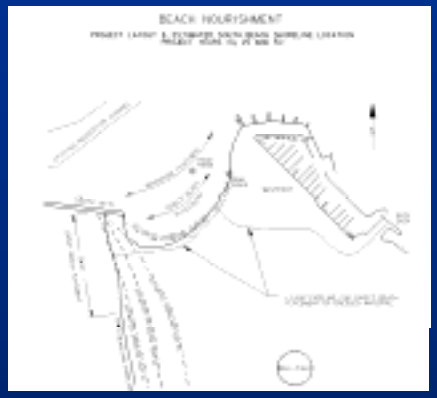
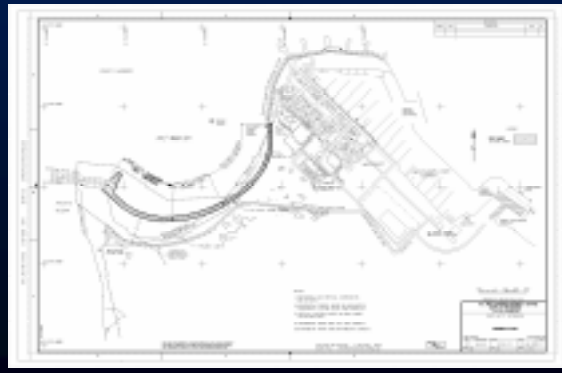
Alternatives Analysis

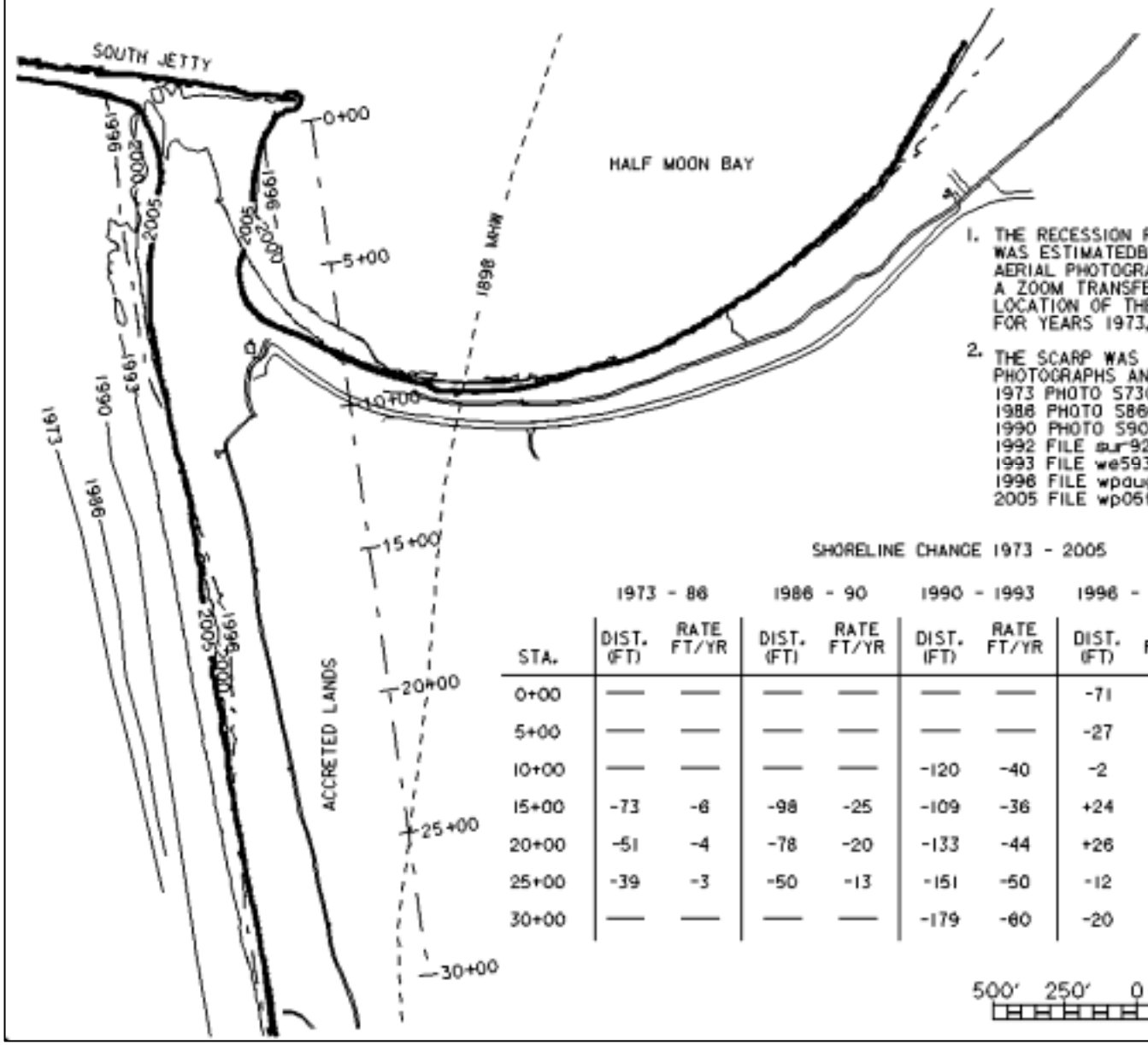




EXISTING CONDITIONS

South Beach Erosion

SHORELINE CHANGE 1973 - 2005



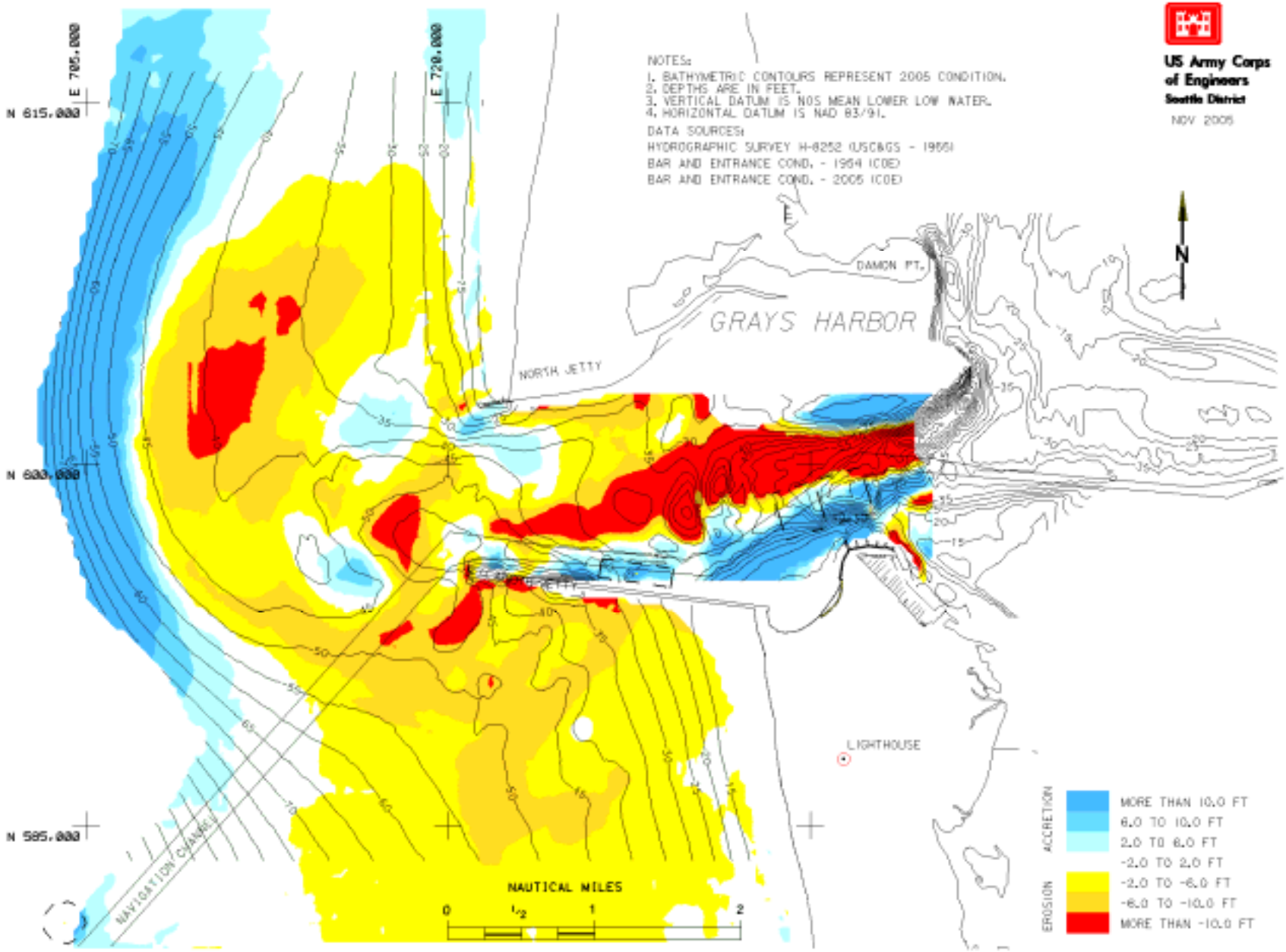
1. THE RECESSION RATE OF THE BEACH SCARP WAS ESTIMATEDBY COMPARING 1973, 86, & 90 AERIAL PHOTOGRAPHS,AND 1993, 1996, AND 2004 SURVEYS. A ZOOM TRANSFER SCOPE WAS USED TO PLOT THE LOCATION OF THE BEACH SCARP (APPROX. EL. +18') FOR YEARS 1973, 86, AND 90.

2. THE SCARP WAS LOCATED ON THE FOLLOWING PHOTOGRAPHS AND DATA FILES:
1973 PHOTO S73048-5-6,8,& 10
1986 PHOTO S86020-341-8
1990 PHOTO S90007-341-9 & 11
1992 FILE sur92mllw.tpo
1993 FILE we593tn.dgn & we593ts.dgn
1996 FILE wpaug96.tpo
2005 FILE wp05t&b.dgn

SHORELINE CHANGE 1973 - 2005

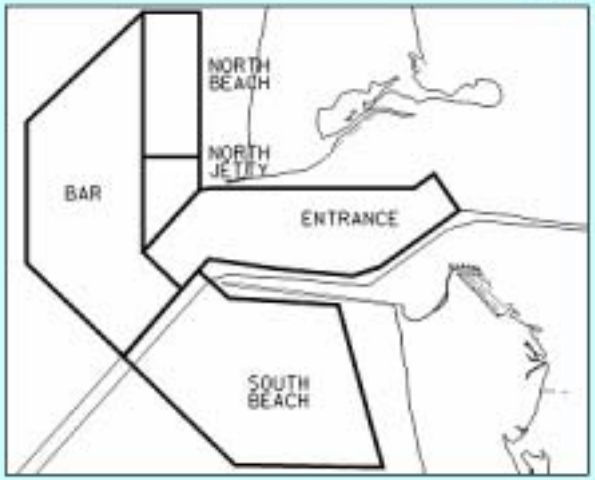
	1973 - 86		1986 - 90		1990 - 1993		1996 - 2000		2000 - 2005		1973 - 2005	
STA.	DIST. (FT)	RATE FT/YR	DIST. (FT)	RATE FT/YR	DIST. (FT)	RATE FT/YR	DIST. (FT)	RATE FT/YR	DIST. (FT)	RATE FT/YR	DIST. (FT)	RATE FT/YR
0+00	—	—	—	—	—	—	-71	-18	-68	-14	—	—
5+00	—	—	—	—	—	—	-27	-9	-29	-6	—	—
10+00	—	—	—	—	-120	-40	-2	-0.5	+5	+1	-407	-13
15+00	-73	-6	-98	-25	-109	-36	+24	+6	+16	+3	-376	-12
20+00	-51	-4	-78	-20	-133	-44	+26	+6	+15	+3	-337	-11
25+00	-39	-3	-50	-13	-151	-50	-12	-3	+5	+1	-299	-9
30+00	—	—	—	—	-179	-60	-20	-5	-12	-2	—	—

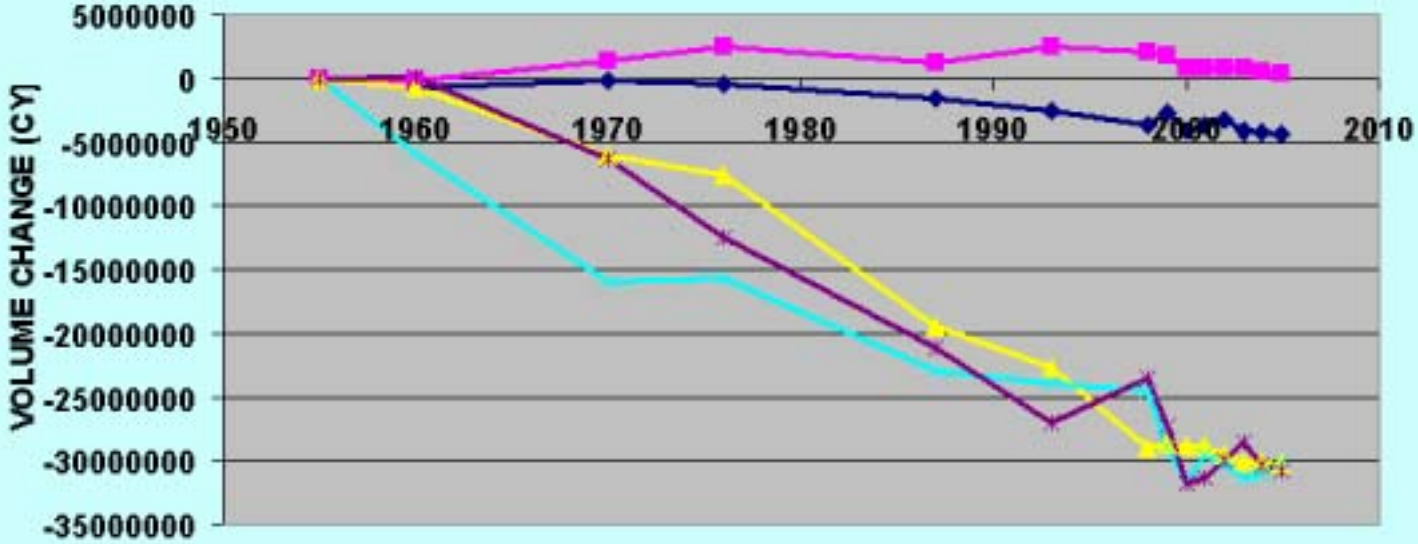
GRAYS HARBOR BAR AND ENTRANCE – ELEVATION CHANGES 1955 TO 2005



BAR AND ENTRANCE VOLUME CHANGE

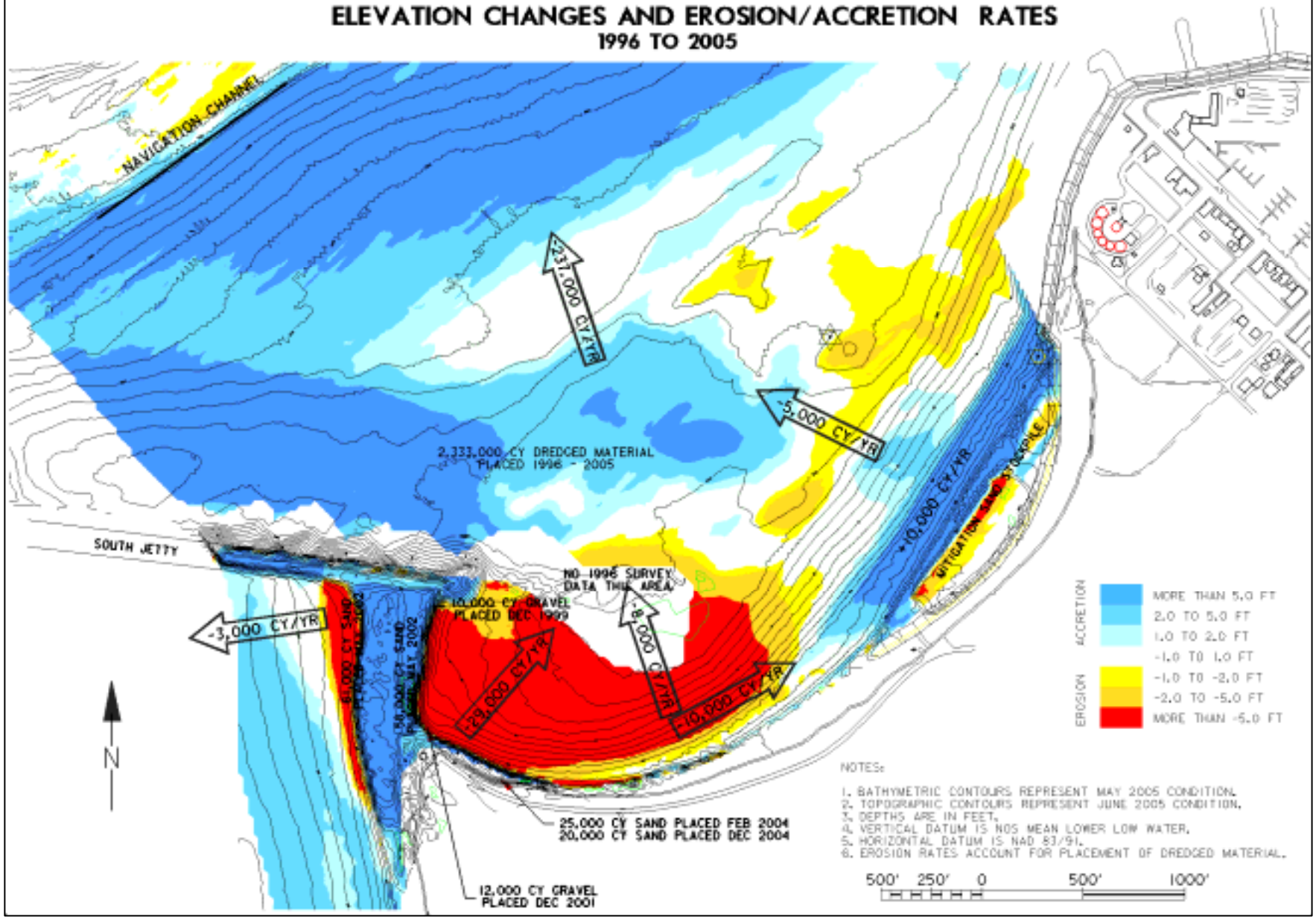
1955 - 2005





Half Moon Bay Erosion

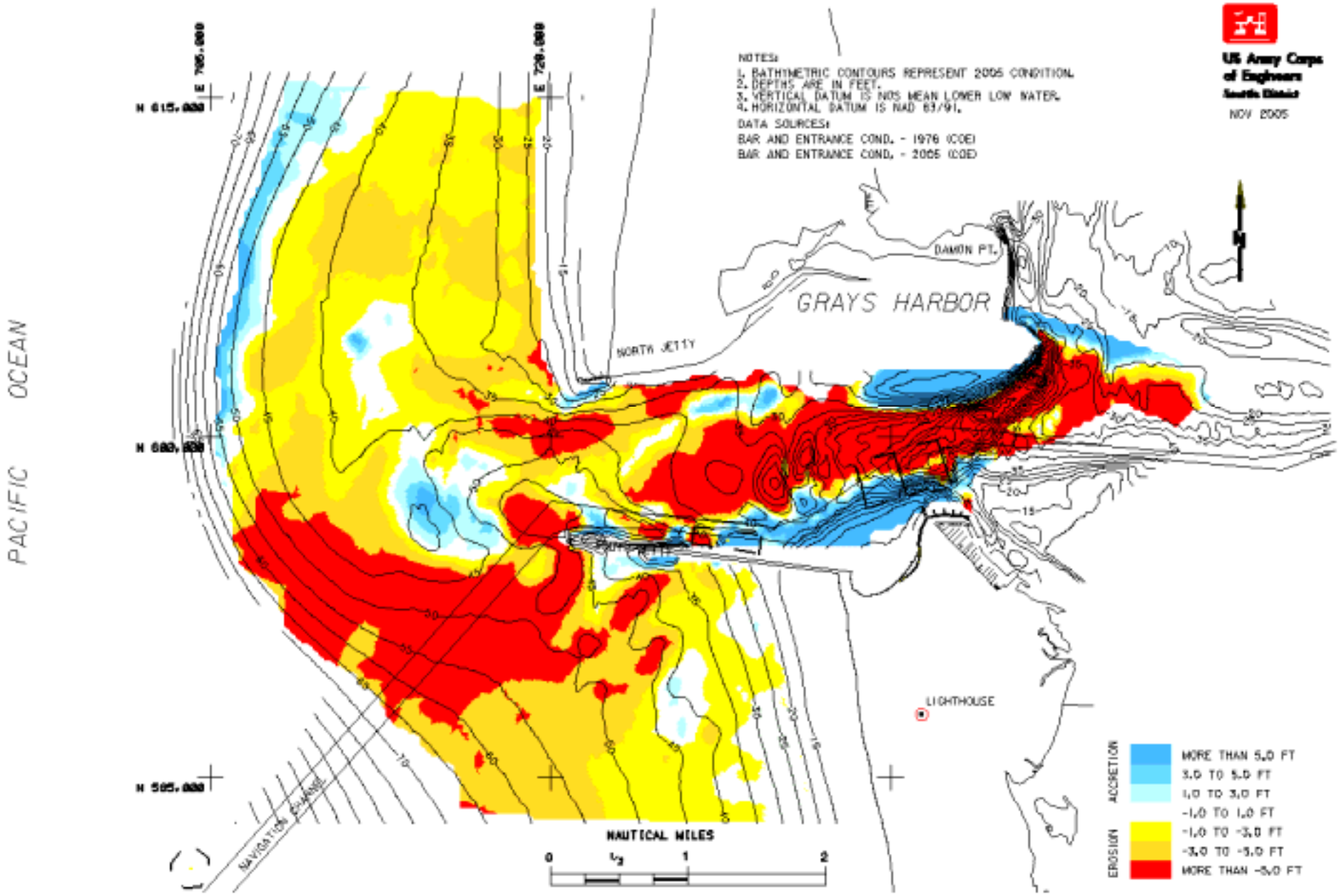
HALF MOON BAY
ELEVATION CHANGES AND EROSION/ACCRETION RATES
1996 TO 2005



Source of Beach Nourishment Material ?

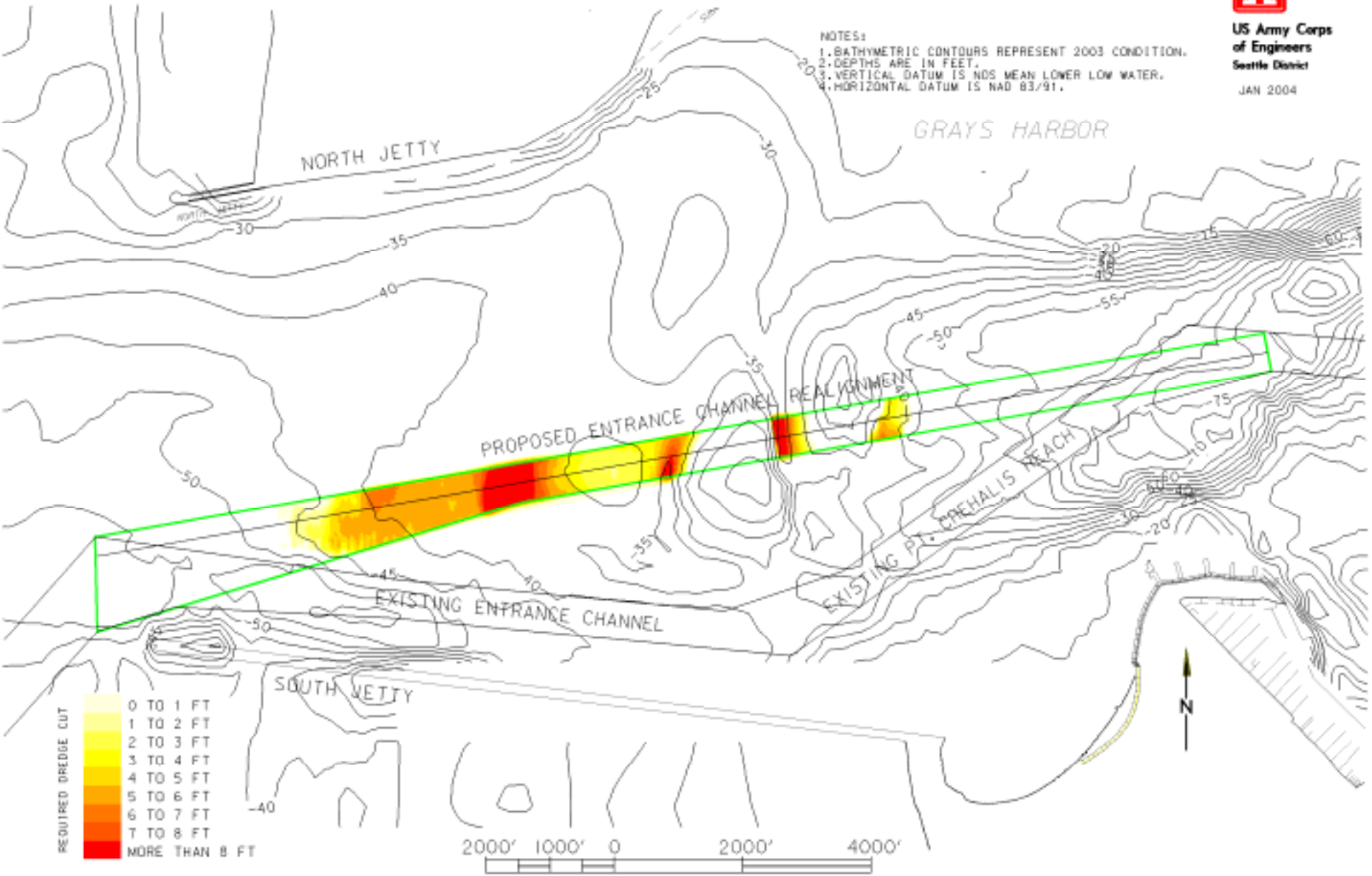
Grays Harbor Navigation Project

GRAYS HARBOR BAR AND ENTRANCE – ELEVATION CHANGES 1976 TO 2005

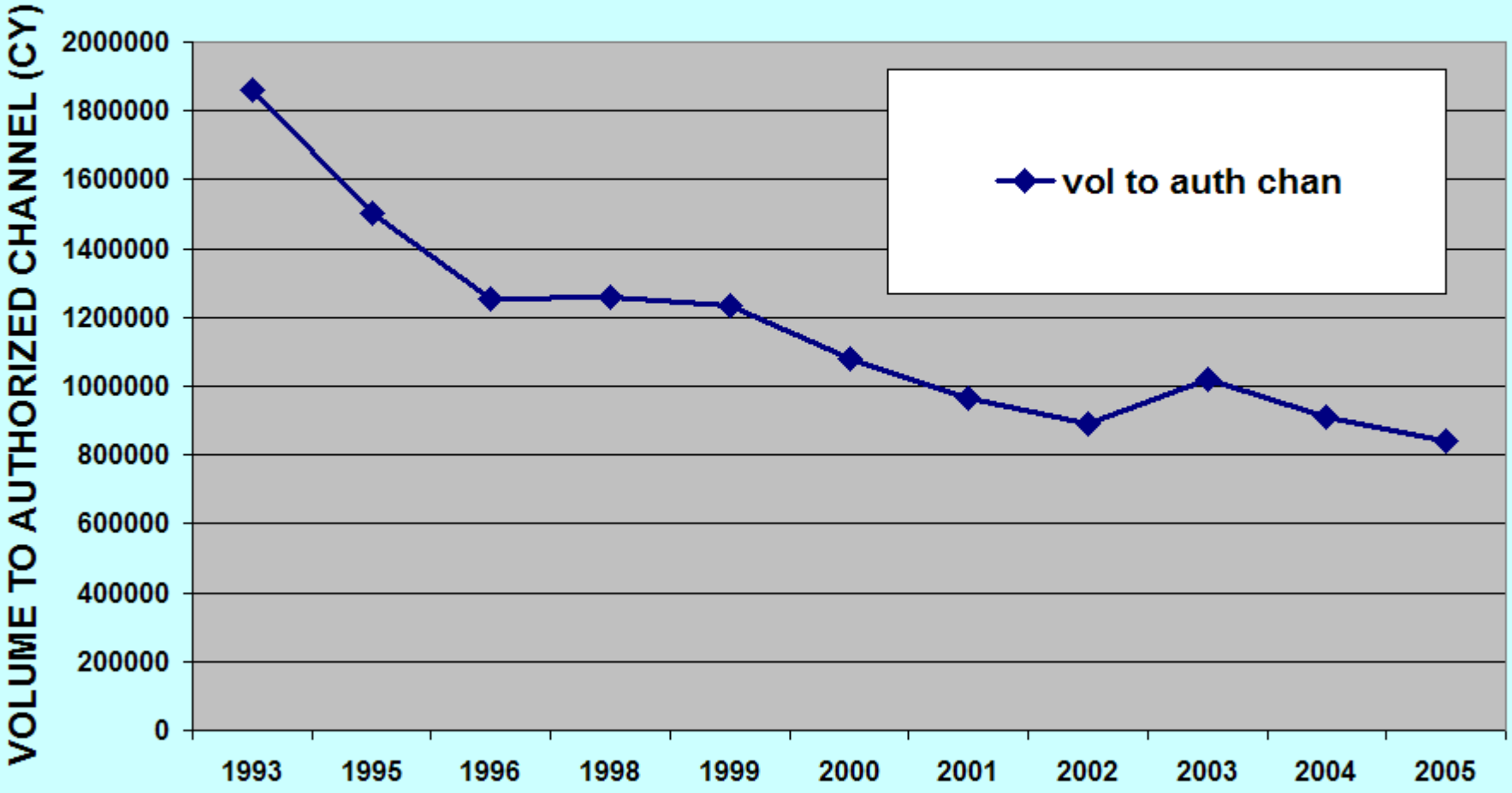


ENTRANCE CHANNEL REALIGNMENT

REQUIRED DREDGE CUT TO AUTHORIZED DEPTH +2'



MIDDLE CHANNEL - VOLUME TO AUTHORIZED DEPTH



Design Assumptions

- **The project costs and environmental effects of the alternatives will be evaluated on the basis of a 50-year-design life.**
- **The recession rate of the South Beach shoreline will continue at the 1976 – 2005 average.**
- **The erosion of material from Half Moon Bay will continue at the 1996-2005 rate.**
- **The Entrance Channel will be realigned, naturally or by dredging, within the next 10 years.**
- **The availability of maintenance dredged material for beach nourishment will decrease significantly when the Entrance Channel is realigned.**

Design Objectives

- **The plan will allow the Corps of Engineers to continue to maintain and protect the Grays Harbor Navigation Project features in a cost effective, environmentally acceptable manner.**
- **The plan will address the long-term erosion rates of the South Beach and Half Moon Bay shorelines and balance the availability of sand with beach nourishment requirements.**
- **The plan will provide for access to the South Jetty for both routine and emergency repairs.**

NWS Alternatives

No Action

Sand (or Gravel)

Armor Stone

10 AUG 1994

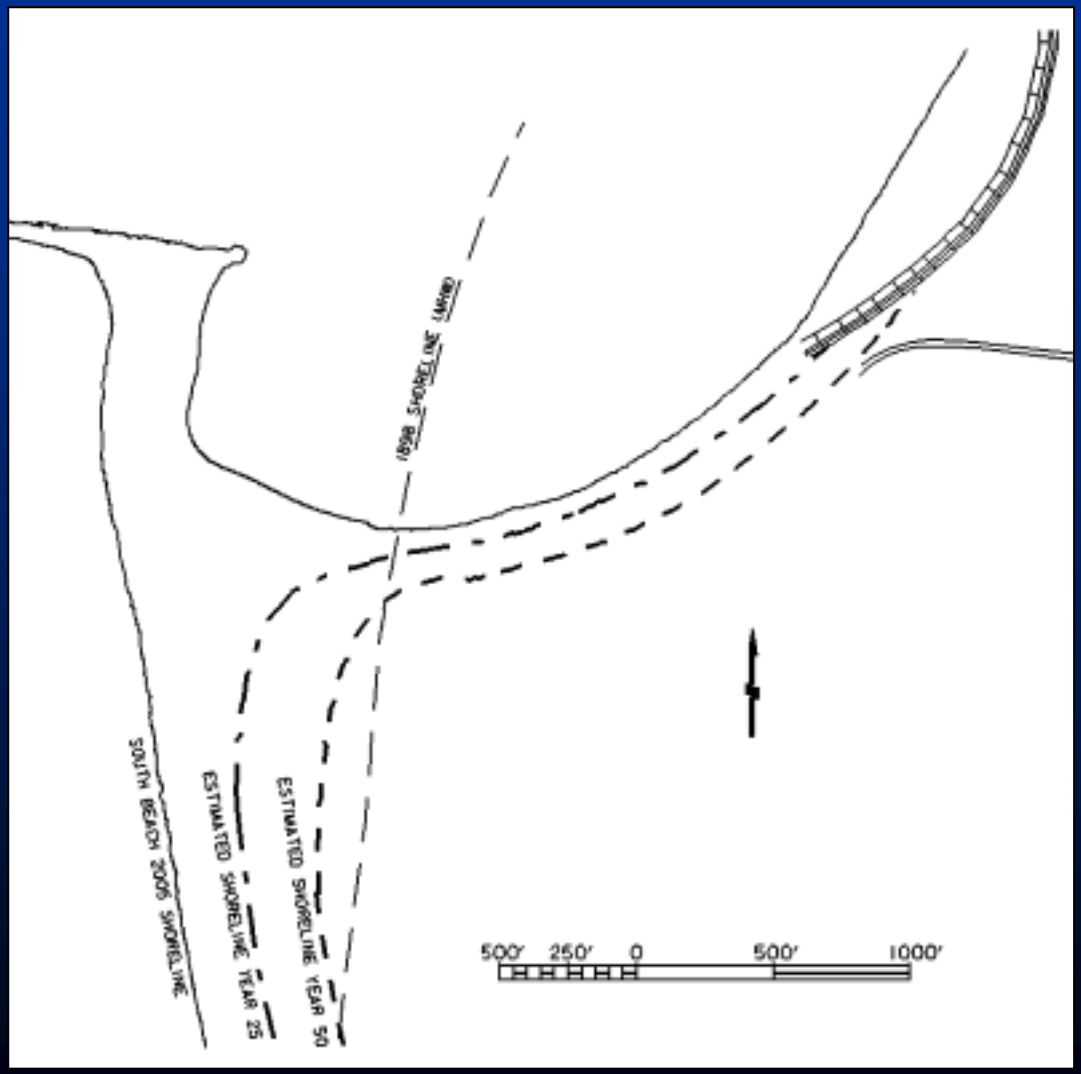
TIDE EL. : +2.3’ MLLW

No Action – (Allow Breach to Form)

Allow Breach to Form

(No Action Alternative Mandated by NEPA)

ESTIMATED SHORELINE LOCATION - PROJECT YEARS 25 AND 50

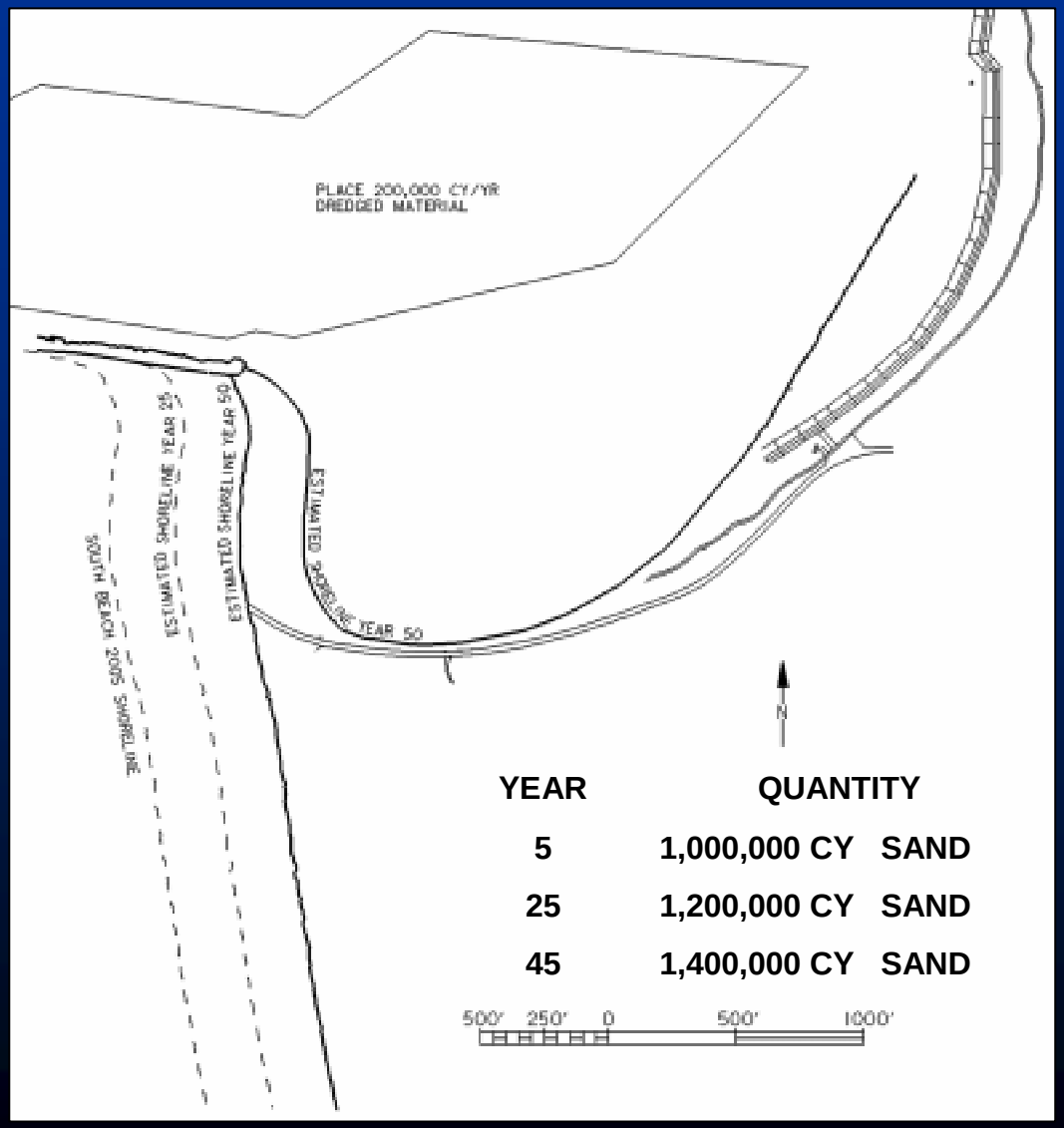


(Emergency closure will also be considered)

Continue Current Practice

PROJECT LAYOUT & ESTIMATED SHORELINE LOCATION

PROJECT YEARS 25 AND 50



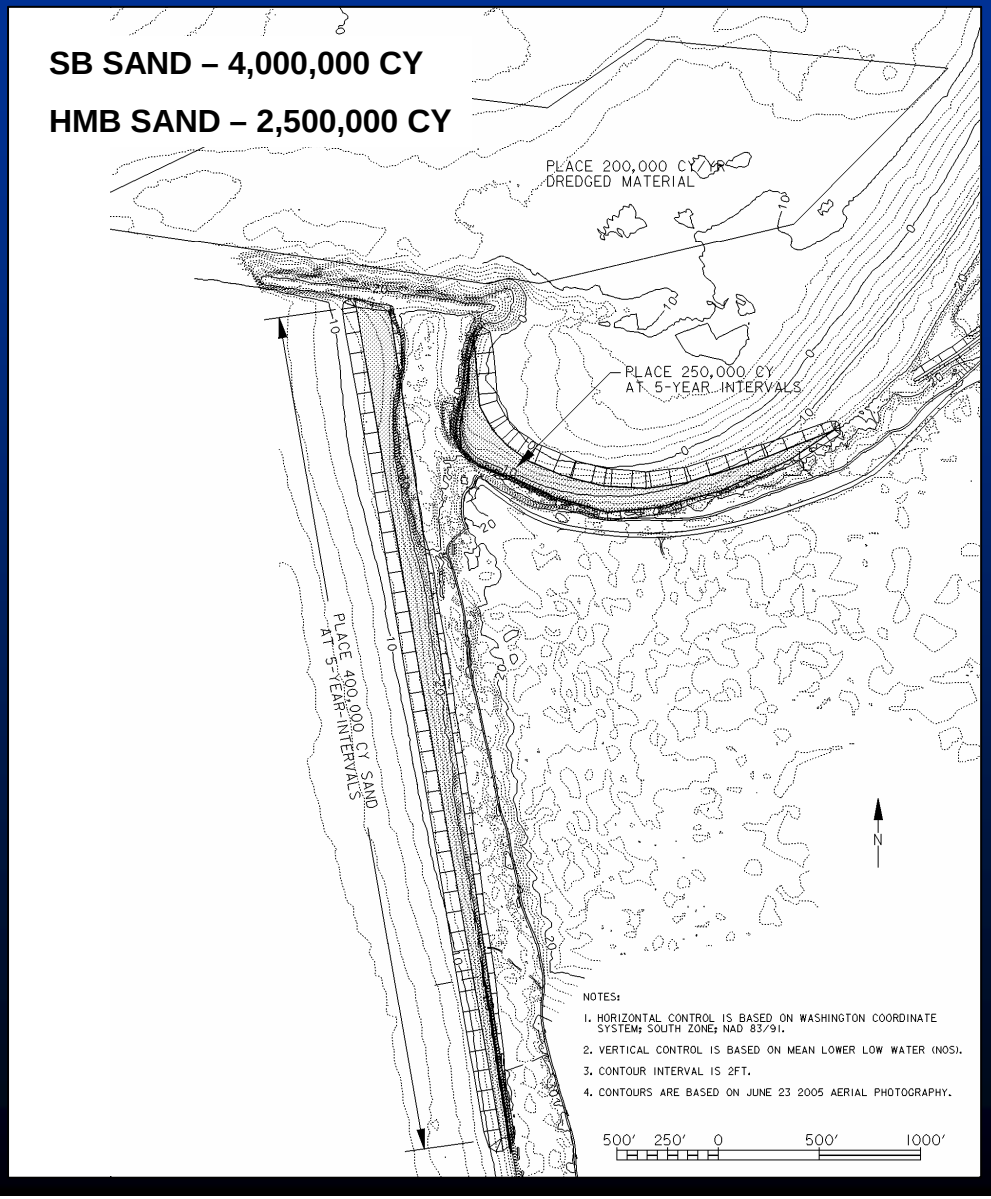
Beach Nourishment

Direct Beach Placement

(Sand on South Beach and Half Moon Bay)

SB SAND – 4,000,000 CY

HMB SAND – 2,500,000 CY



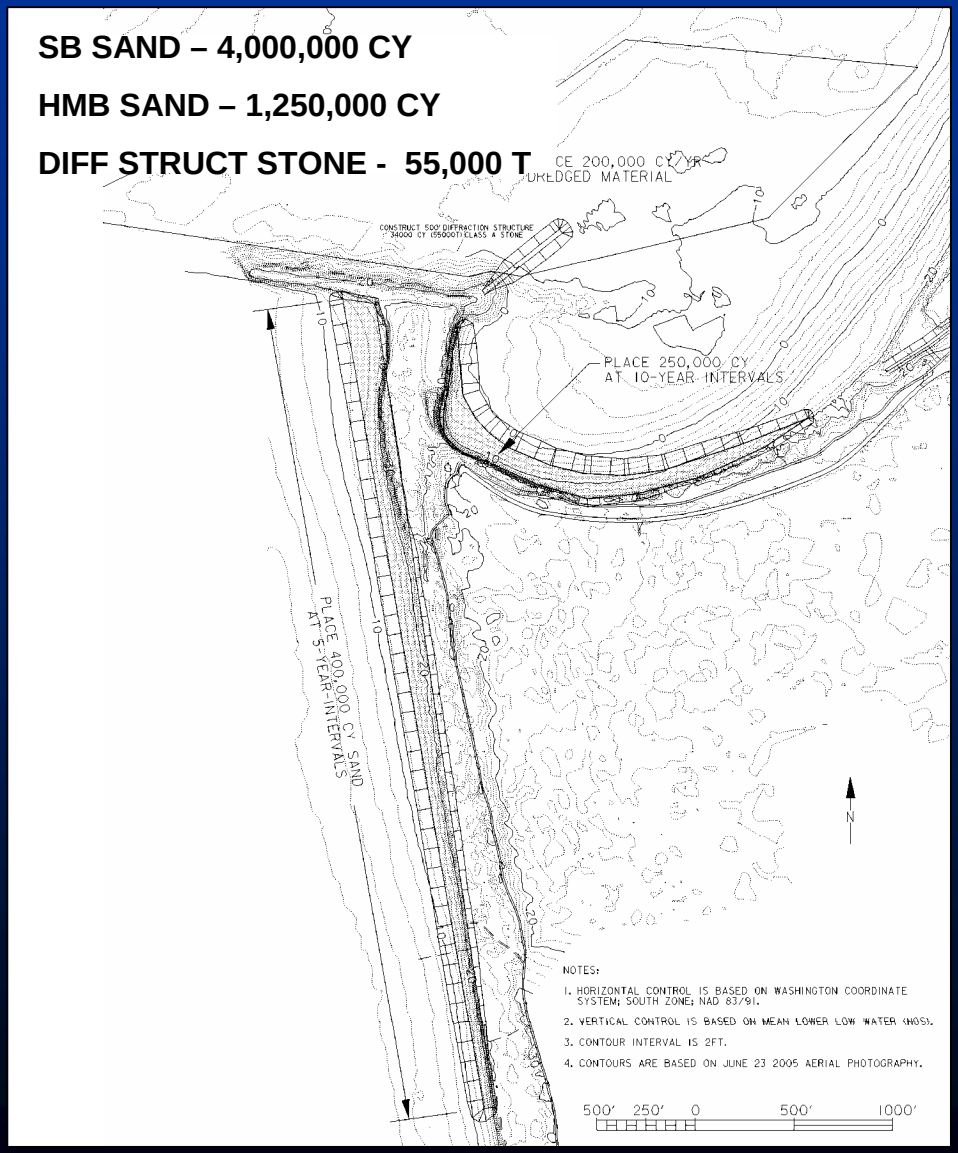
Beach Nourishment

Direct Beach Placement with Diffraction Structure (Sand on South Beach and Half Moon Bay)

SB SAND – 4,000,000 CY

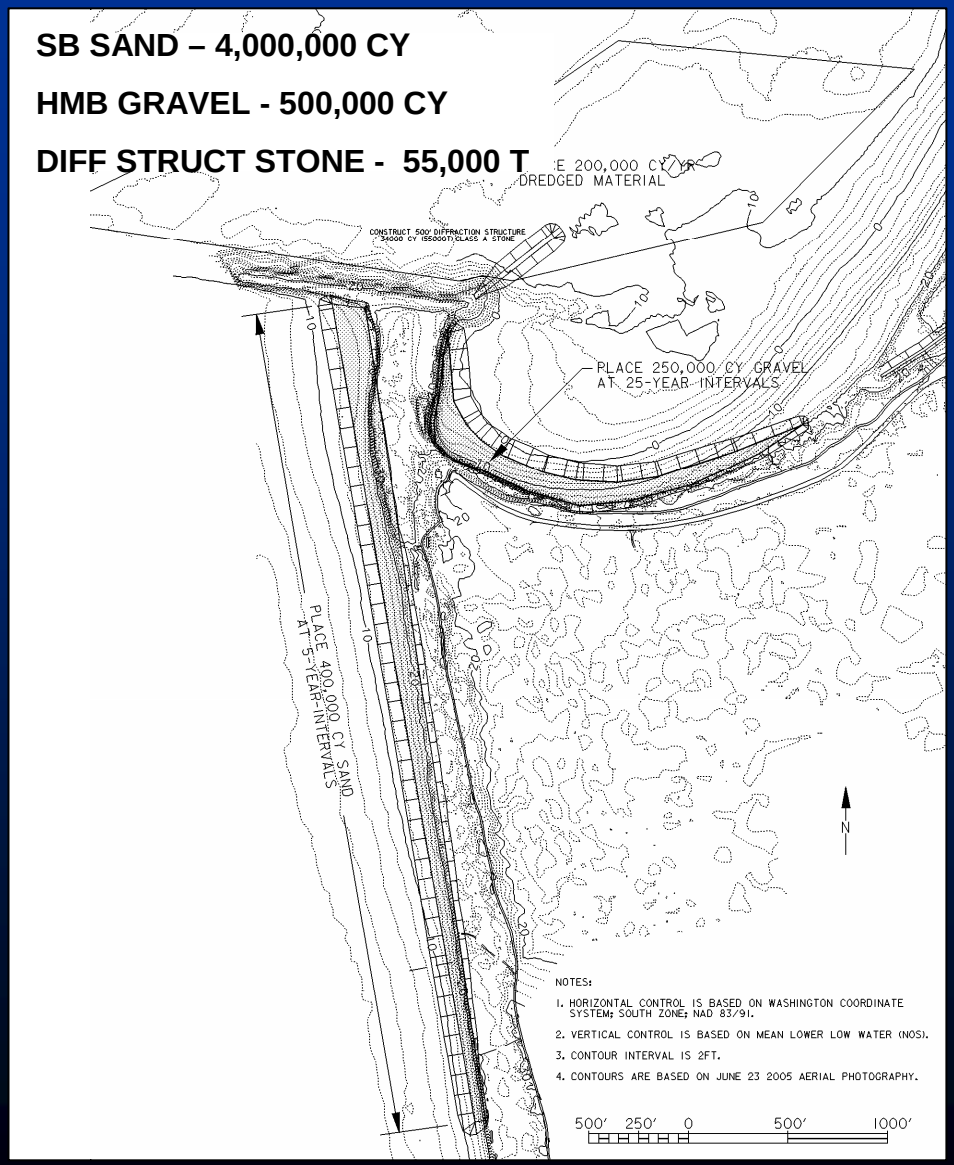
HMB SAND – 1,250,000 CY

DIFF STRUCT STONE - 55,000 T



Beach Nourishment

Direct Beach Placement with Diffraction Structure (Sand on South Beach, Gravel on Half Moon Bay)



Beach Nourishment

Dune Construction with Diffraction Structure

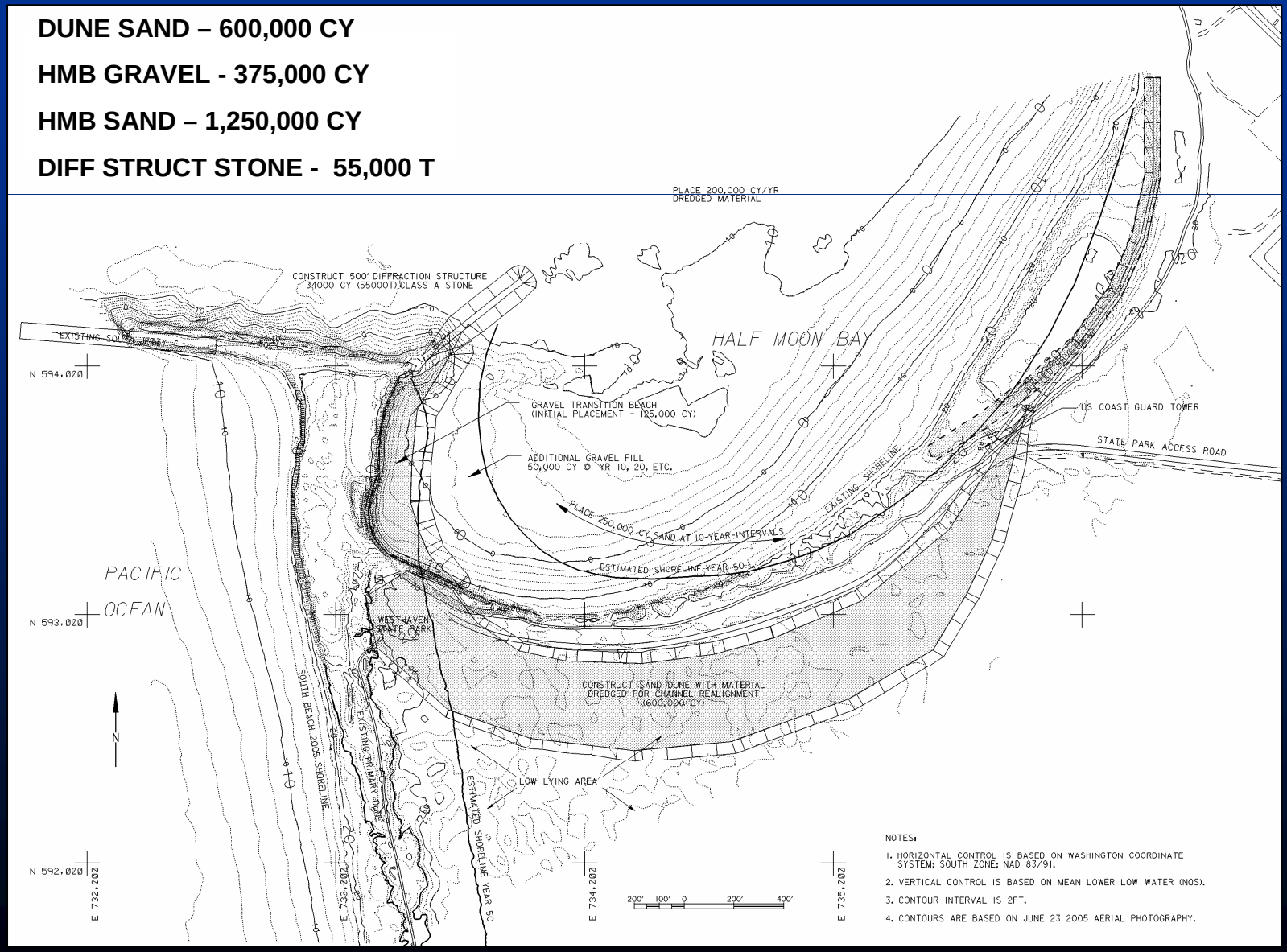
(Sand and Gravel on Half Moon Bay)

DUNE SAND – 600,000 CY

HMB GRAVEL - 375,000 CY

HMB SAND – 1,250,000 CY

DIFF STRUCT STONE - 55,000 T



Beach Nourishment

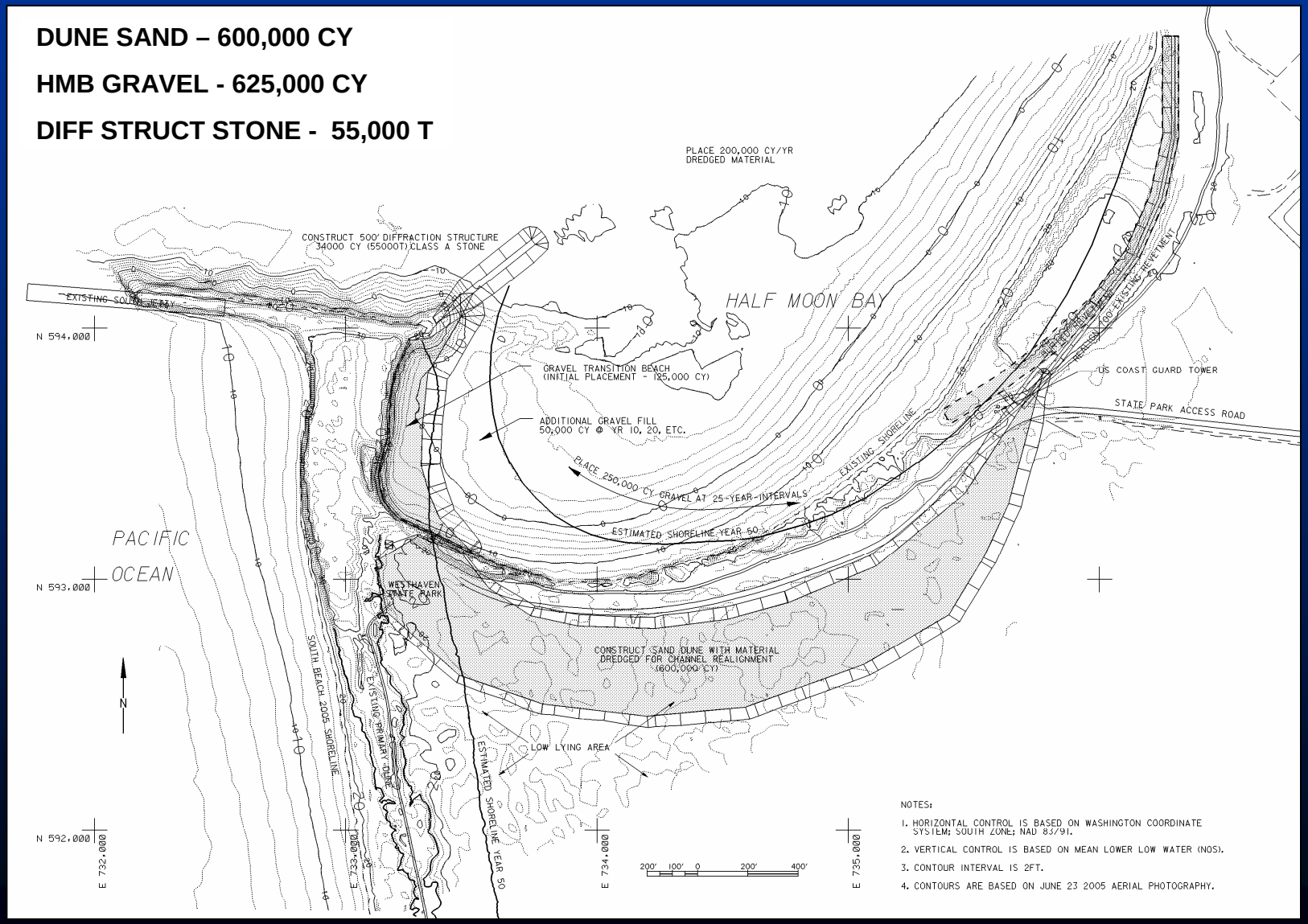
Dune Construction with Diffraction Structure

(Gravel on Half Moon Bay)

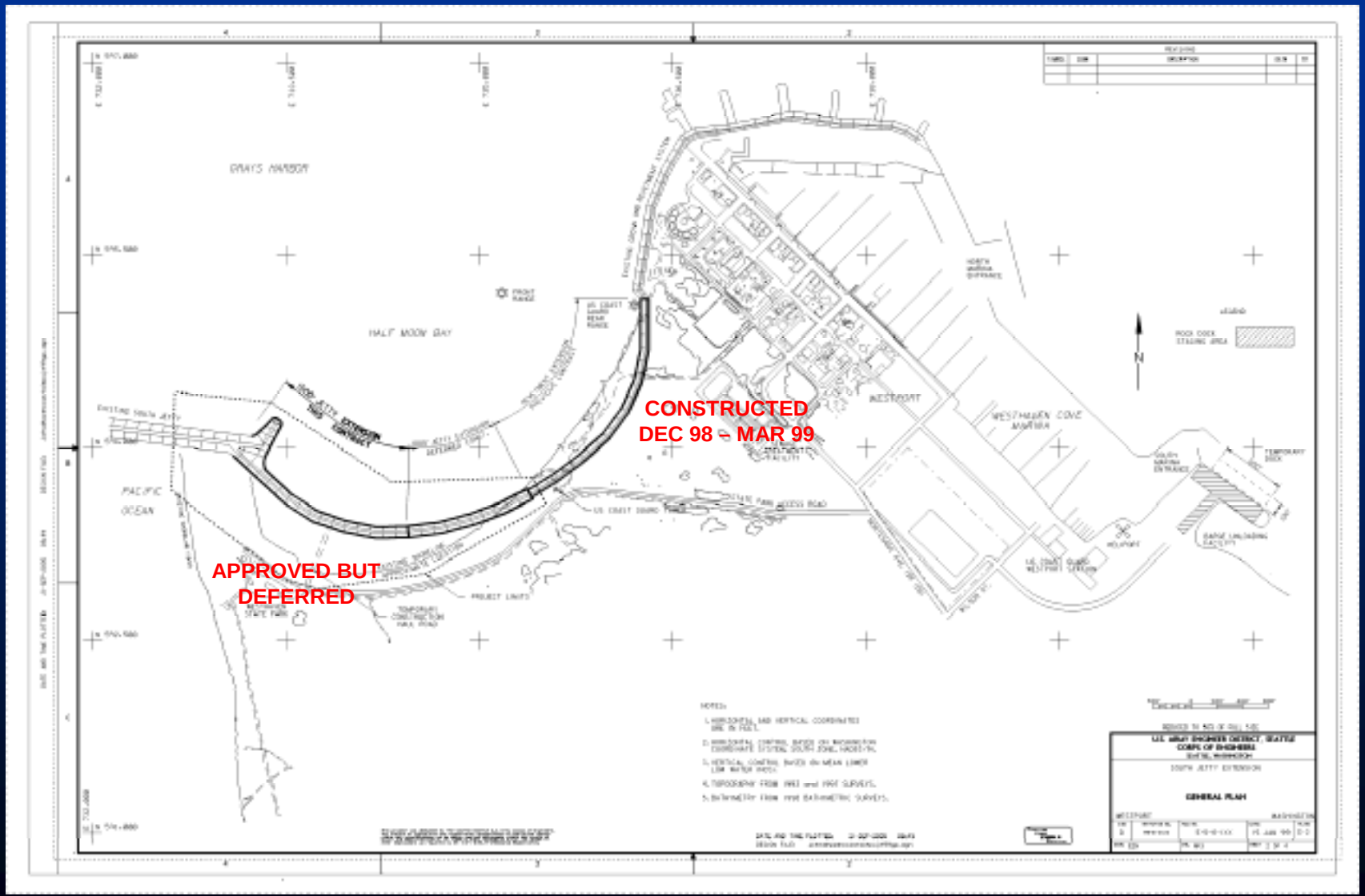
DUNE SAND – 600,000 CY

HMB GRAVEL - 625,000 CY

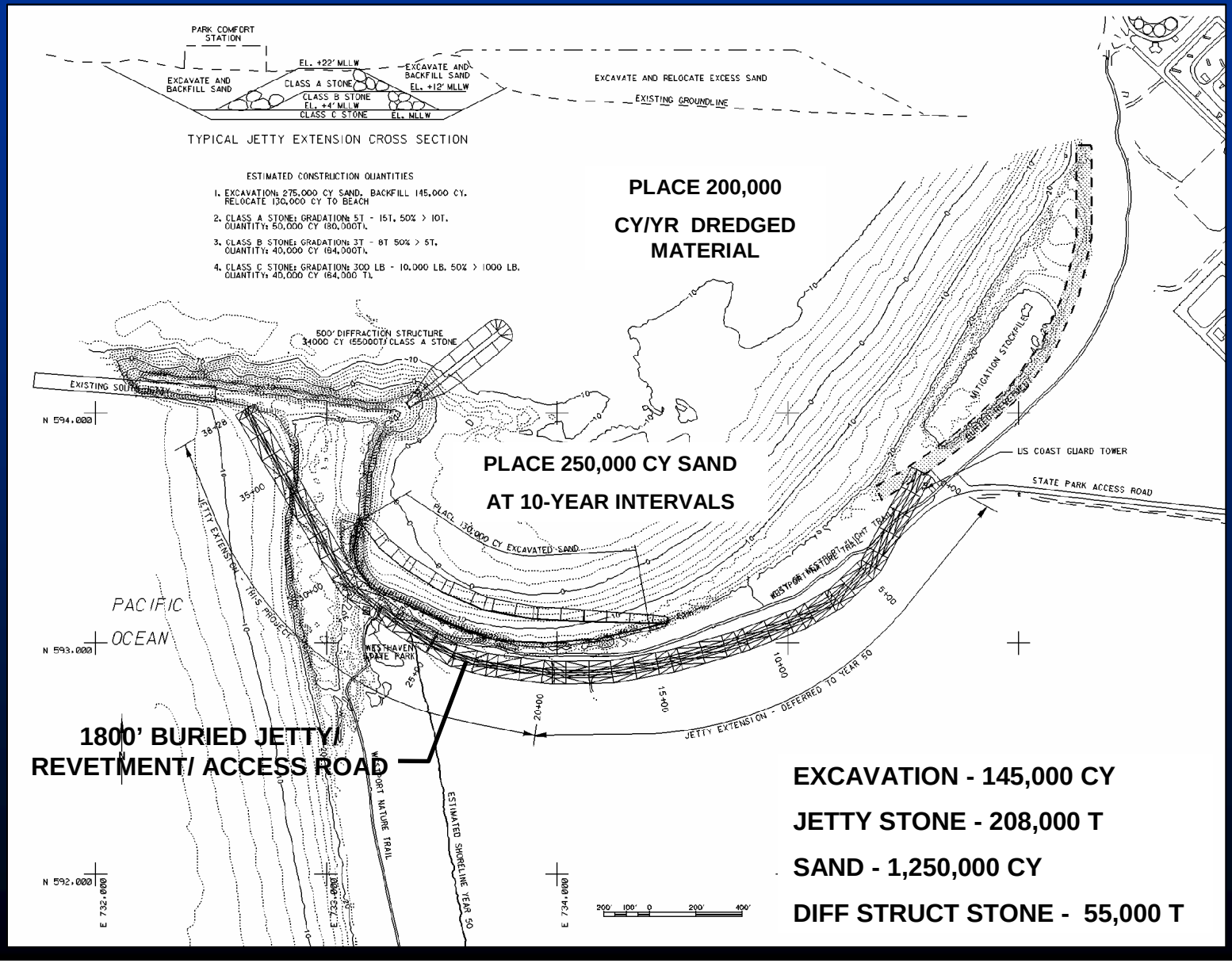
DIFF STRUCT STONE - 55,000 T



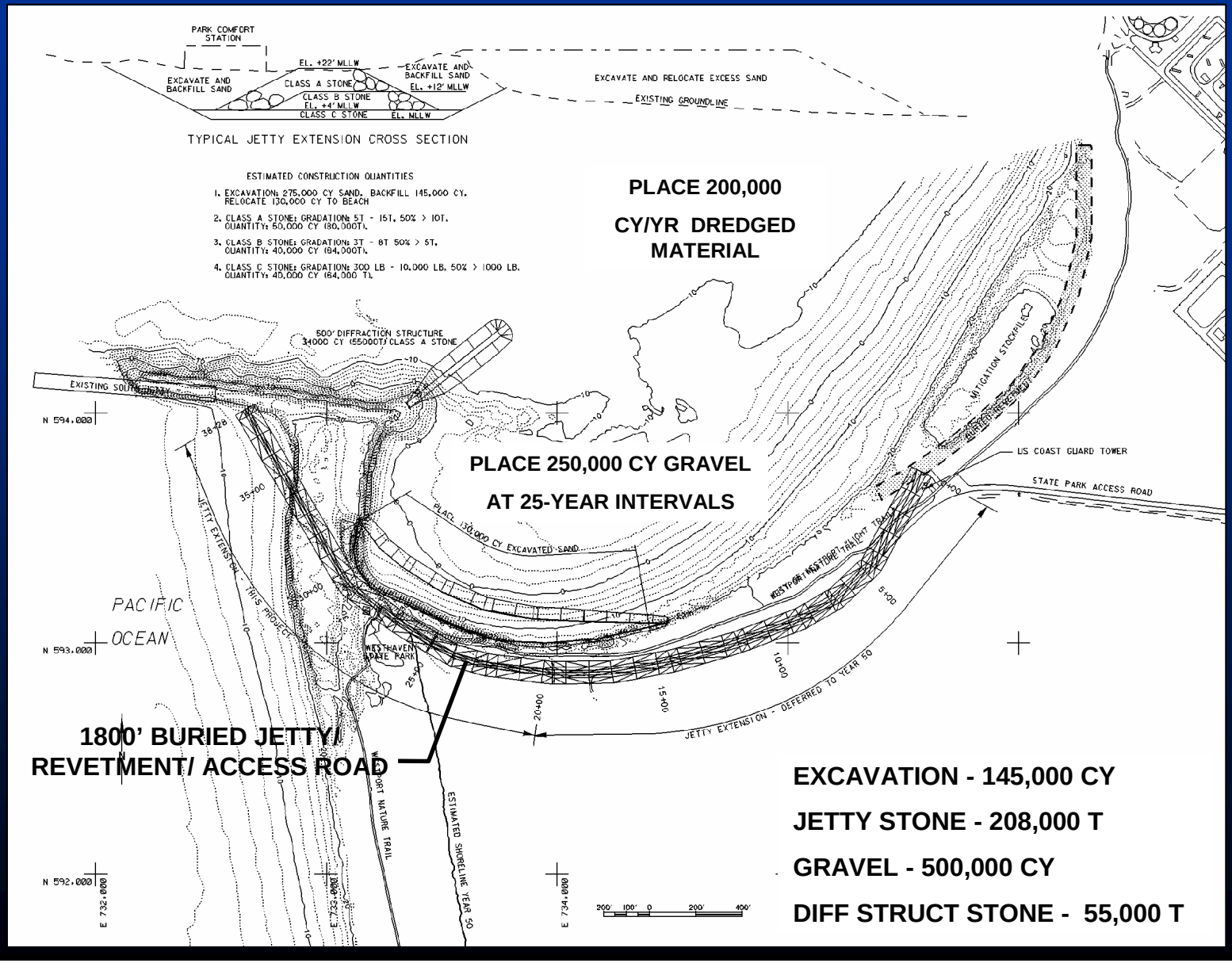
Jetty Extension
(Current Approved Plan)



Jetty Extension
(Revised Plan)



Jetty Extension
(Revised Plan)



Jetty Extension with weir
(Revised Plan with Weir Jetty)