+12
98 AC 5400 LF
EARTH DIKE
750,000 C.Y.
LONG BEACH CITY
LIMIT

+12
5 AC 500 LF
RUBBLE DIKE
380,000 C.Y.

PROPOSED OCEAN
DISPOSAL SITE
6,086,000 C.Y. @
39° 37' 06" N
118° 17' 24" W

PORT

LOS

ANGELES

LONG

U.S. NAVY

PORT

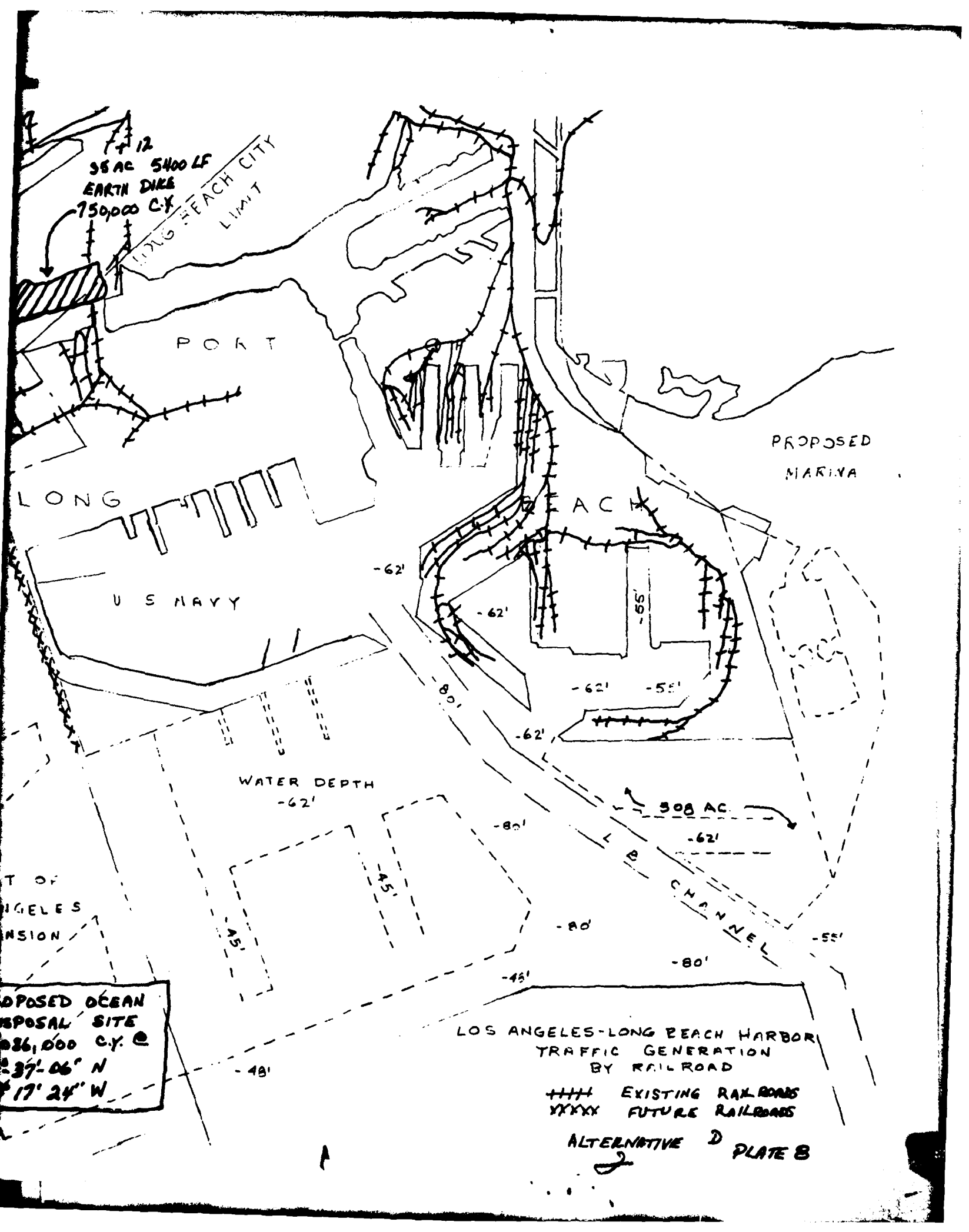
WATER
-6

PORT OF
LOS ANGELES
EXPANSION

EXISTING

45'
AS

-40'



12
 38 AC 5400 LF
 EARTH DIKE
 750,000 C.Y.

1976 BEACH CITY
 LIMIT

PORT

LONG

BEACH

PROPOSED
 MARINA

U S NAVY

PORT OF
 LOS ANGELES
 EXTENSION

WATER DEPTH
 -62'

308 AC

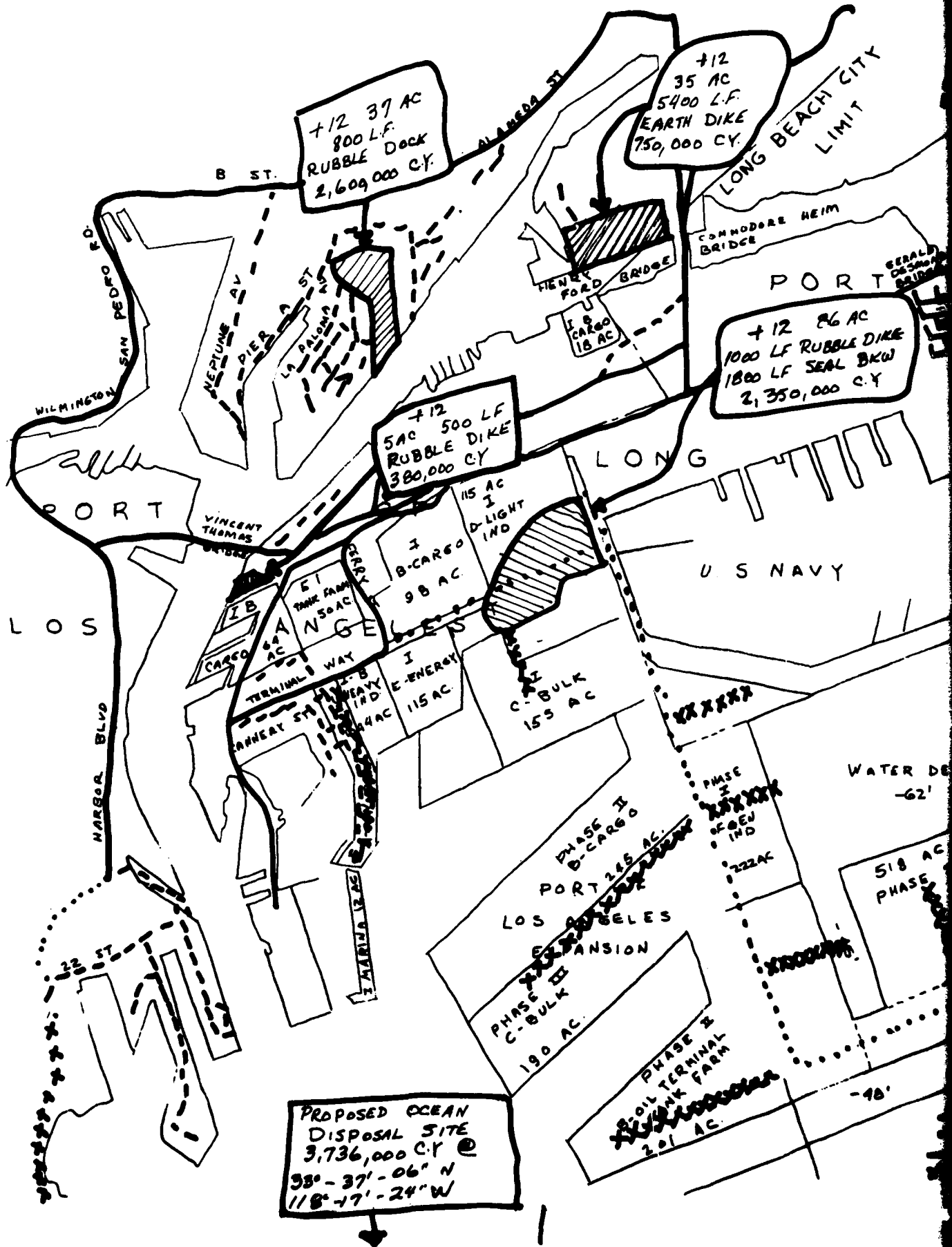
CHANNEL

PROPOSED OCEAN
 DISPOSAL SITE
 86,000 C.Y. @
 37'-06" N
 17' 24" W

LOS ANGELES-LONG BEACH HARBOR
 TRAFFIC GENERATION
 BY RAILROAD

HHH EXISTING RAILROADS
 YYYYY FUTURE RAILROADS

ALTERNATIVE D PLATE B
 2



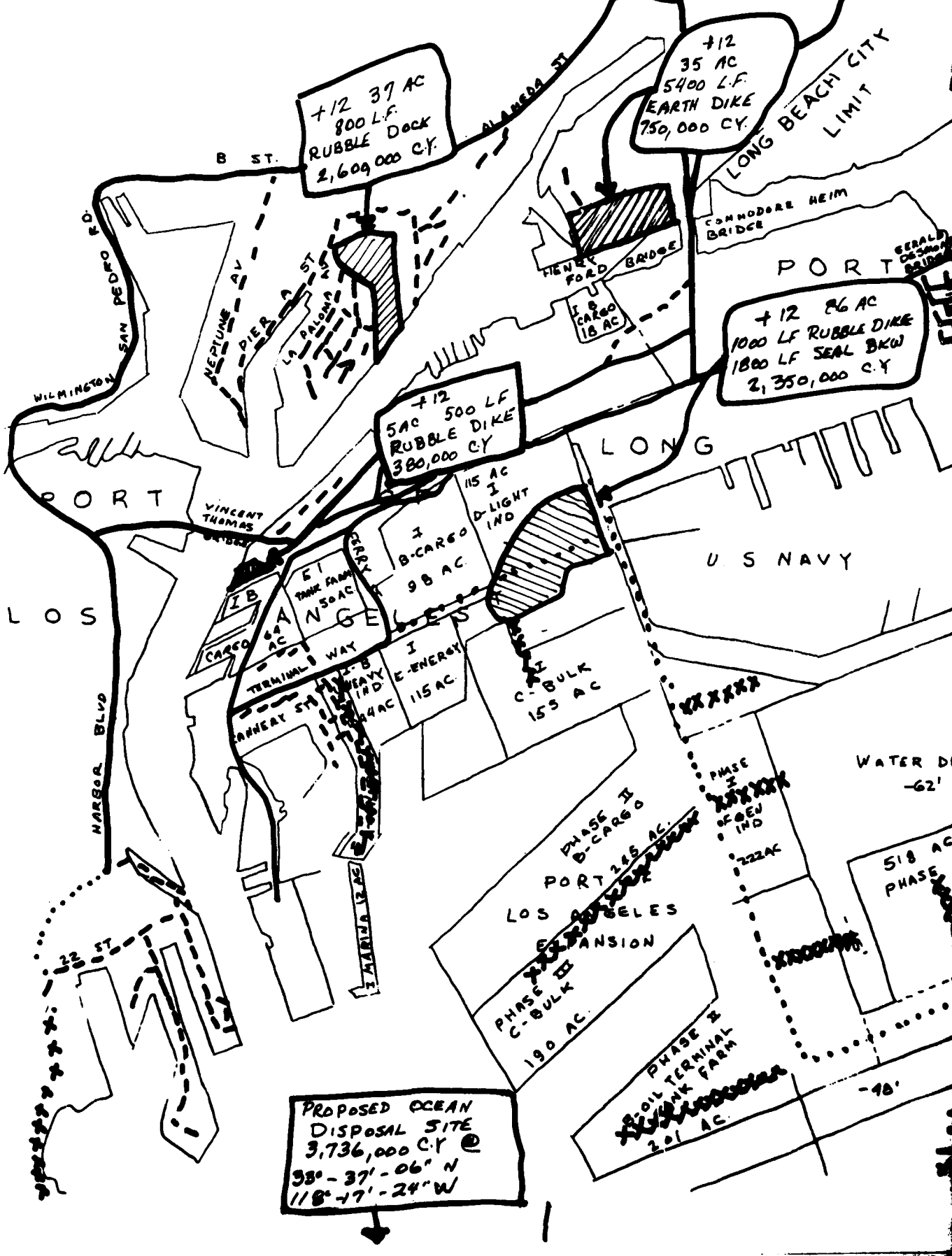
+12 37 AC
800 LF
RUBBLE DOCK
2,609,000 CY.

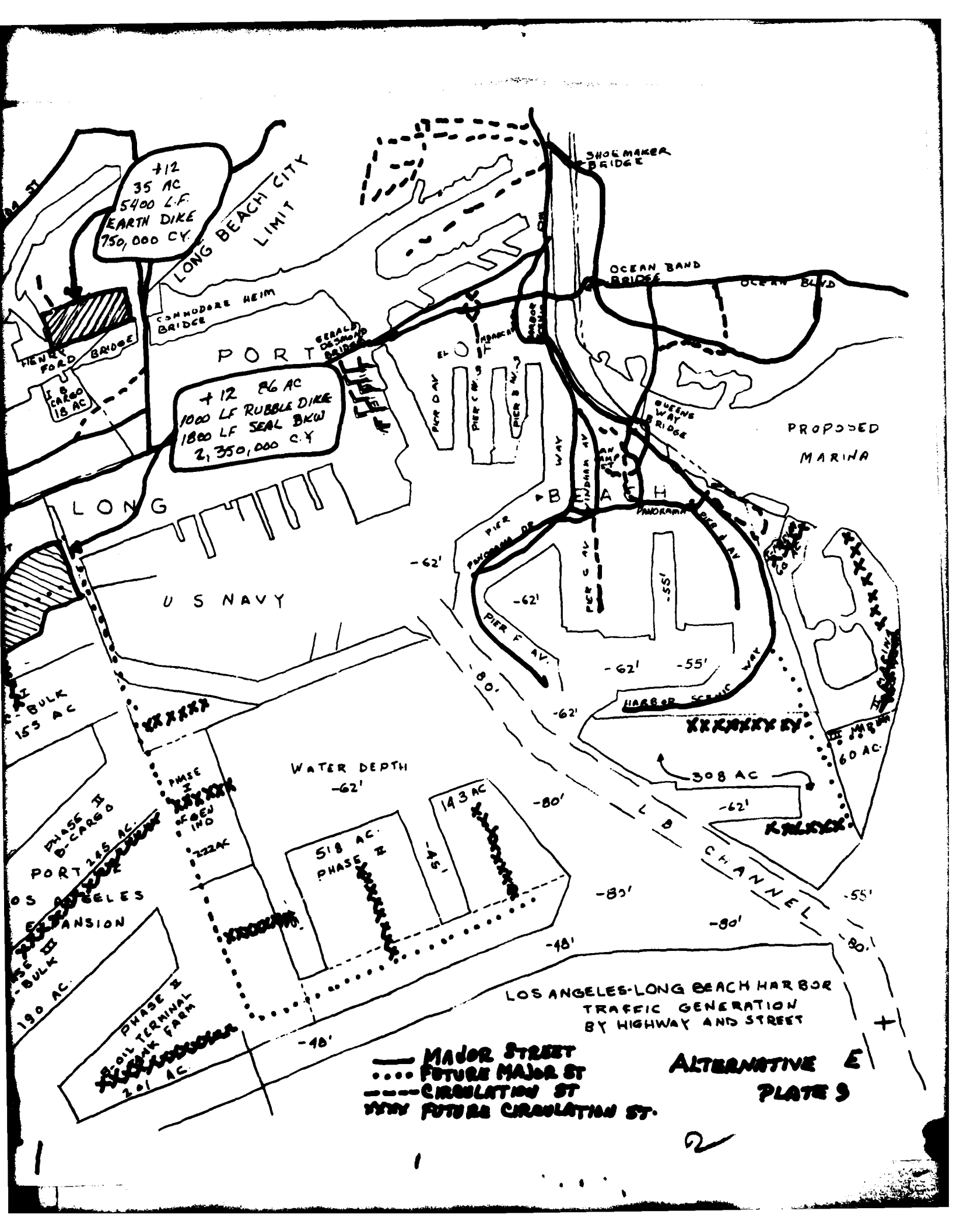
+12 35 AC
5400 LF
EARTH DIKE
750,000 CY.

+12 86 AC
1000 LF RUBBLE DIKE
1800 LF SEAL BRW
2,350,000 CY.

+12 5AC 500 LF
RUBBLE DIKE
380,000 CY.

PROPOSED OCEAN
DISPOSAL SITE
3,736,000 C.Y. @
98°-37'-06" N
118°-17'-24" W





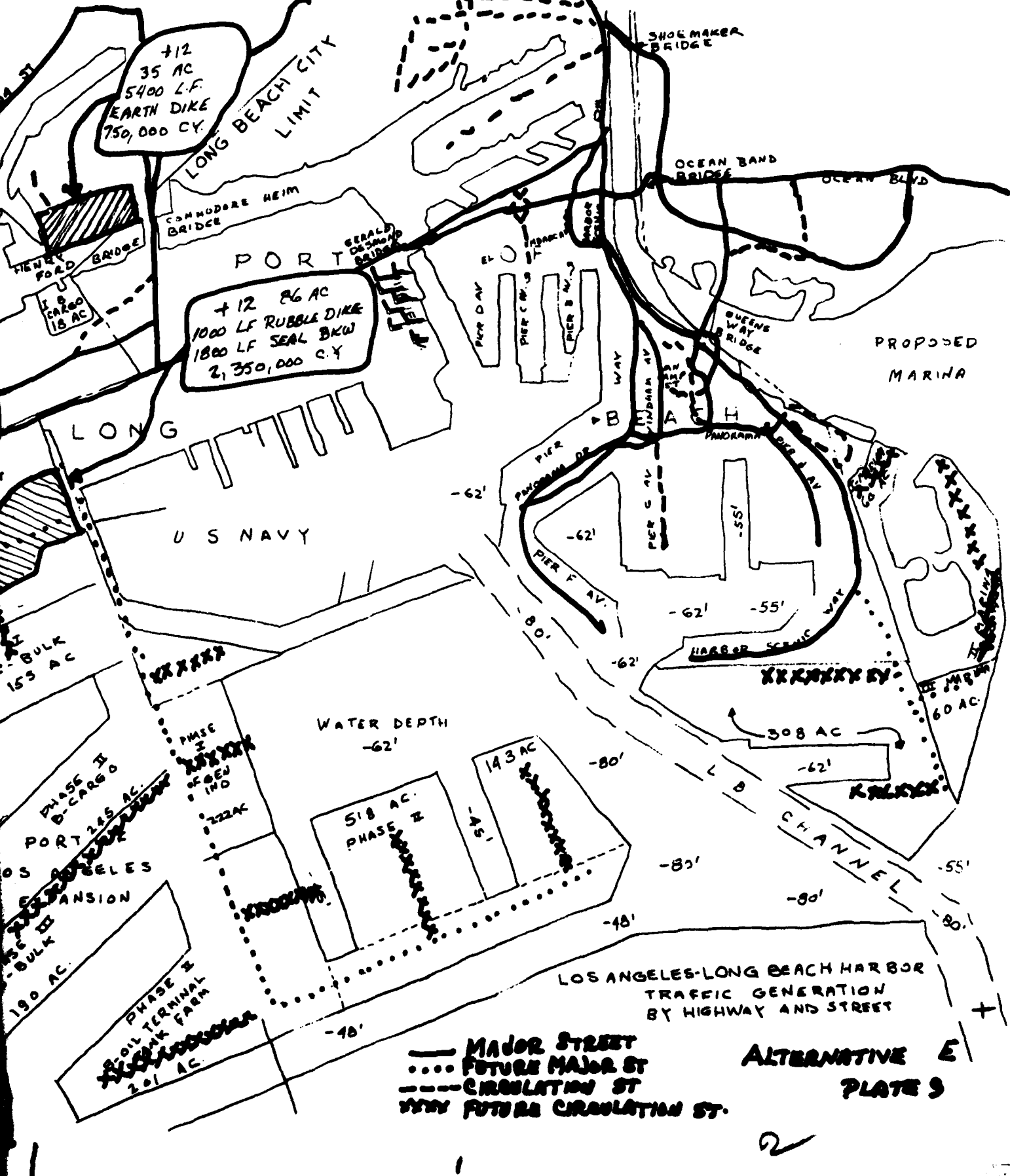
+12
35 AC
5400 LF
EARTH DIKE
750,000 CY.

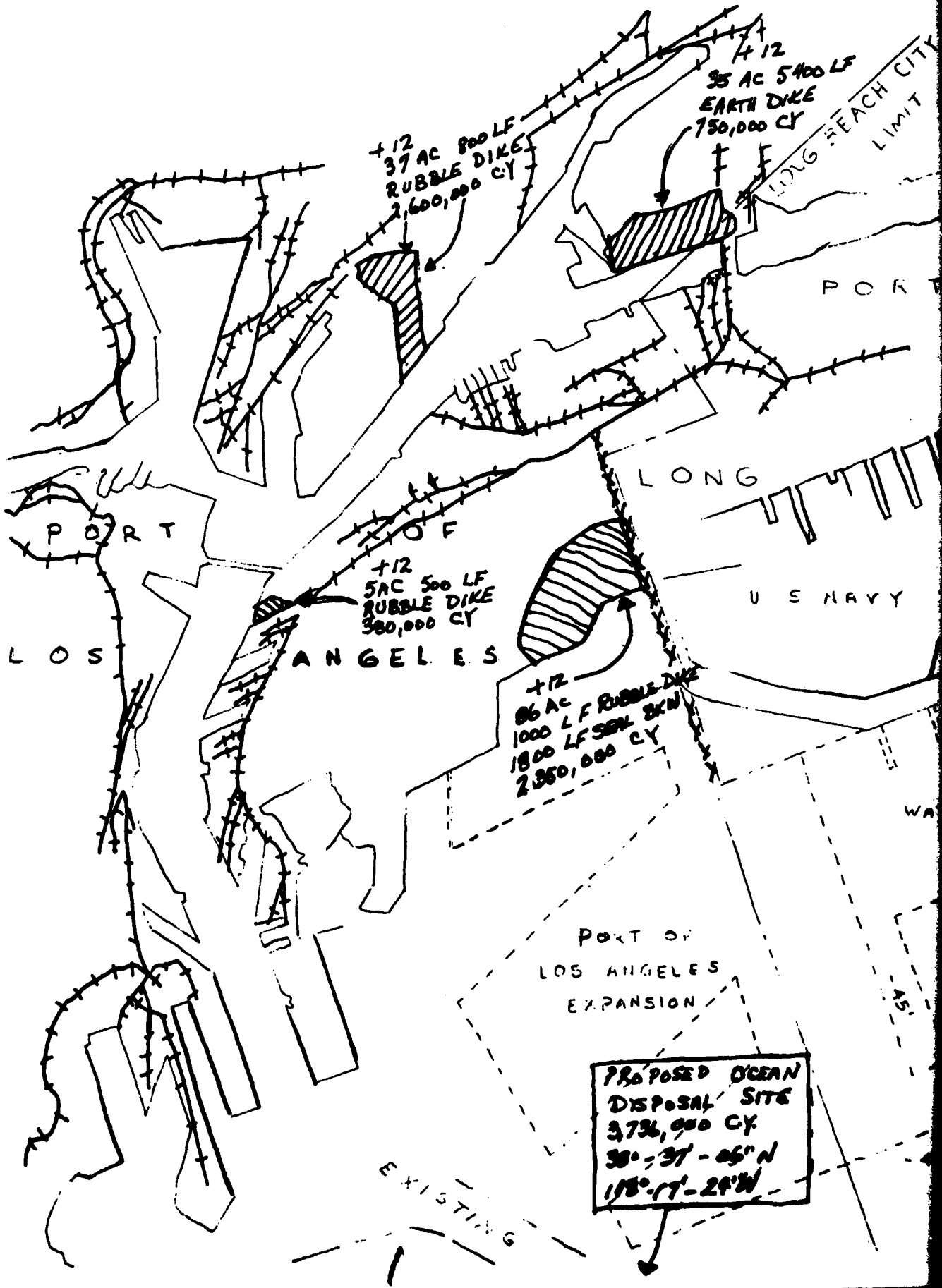
+12 26 AC
1000 LF RUBBLE DIKE
1800 LF SEAL BKW
2,350,000 CY.

- MAJOR STREET
- FUTURE MAJOR ST
- CIRCULATION ST
- ~~~~ FUTURE CIRCULATION ST.

ALTERNATIVE E
PLATE 9

2





+12
37 AC 800 LF
RUBBLE DIKE
2,600,000 CY

+12
35 AC 5400 LF
EARTH DIKE
750,000 CY

+12
5 AC 500 LF
RUBBLE DIKE
300,000 CY

+12
86 AC
1000 LF RUBBLE DIKE
1800 LF SEAL SKIN
2,350,000 CY

PROPOSED OCEAN
DISPOSAL SITE
3,736,000 CY
30°-37'-05" N
118°-17'-24" W

PORT
LOS

ANGELES

LONG

U S NAVY

PORT OF
LOS ANGELES
EXPANSION

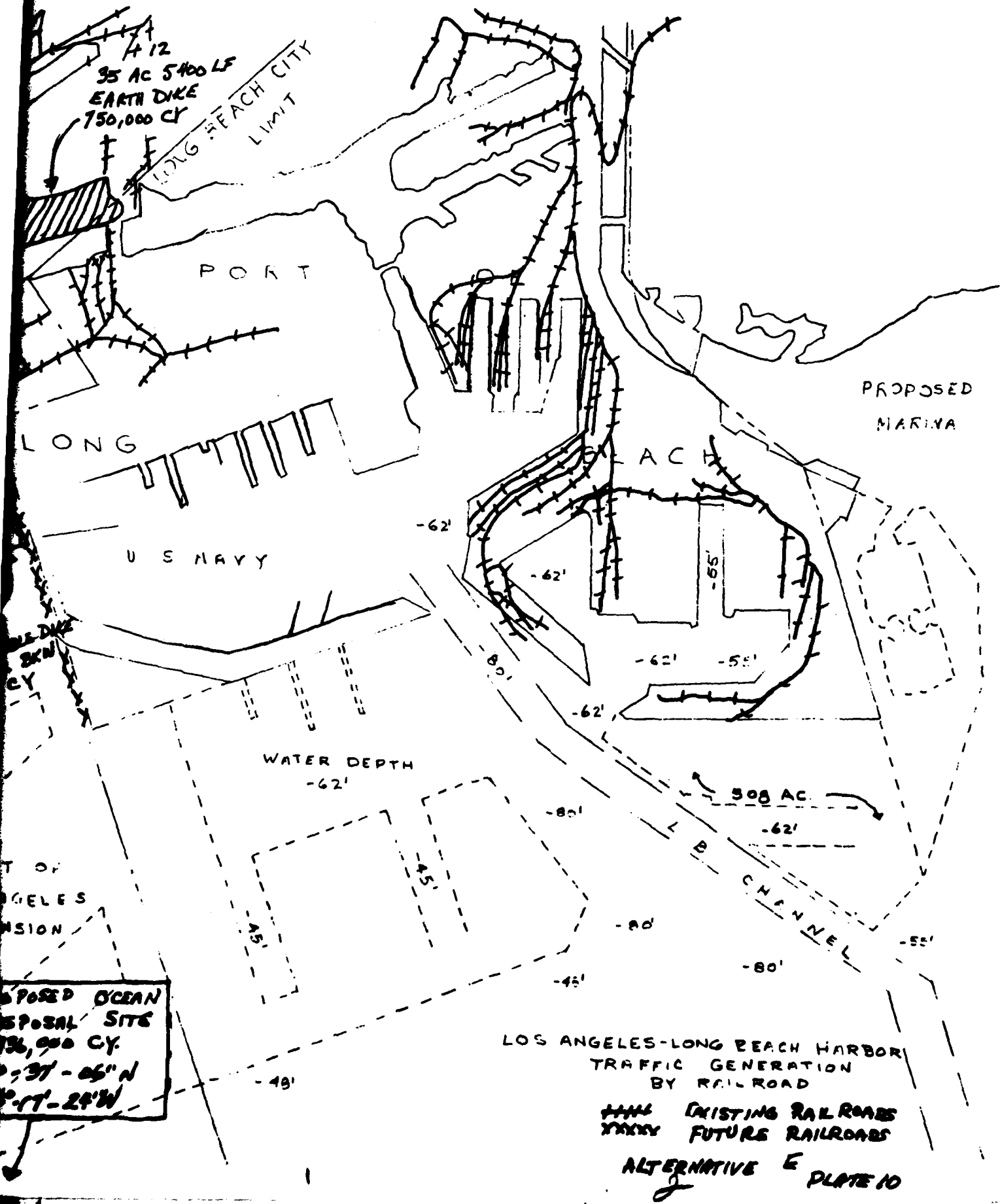
EXISTING

LONG BEACH CITY
LIMIT

PORT

WA

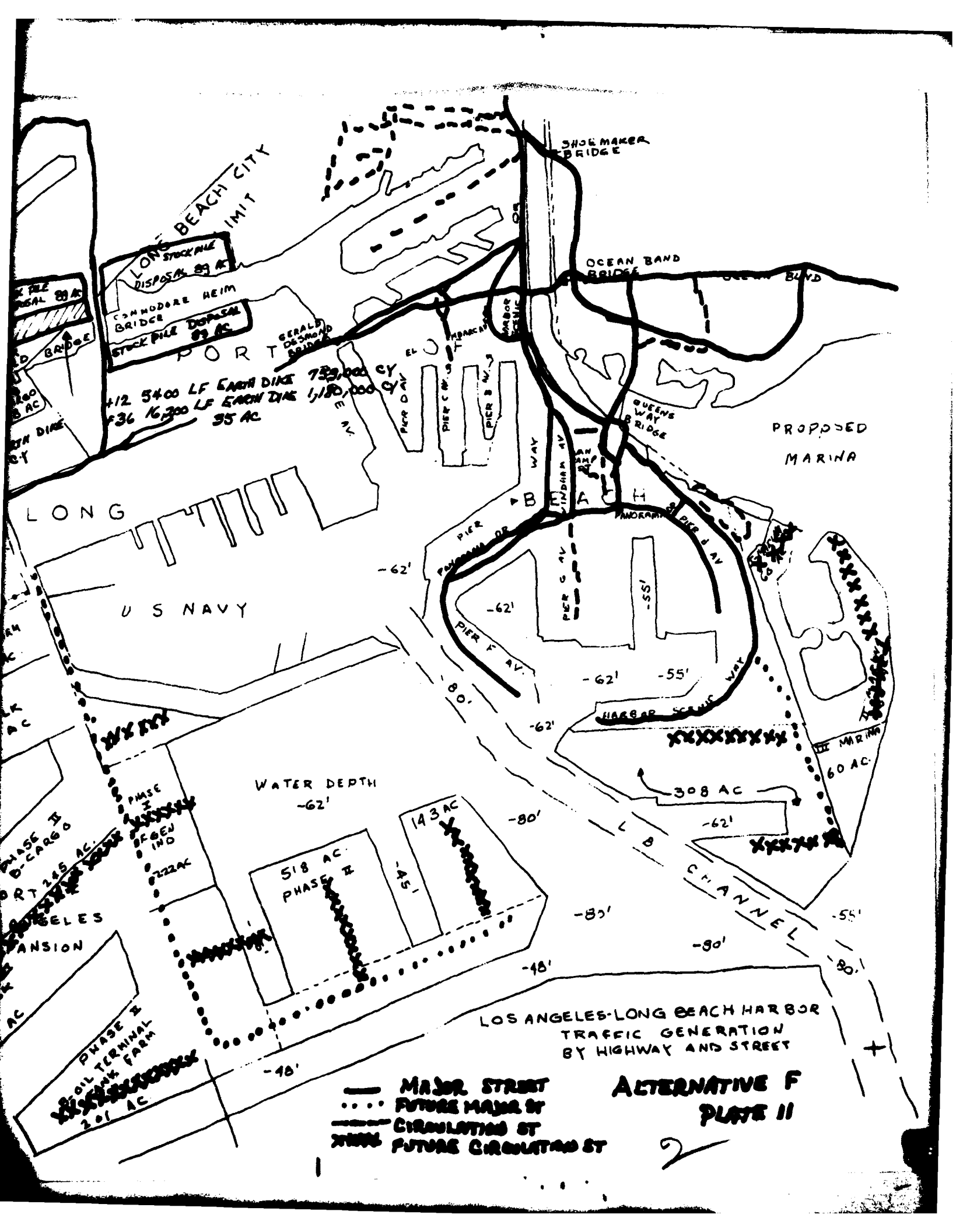
AS



LOS ANGELES-LONG BEACH HARBOR
TRAFFIC GENERATION
BY RAILROAD

--- EXISTING RAILROADS
--- FUTURE RAILROADS

ALTERNATIVE E PLATE 10



LONG BEACH CITY
LIMIT

SHOE MAKER
BRIDGE

OCEAN BAND
BRIDGE

LONG STOCKPILE
DISPOSAL 89 AC

COMMODORE HEIM
BRIDGE

12 5400 LF EARTH DIKE 750,000 CY
36 16,200 LF EARTH DIKE 1,180,000 CY
35 AC

PORT

QUEEN BLVD

QUEENS
WAY
BRIDGE

PROPOSED
MARINA

LONG

U S NAVY

LONG BEACH

WATER DEPTH
-62'

518 AC
PHASE II

143 AC

308 AC

60 AC

LOS ANGELES-LONG BEACH HARBOR
TRAFFIC GENERATION
BY HIGHWAY AND STREET

- MAJOR STREET
- FUTURE MAJOR ST
- - - - CIRCULATION ST
- · - · - FUTURE CIRCULATION ST

ALTERNATIVE F
PLATE II

2

+12 800 LF RUBBLE DIKE 2,600,000 CY
+36 1900 LF EARTH DIKE 4,176,000 CY
37 AC

REACH CITY
LIMIT

STOCK PILE DEPOSIT

STOCK PILE DEPOSIT
AREA 23 AC

STOCK PILE DEPOSIT
59 AC

+12 5400 LF EARTH DIKE TO
+36 16200 LF EARTH DIKE 18
35 AC

+36 17300 LF
57 AC EARTH DIKE
3,190,000 CY

PORT

LONG

U.S. NAVY

LOC

ANGELES

+12
542 500 LF
RUBBLE DIKE
20,000 CY

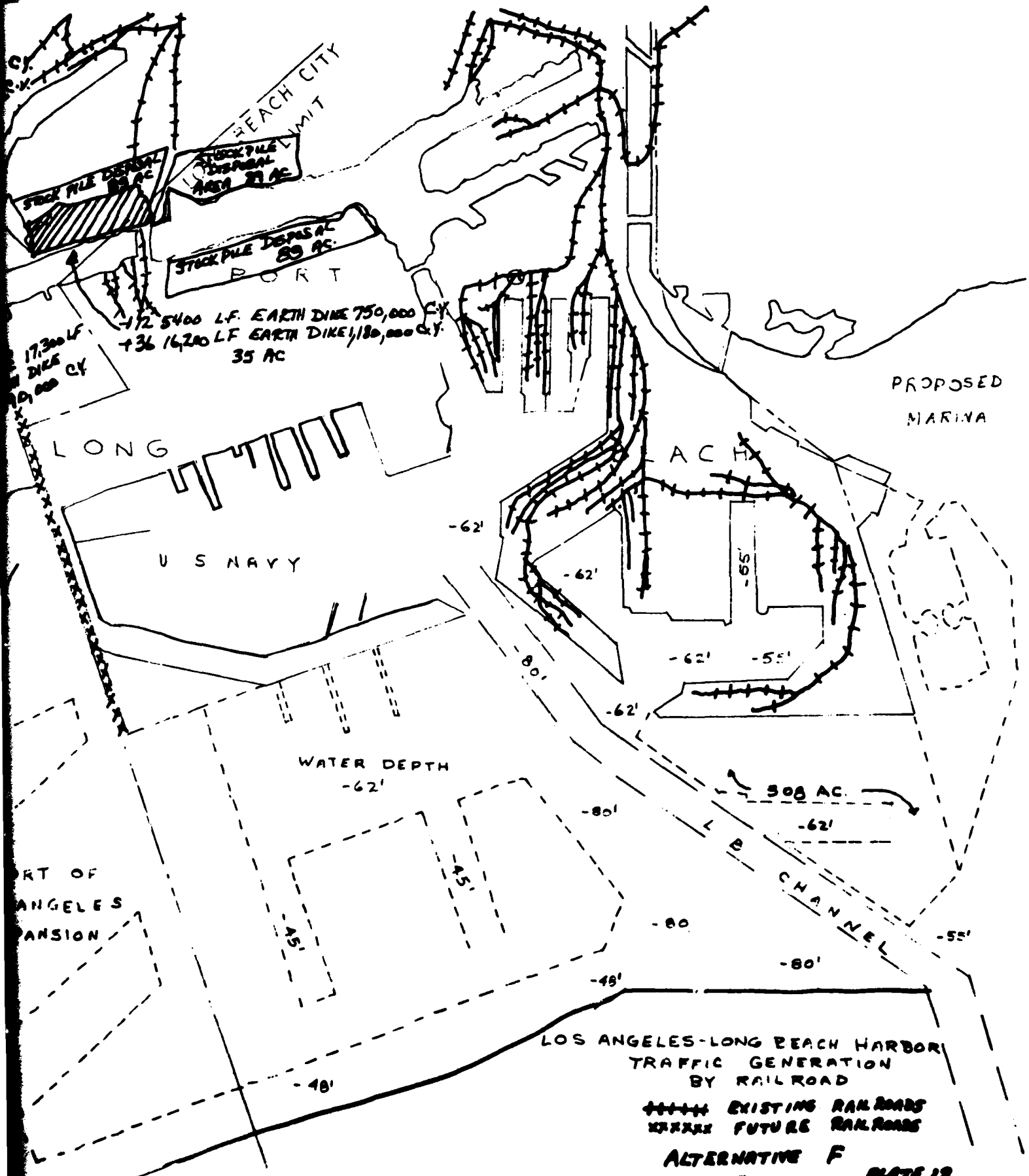
+36
10 AC 2500 LF
EARTH DIKE
579,000 CY

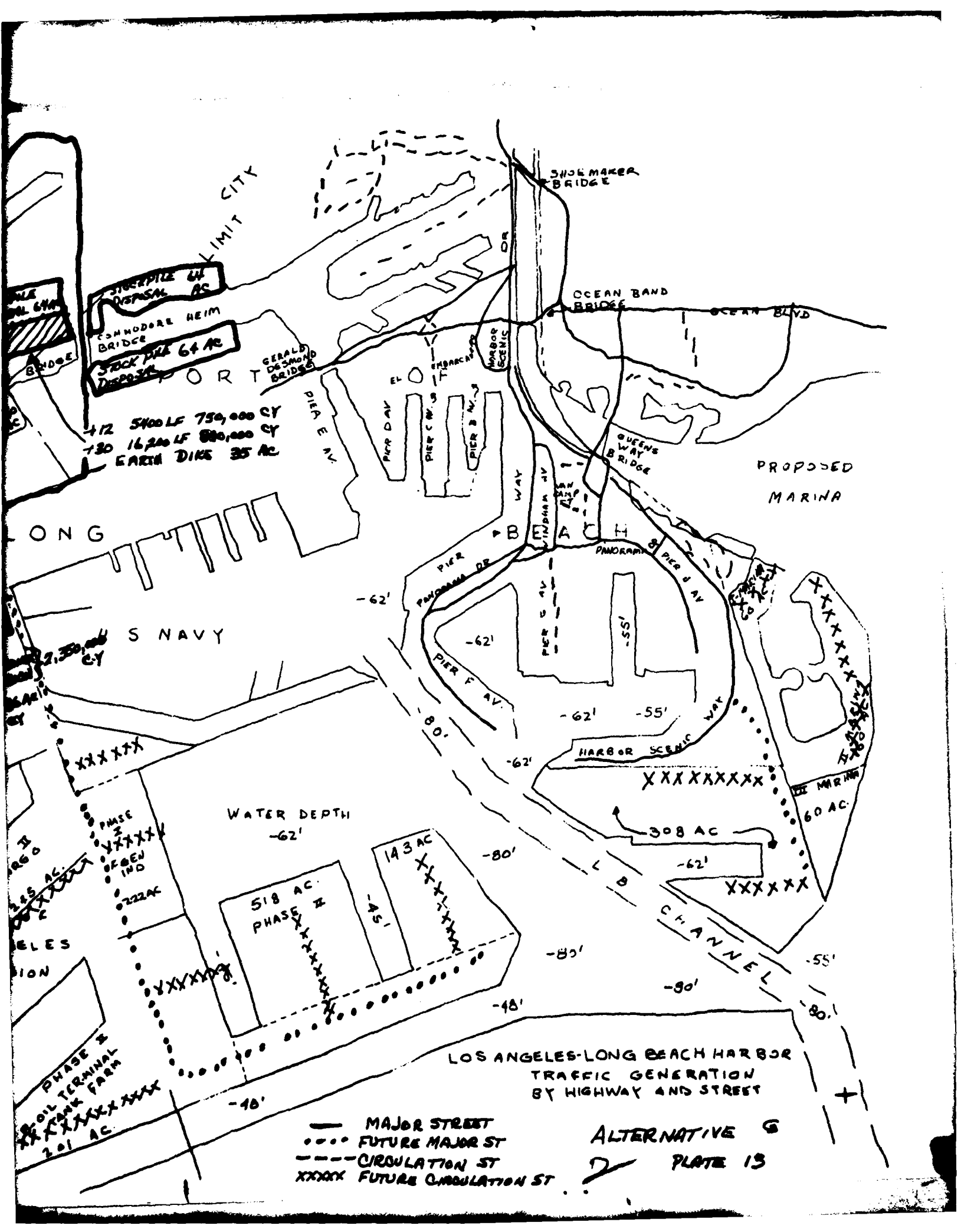
WATER
-6

PORT OF
LOS ANGELES
EXPANSION

EXISTING

AS
-10





STOCKPILE 44
 DISPOSAL AS
 ADMIRAL HEIM
 BRIDGE
 STOCKPILE 64 AC
 DISPOSAL

+12 5400 LF 750,000 CY
 +30 16,200 LF 800,000 CY
 EARTH DIKE 35 AC

LONG BEACH
 S NAVY
 7,350,000 CY

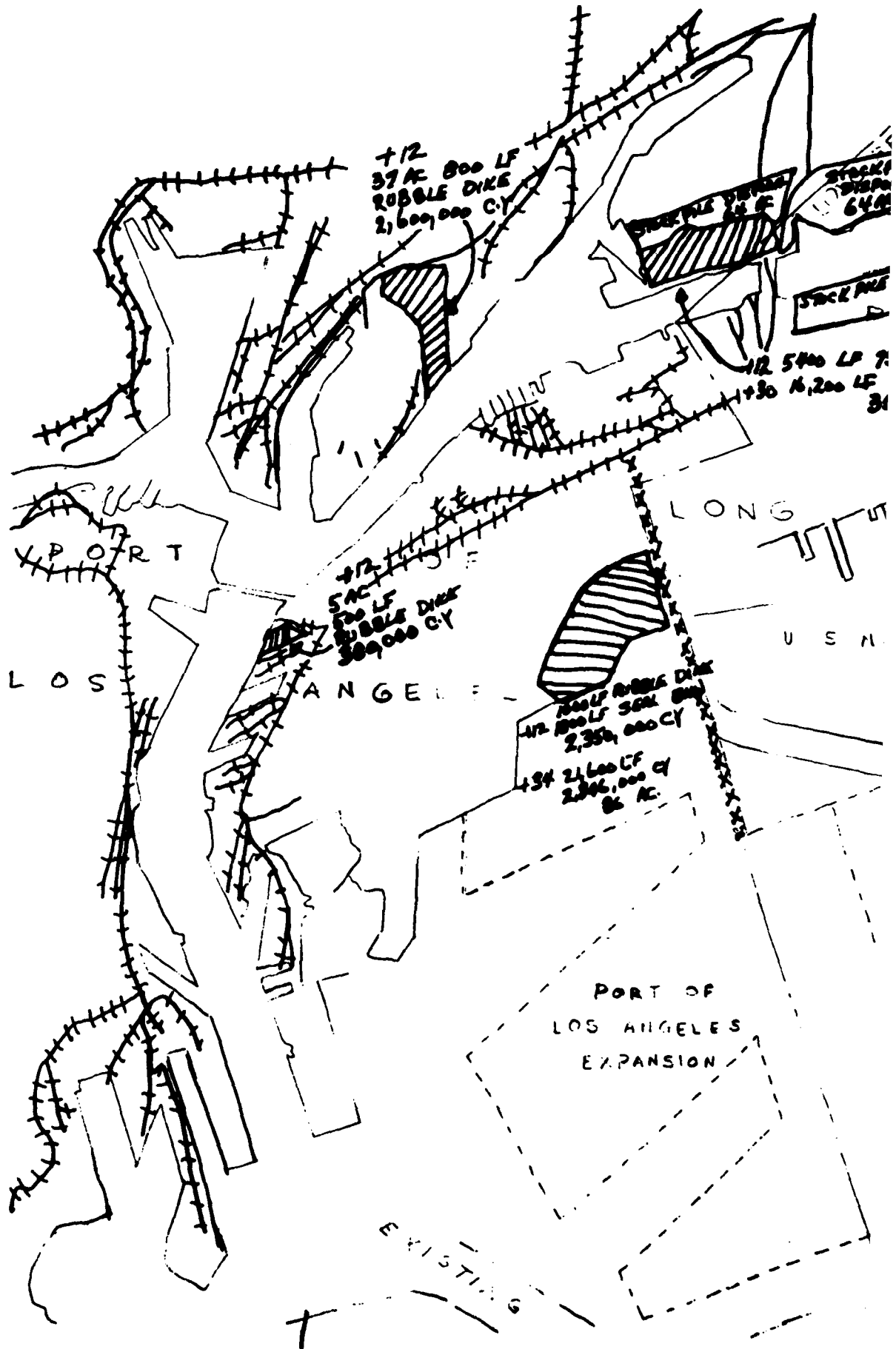
PHASE 1
 145 AC
 PHASE 2
 143 AC
 PHASE 3
 518 AC
 PHASE 4
 143 AC
 PHASE 5
 201 AC
 OIL TERMINAL
 PANK FARM

WATER DEPTH
 -62'
 -80'
 -85'
 -90'
 -10'

LOS ANGELES-LONG BEACH HARBOR
 TRAFFIC GENERATION
 BY HIGHWAY AND STREET

- MAJOR STREET
- FUTURE MAJOR ST
- - - CIRCULATION ST
- XXXXXX FUTURE CIRCULATION ST

ALTERNATIVE G
 PLATE 13



112
37 AC 800 LF
ROBBLE DIKE
2,600,000 CY

STOCKS
DISP
64 AC

112 5400 LF 7'
1130 16,200 LF 34'

PORT

LOS

ANGELES

LONG

BEACH

112 100 LF 500' DIKE
2,350,000 CY

134 2,100 LF
2,000,000 CY
26 AC

PORT OF
LOS ANGELES
EXPANSION

EXISTING

AD-A136 716

LOS ANGELES BEACH HARBORS LOS ANGELES COUNTY CALIFORNIA
(U) OFFICE OF THE CHIEF OF ENGINEERS (ARMY) WASHINGTON
DC OCT 74

4/4

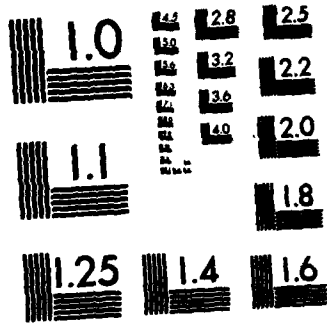
UNCLASSIFIED

F/G 13/2

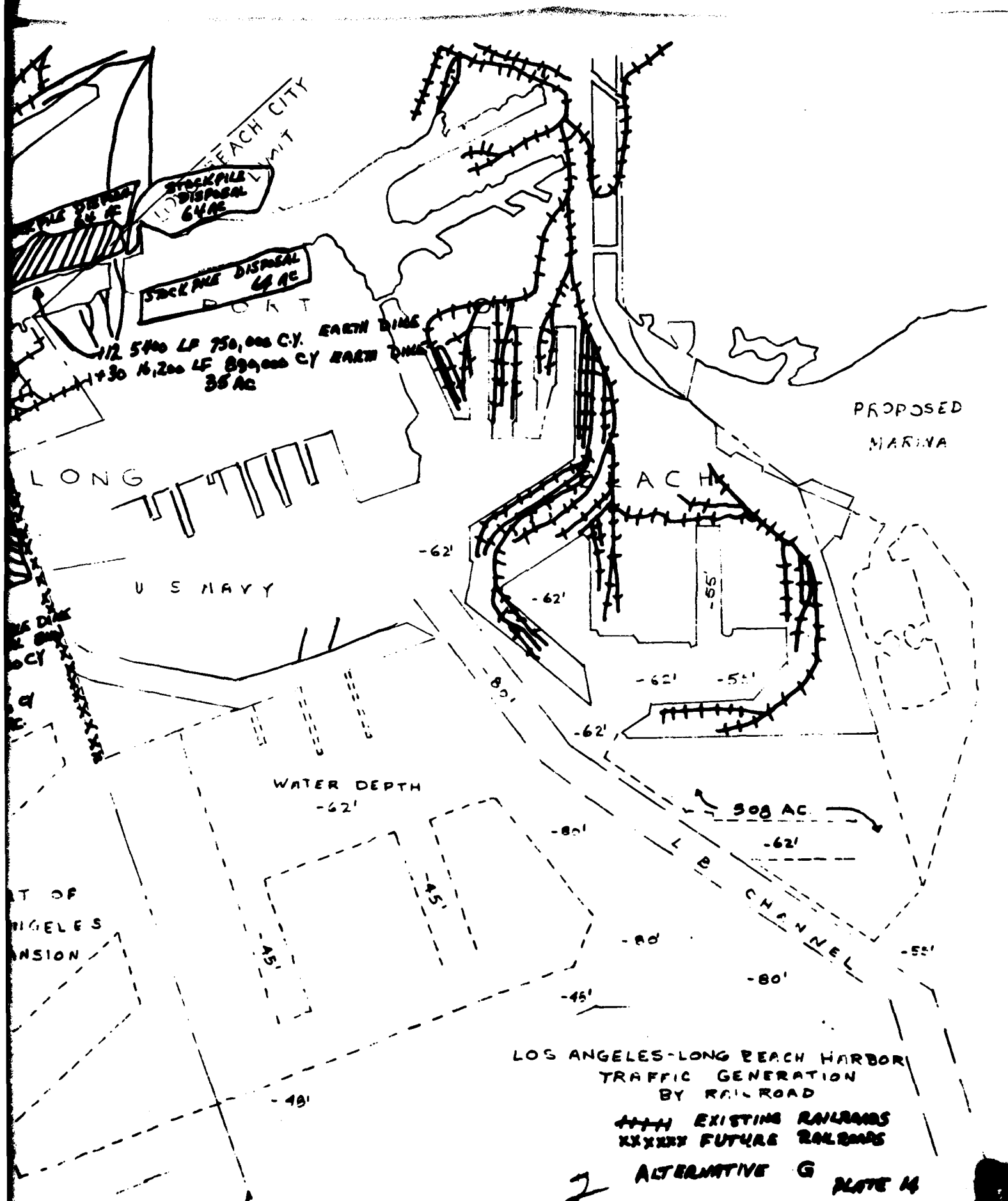
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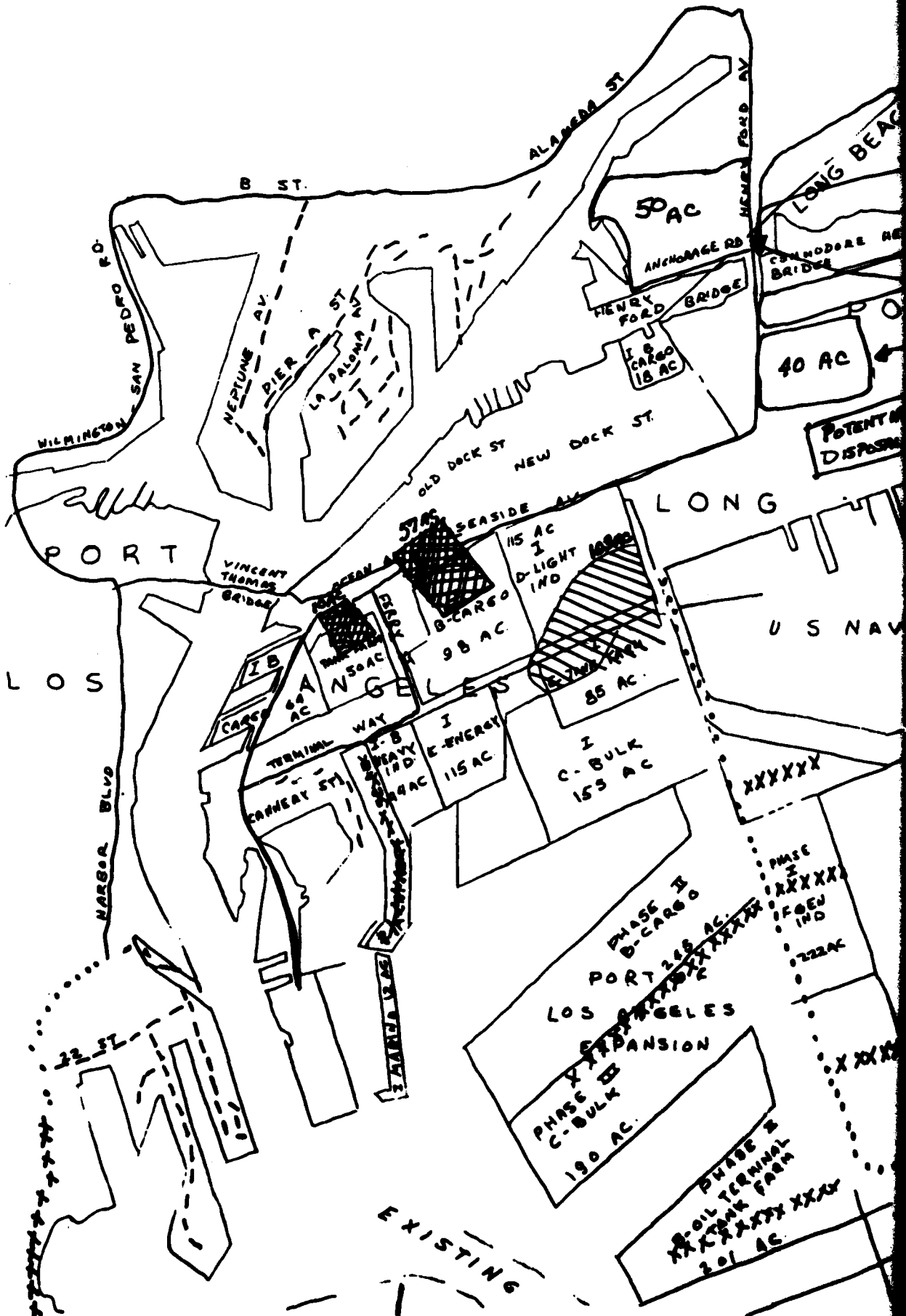
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

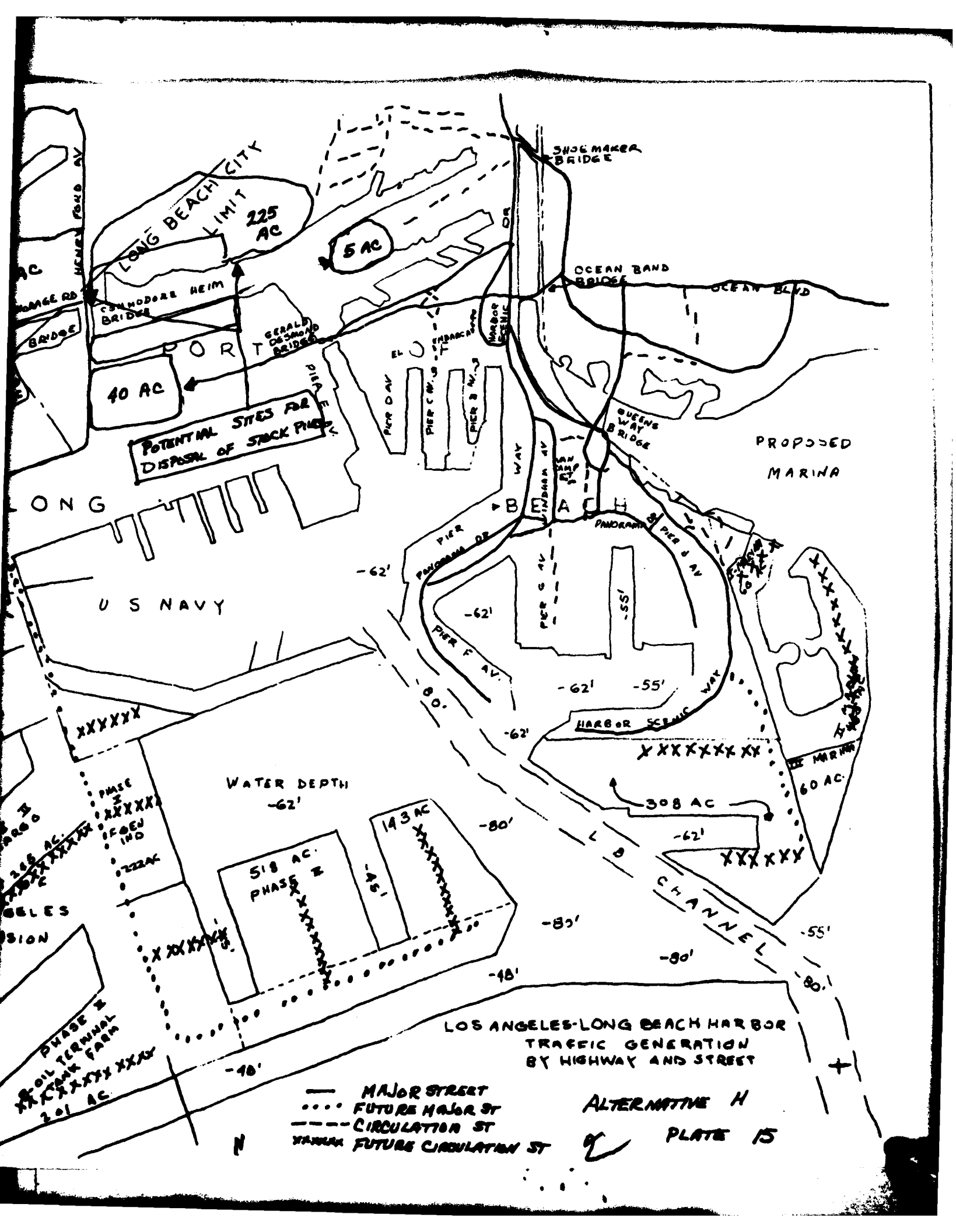


LOS ANGELES-LONG BEACH HARBOR
TRAFFIC GENERATION
BY RAILROAD

---- EXISTING RAILROADS
XXXX FUTURE RAILROADS

2 ALTERNATIVE G PLATE 14





LONG BEACH CITY
LIMIT
225 AC

40 AC

5 AC

POTENTIAL SITES FOR
DISPOSAL OF STACK PILES

U S NAVY

WATER DEPTH
-62'

518 AC
PHASE II

143 AC

308 AC

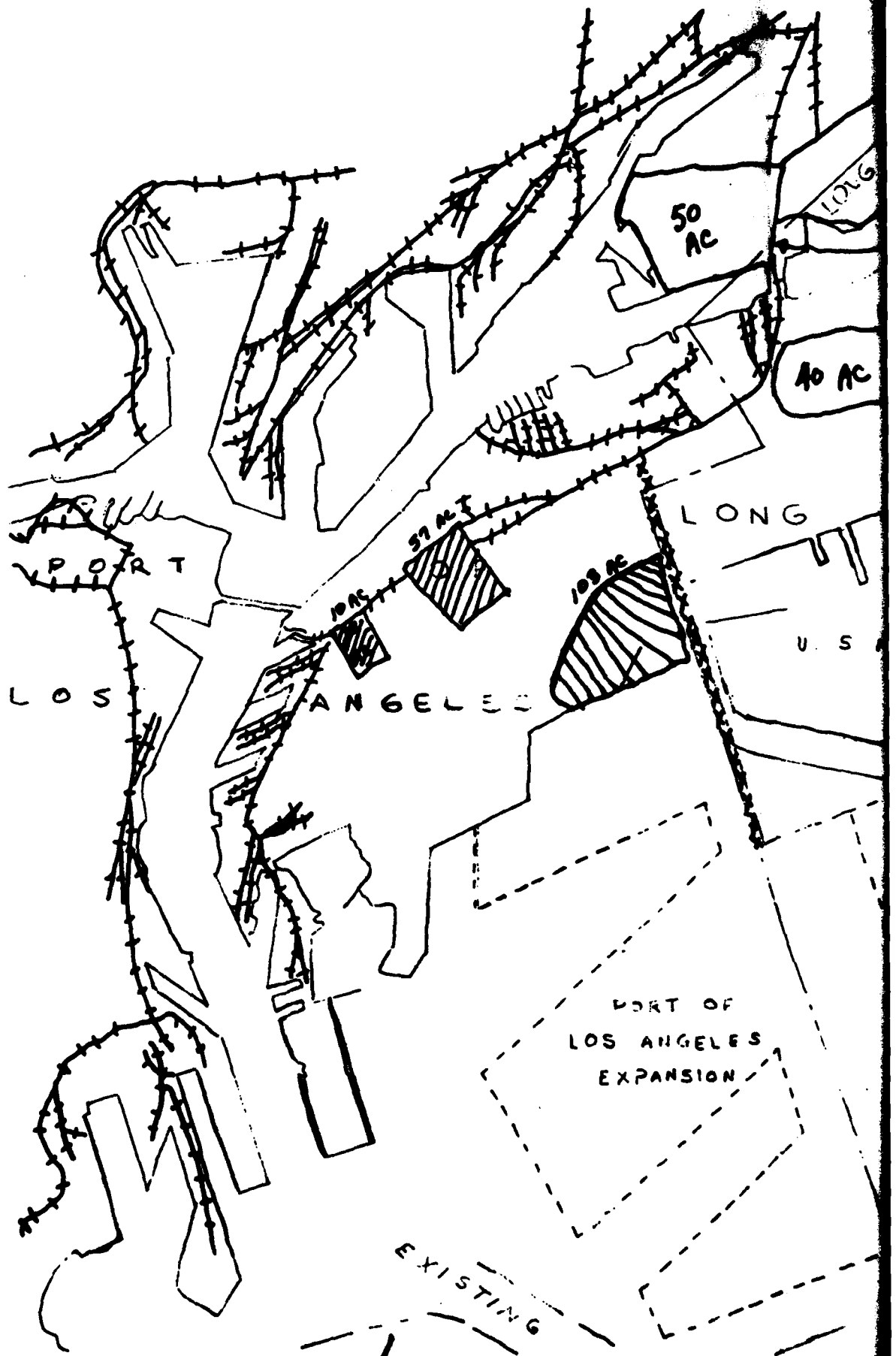
60 AC

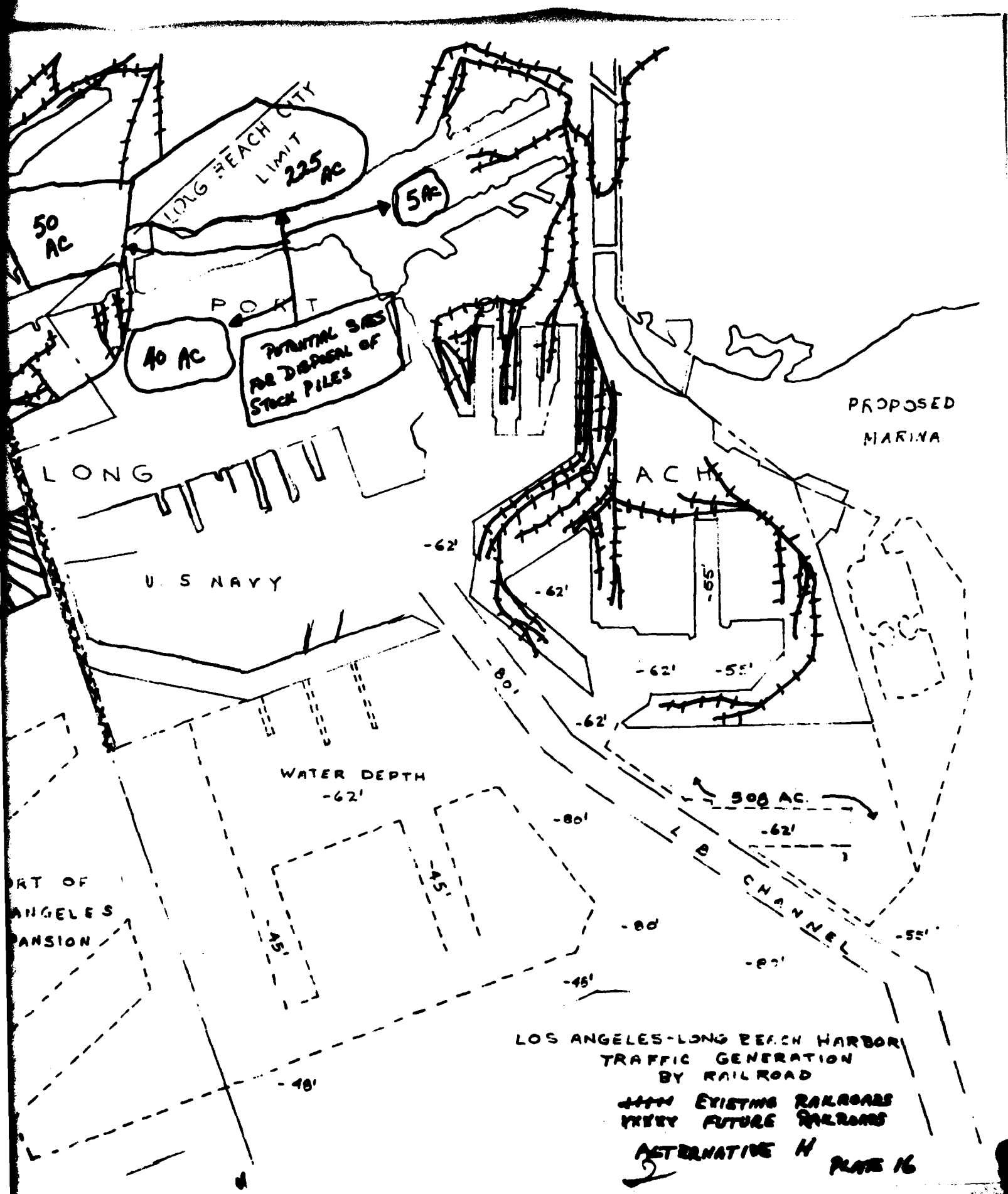
PHASE III
201 AC

LOS ANGELES-LONG BEACH HARBOR
TRAFFIC GENERATION
BY HIGHWAY AND STREET

- MAJOR STREET
- FUTURE MAJOR ST
- - - CIRCULATION ST
- XXXXXX FUTURE CIRCULATION ST

ALTERNATIVE H
PLATE 15

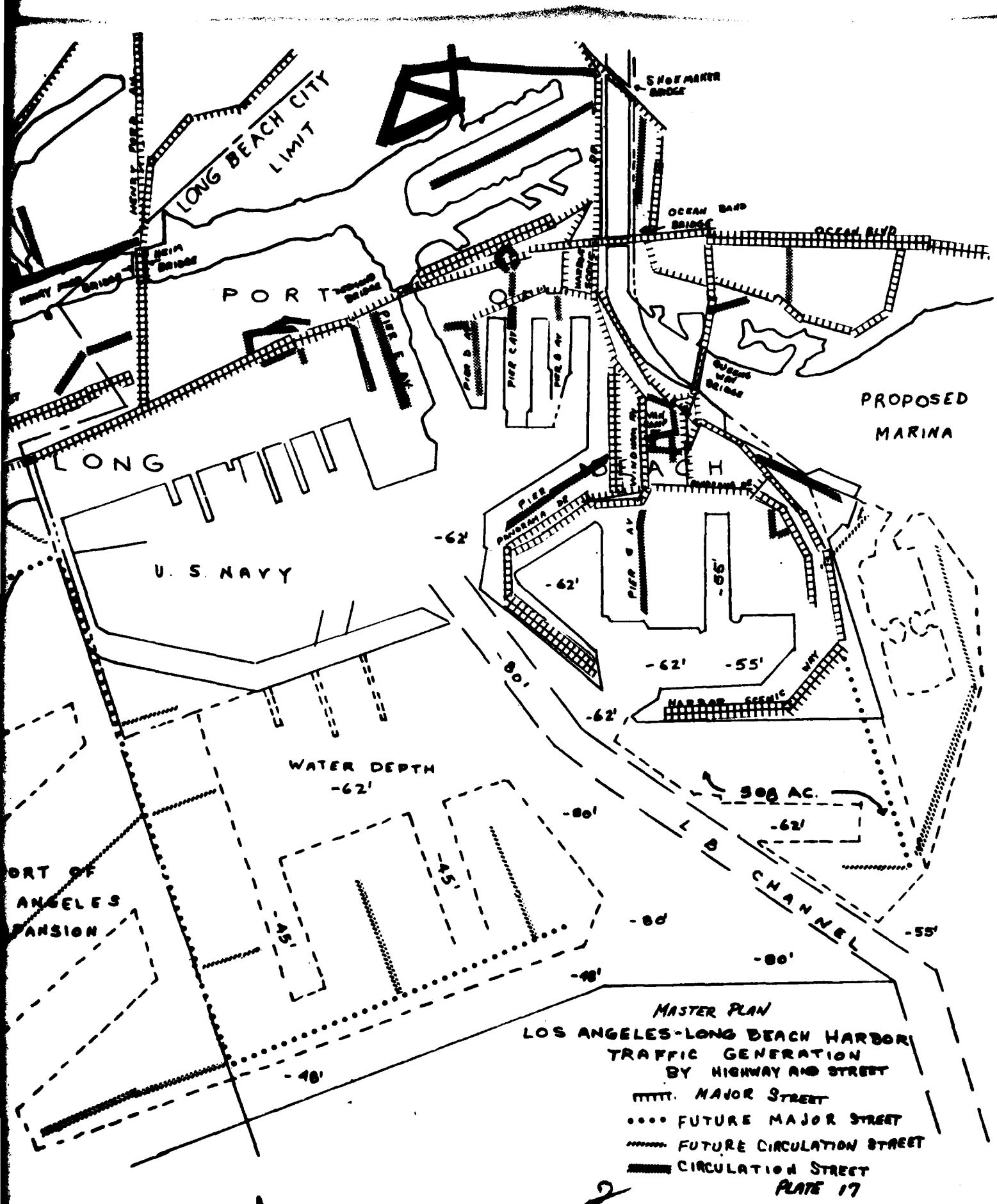




LOS ANGELES-LONG BEACH HARBOR
 TRAFFIC GENERATION
 BY RAILROAD

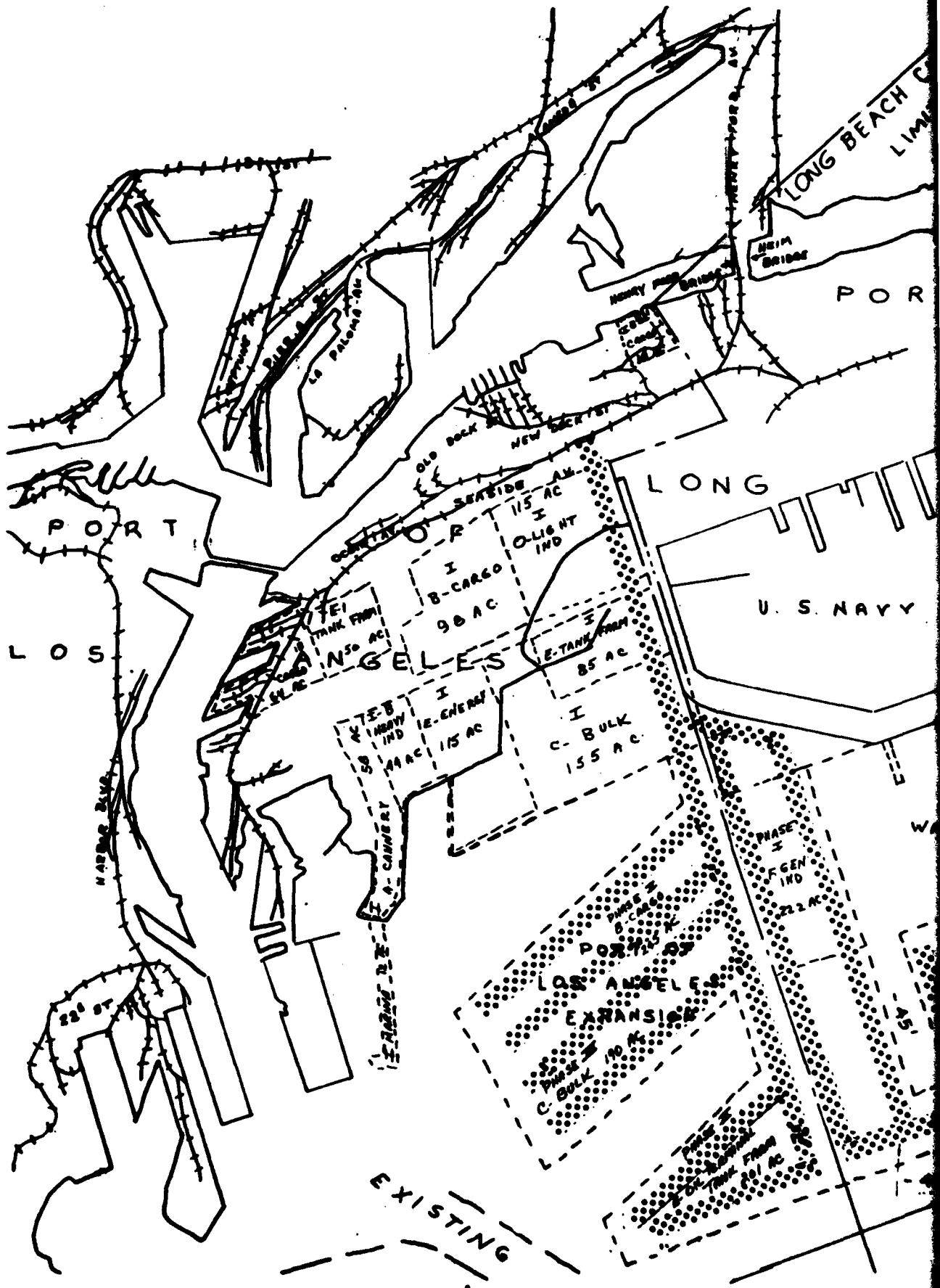
--- EXISTING RAILROADS
 - - - - - FUTURE RAILROADS

ALTERNATIVE H
 2
 PAGE 16



MASTER PLAN
LOS ANGELES-LONG BEACH HARBOR
TRAFFIC GENERATION
BY HIGHWAY AND STREET
 - - - - - MAJOR STREET
 FUTURE MAJOR STREET
 ~~~~~ FUTURE CIRCULATION STREET  
 ===== CIRCULATION STREET  
 PLATE 17

2



LOS ANGELES PORT

LONG BEACH LIM

PORT

LONG

U.S. NAVY

LOS ANGELES

SEASIDE AVE. 115 AC

I-B-CARGO 90 AC

I-E-TANK 85 AC

I-E-ENERGY 115 AC

I-C-BULK 155 AC

LOS ANGELES

EXPANSION

EXISTING

PHASE I  
F-GEN IND  
222 AC

PHASE II  
C-BULK 70 AC

PHASE III  
E-TANK 261 AC

HARBOR BLVD.

224 ST.

451 ST.

OLD DOCK ST.

NEW DOCK ST.

HARRY FINE BRIDGE

MAIN BRIDGE

U.S. PALM

TANK FARM

NAVY IND

CANNERY

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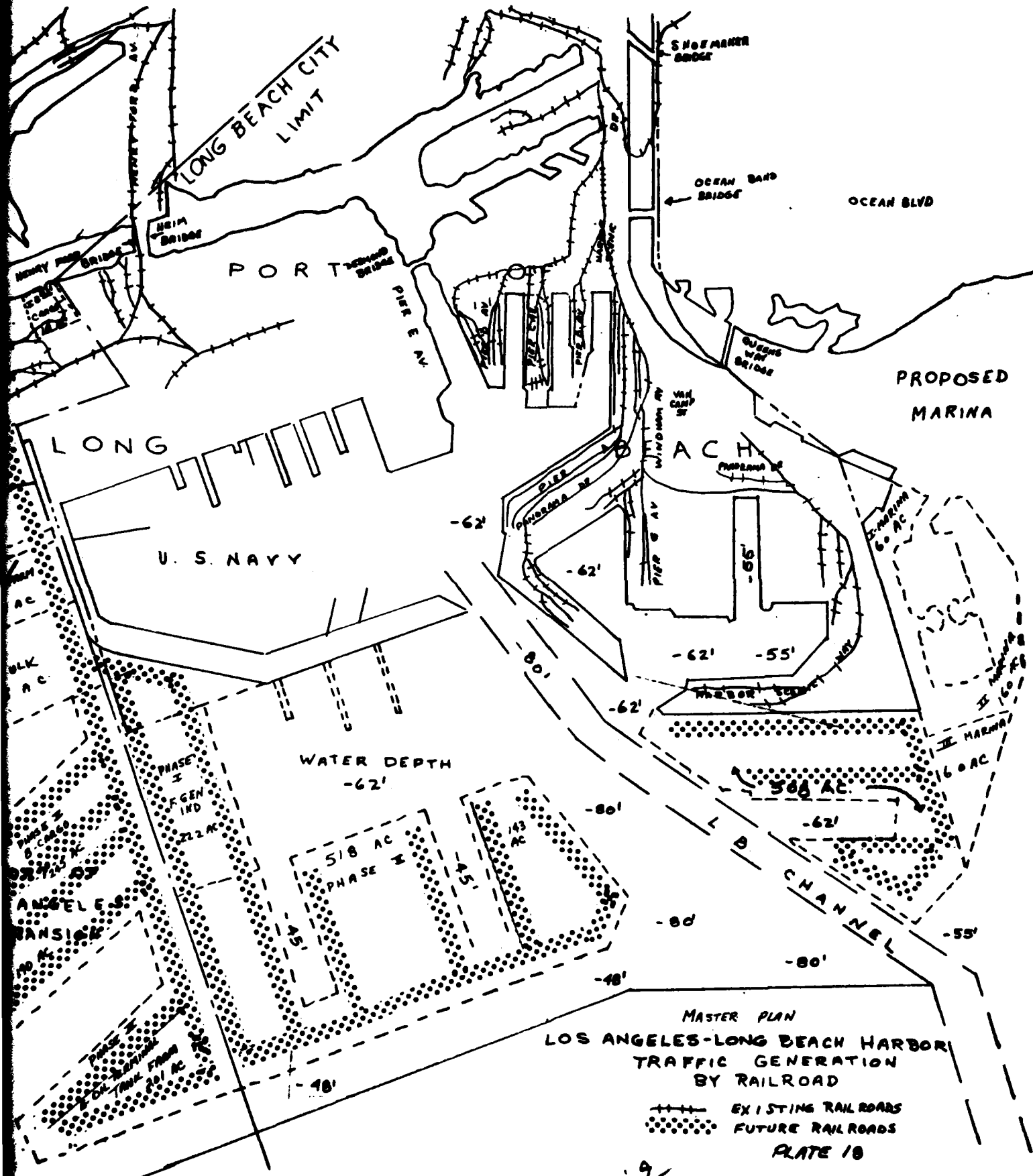
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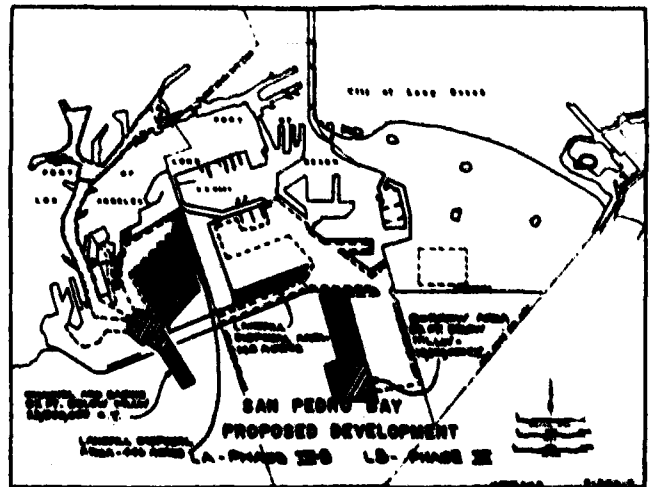
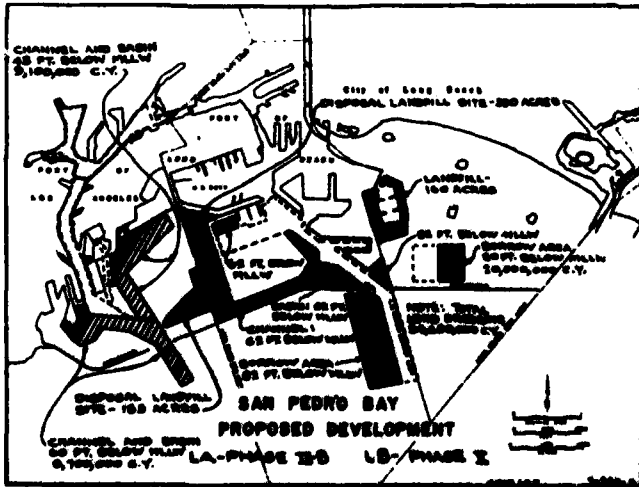
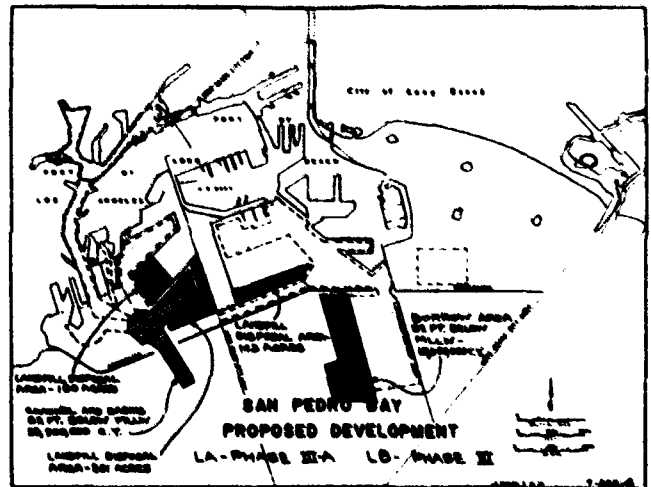
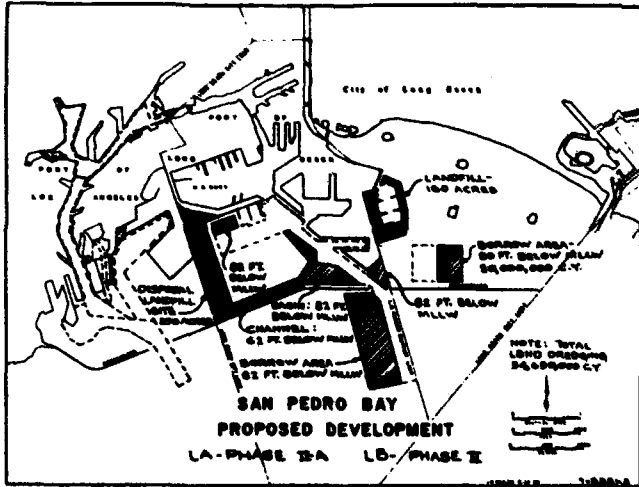
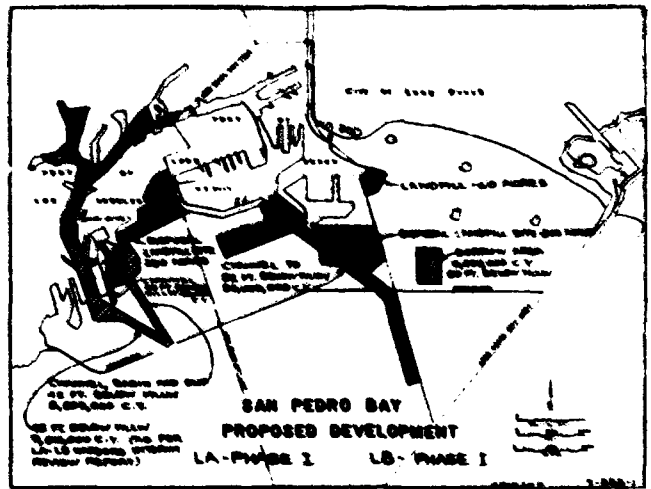
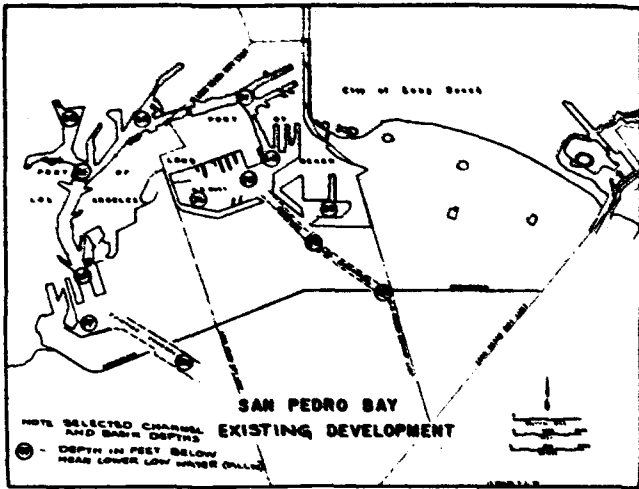


MASTER PLAN  
 LOS ANGELES-LONG BEACH HARBOR  
 TRAFFIC GENERATION  
 BY RAILROAD

- ++++ EXISTING RAILROADS
- ..... FUTURE RAILROADS

PLATE 10

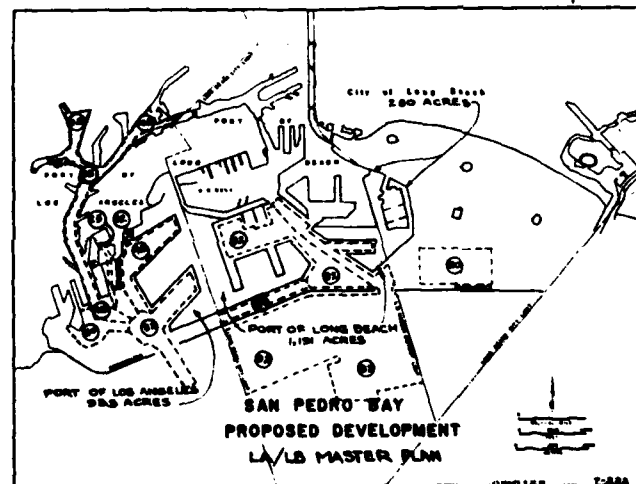
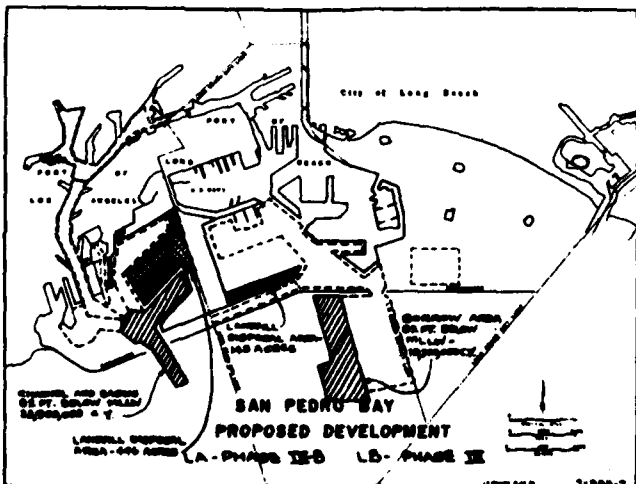
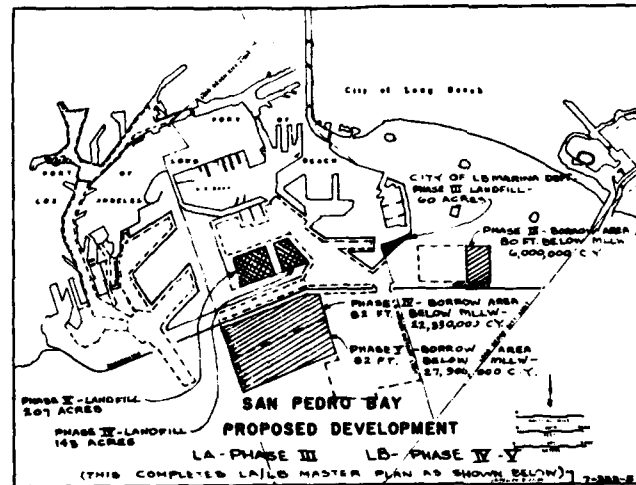
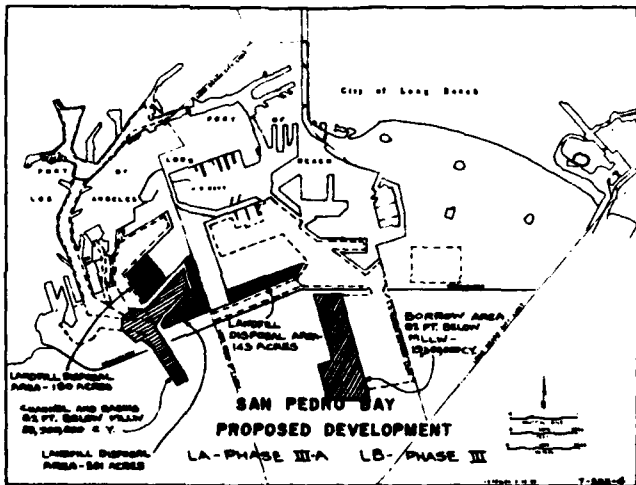
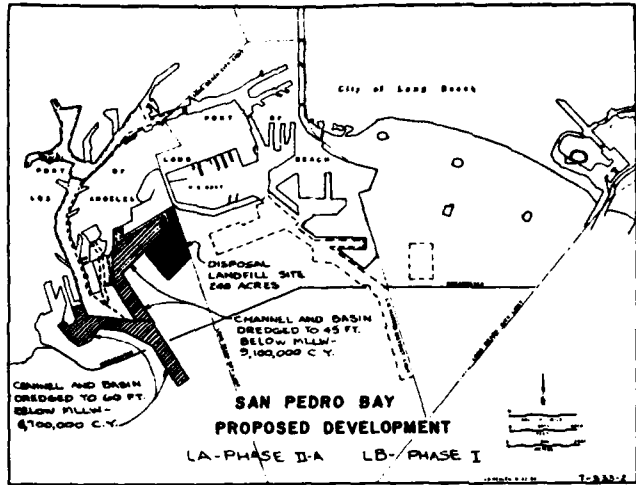
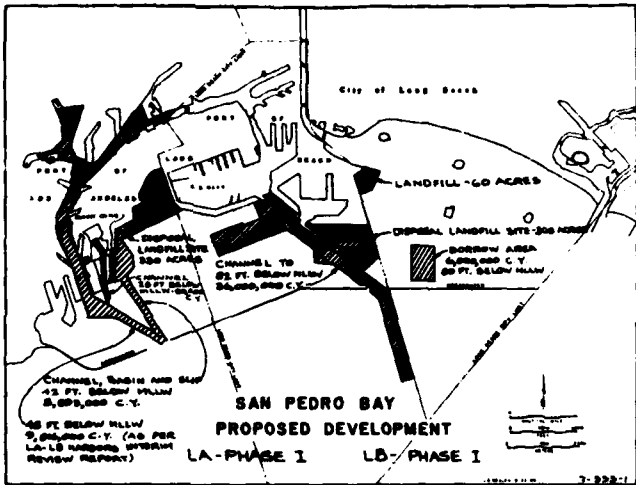
9



NOTE: TWO ALTERNATE CHANNELS FOR THE COMPLETION OF THE PROPOSED MASTER PLAN ARE INDICATED



**SAN PEDRO BAY  
PHASED DEVELOPMENT**  
AS PROPOSED BY: PORT OF LOS ANGELES  
CITY OF LONG BEACH  
CITY OF LONG BEACH



**SAN PEDRO BAY PHASED DEVELOPMENT**  
 AS PROPOSED BY: PORT OF LOS ANGELES  
 PORT OF LONG BEACH  
 CITY OF LONG BEACH

| REVISION | DESCRIPTION | DATE |
|----------|-------------|------|
|          |             |      |

SUMMARY DRAWING  
 PREPARED BY: LOS ANGELES DISTRICT,  
 U.S. CORPS OF ENGINEERS,  
 DECEMBER 1978

