US Army Corps of Engineers

PUBLIC NOTICE

US Army Corps of Engineers
New York District
ATTN: Harbor Programs Branch (Shea)
26 Federal Plaza, Room 2119
New York, N.Y. 10278-0090

In replying refer to:
Public Notice Number: **FP63-SAK3-2012**
Issue Date: June 5, 2012
Expiration Date: July 6, 2012

NEW YORK AND NEW JERSEY HARBOR DEEPENING
FEDERAL NAVIGATION PROJECT
CONTRACT AREA S-AK-3

TO WHOM IT MAY CONCERN:

Pursuant to Section 103 of the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 (commonly referred to as the Ocean Dumping Act, 33 U.S.C. 1413), this Public Notice serves as the U.S. Army Corps of Engineers (New York District) notification and request for comments relating to the potential placement of Historic Area Remediation Site (HARS) suitable material to be dredged as part of planned construction contract in the Arthur Kill Channel, which is part of the New York and New Jersey Harbor Deepening Project, as authorized by Section 101(a)(2) of the Water Resources Act of 2000, Public Law 106-541. This contract will deepen select areas of the existing Arthur Kill federal navigation channel. This area was generally identified in the Corps Limited Reevaluation Report dated January 2004 as area S-AK-3. This proposed action will allow suitable Pleistocene age red-brown clay and Pleistocene age glacial till material dredged under this construction contract to be placed at the HARS - see below for further information.

ACTIVITY: The proposed action is to place approximately 30,250 cubic yards (CY) Pleistocene age glacial till dredged material and approximately 30,250 CY of Pleistocene age red-brown clay dredged material at the Historic Area Remediation Site (HARS) for a total of approximately 60,500 CY of Remediation Material for the HARS, as part of the next construction contract for the federal New York and New Jersey Harbor Deepening Project. The remaining material identified in Table 1 will be placed at other sites (e.g., an upland location(s), an artificial reef, etc.) as approved by the involved regulatory agencies that regulate these other sites.

LOCATION: Arthur Kill Federal Navigation Channel is within the Port of New York and New Jersey. The Arthur Kill Federal Channel runs from its confluence with the Kill Van Kull and Newark Bay Channels west then generally south to its confluence with the Raritan Bay.

DESCRIPTION OF PLANNED ACTION:

Contract Area S-AK-3

Contract Area S-AK-3 (see Figure 2) generally contains Holocene age black silts and sands overlying hard Pleistocene age red-brown clay and Pleistocene age glacial till material and bedrock, which is largely shale with some sandstone lenses, that are to be dredged to a depth of –52 feet for the 50-foot project depth (i.e., design depth of –50 feet plus an additional –2 feet for safety). To account for the inherent imprecision and variability in a dredging operation, the contractor is also paid for removing up to an additional 1.5 feet of material, below the required depth of –52 feet mean low water. Based on analyses of survey data from previous contracts, it is expected that that the average depth that will be achieved will be –53.5 feet. Approximately 95% of the individual survey points will likely be between –52.5 feet and –54.5 feet below mean low water.

The following Table 1 summarizes the estimated volumes of dredged material proposed to be removed from this contract in the Arthur Kill Channel. The attached Figures 3A and 3B show the vertical and horizontal extent of the various types of dredged materials throughout the approximate 1-mile long construction contract dredging area. The construction contract under discussion in this public notice is expected to begin in November 2012 and require approximately one year to complete. The District will be requesting a Water Quality Certificates and Federal Consistency Determinations from the State of New Jersey Department of Environmental Protection and the New York State Department of Environmental Conservation for this work.

Table 1
Contract Material Volume Estimates by Area

Location of Material / Volume Estimates	**HARS Suitable Pleistocene Age Sediments**		**Non-HARS Suitable Holocene Sediments**	**Rock (shale and sandstone) (CY)**	**Total Material Volume (CY)**
	Glacial Till* (CY)	**Red-Brown Clay**(CY)**	**Silts and Sands***(CY)**		
Contract Area S-AK-3	**30,250**	**30,250**	**100,000**	**842,000**	**1,025,000**

* The USEPA, Region 2 and the USACE, NY District determined in a Memorandum For Record dated July 29, 2003, that Pleistocene age glacial till from Newark Bay is characterized for HARS placement.

** The USEPA, Region 2 and the USACE, NY District determined in a Memorandum for Record dated January 26, 2000 that Pleistocene age red-brown clay from the greater Newark Bay formation is characterized for HARS placement.

*** The New York District will send this Holocene age black silt and Holocene sandy dredged material to a state-approved site(s), not to the HARS. The volume is included in this table for completeness.

The purpose of this Public Notice is to solicit comments regarding the proposed placement of these HARS suitable materials at the HARS. These comments, along with all available technical data/information, will form the basis of a determination of whether this proposed placement is in the public interest. The HARS (Figures 4 & 5), located in the Atlantic Ocean off the coasts of New York and New Jersey, is described later in this notice.

Approximately 41,000 CY of the proposed dredged material from this proposed work has been demonstrated to be Pleistocene age glacial till. The joint U.S. Environmental Protection Agency – Region 2 and U.S. Army Corps of Engineers – New York District July 29, 2003 Memorandum For The Record titled Joint Federal Position on Testing of Glacial Till Dredged Materials from Selected Areas of New York – New Jersey Harbor concluded that Pleistocene age glacial till is removed from sources of contaminants and has been adequately characterized by previous testing in the vicinity. As such, further project-specific testing of glacial till, including these 157,000 CY, is not required.

In accordance with geological testing and assessment procedures set forth in a joint U.S. Environmental Protection Agency – Region 2 and U.S. Army Corps of Engineers –New York District standardized operating procedures, these 41,000 CY are glacial till because the material (1) lacks detectible fossils or shells, (2) has a low organic carbon content, (3) has a reddish or red-brown color, (4) is comprised of a poorly sorted layer of clay particles, silts, sands, gravels and boulders, and (5) has a stratigraphic setting consistent with other Pleistocene age deposits in the vicinity of this Newark Bay Channel dredging area. A copy of the glacial till determination for this construction contract area may be requested from Mr. Monte Greges, Chief, Dredged Material Management Section, at telephone number (917) 790-8428.

This deepening contract also includes approximately 41,000 CY of Pleistocene age red-brown clay dredged material. Pleistocene age red-brown clay dredged materials (from the Newark Bay complex) were previously tested to determine their suitability for use as Remediation Material at the HARS. A Joint Memorandum for Record (MFR) signed by both agencies on January 26, 2000, concluded that the Pleistocene age red-brown clay found throughout the Newark Bay Complex, including the northern end of the Arthur Kill, was suitable for HARS placement and would not require further testing.

The approximately 100,000 CY of Holocene age black silt material in this proposed work will be removed with an environmental dredging clamshell bucket. The base solicitation for this contract plans for this material to be processed into amended dredged material and used beneficially in the ongoing remediation of suitable state approved upland remediation or construction location(s).

The approximately 842,000 CY of dredged rock from this proposed action will be used beneficially by its placement at permitted ocean artificial reef(s) or at the HARS if the size of the rock materials is not suitable for placement at the ocean artificial reef(s).

The proposed transportation and placement of this dredged material in ocean waters is being evaluated to determine that the proposed placement will not unreasonably degrade or endanger human health, welfare or amenities, or the marine environment, ecological systems or economic potentialities. The criteria established by the Administrator, USEPA, pursuant to Section 102(a) of the Ocean Dumping Act will be applied. In addition, based upon an evaluation of the potential effect which the failure to utilize this ocean placement site will have on navigation, economic and industrial development, and foreign and domestic commerce of the United States, an independent determination will also be made of the need to place the dredged material in ocean waters, considering other possible methods of disposal and other appropriate locations.

ALL COMMENTS REGARDING THIS ACTIVITY MUST BE PREPARED IN WRITING AND MAILED TO REACH THE NEW YORK DISTRICT, USACE AT THE OFFICE ADDRESS SHOWN ON THE FRONT PAGE OF THIS NOTICE, BEFORE THE EXPIRATION DATE OF THIS NOTICE. Otherwise, it will be presumed that there are no objections to the activity.

The proposed placement at the HARS has been reviewed based upon the "Biological Assessment for the Closure of the Mud Dump Site and Designation of the Historic Area Remediation Site (HARS) in the New York Bight and Apex" (USEPA, 1997) prepared pursuant to Section 7 of the Endangered Species Act (16 USC 1531). Based upon that review, and a review of the latest public listing of threatened and endangered species, it has been preliminarily determined that the proposed activity described herein is not likely to adversely affect any federally-listed threatened or endangered species (humpback whales, finback whales, right whales, loggerhead turtles, leatherback turtles, green turtles, and Kemp's Ridley turtles) or their critical habitat.

The material proposed for HARS placement will not be placed within 0.27 nautical miles or more of any identified wrecks, which are indicated in the National Register of Historic Places. Other than wrecks, there are no known sites eligible for, or included in, the Register within the dredged material placement area. No known archaeological, scientific, pre-historical or historical data is expected to be lost by the anticipated placement of dredged material.

The District continues to work closely with the following Federal and State agencies:

- U.S. Environmental Protection Agency
- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Department of Commerce, National Marine Fisheries Service
- U.S. Coast Guard, Activities New York
- New Jersey Department of Environmental Protection
- New York State Department of Environmental Conservation
- New York State Department of State

ENVIRONMENTAL DOCUMENTATION:

The environmental impacts of the New York and New Jersey Harbor Deepening Project (HDP) have been evaluated in National Environmental Policy Act (NEPA) and regulatory documents including: (1) the Final Feasibility Report and Final Environmental Impact Statement dated December 1999; (2) the Federal Record-of-Decision executed in June 2002; (3) the Final Limited Reevaluation Report and Final Environmental Assessment/Finding of No Significant Impact dated January 2004; and (4) the Final Environmental Assessment of the NY & NJ Harbor Deepening Project on the Remedial Investigation/Feasibility Study of the Newark Bay Study Area, June 2007.

Copies of these documents can be viewed and/or obtained by contacting Mr. Thomas Shea, Project Manager for this contract of the New York and New Jersey Harbor Deepening Project, at telephone number (917) 790-8304.

HISTORIC AREA REMEDIATION SITE (HARS):

In 1972, Congress enacted the Marine Protection Research and Sanctuaries Act (MPRSA) to address and control the dumping of materials into ocean waters. Title I of the Act authorized the US Environmental Protection Agency and the US Army Corps of Engineers to regulate dumping in ocean waters. USEPA and USACE share responsibility for MPRSA permitting and ocean disposal site management. USEPA regulations implementing MPRSA are found at 40 CFR Sections 220 through 229. With few exceptions, MPRSA prohibits the transportation of material from the United States for the purpose of ocean dumping except as may be authorized by a permit issued under the MPRSA. The MPRSA divides permitting responsibility between the USEPA and USACE. Under Section 102 of the MPRSA, USEPA has responsibility for issuing permits for all materials other than dredged material. Under Section 103 of MPRSA, the Secretary of the Army has the responsibility for issuing permits for dredged material, subject to USEPA concurrence.

In the fall of 1997, the USEPA de-designated and terminated the use of the New York Bight Dredged Material Disposal Site (commonly known as the Mud Dump Site or MDS). The MDS had been designated in 1984 for the disposal of up to 100 million CY of dredged material from navigation channels and other port facilities within the Port of New York and New Jersey. Simultaneous with the closure of the MDS, the site and surrounding areas that had been used historically as disposal sites for dredged materials were redesignated as the HARS (Figures 4 & 5) at 40 CFR Sections 228.15(d)(6) (See 62 Fed. Reg. 46142 (August 29, 1997); 62 Fed. Reg. 26267 (May 13, 1997)). The HARS is to be managed to reduce impacts of historical disposal activities at the site to acceptable levels in accordance with 40 CFR Sections 228.11(c). The need to remediate the HARS is supported by the presence of toxic effects, dioxin bioaccumulation exceeding Category 1 levels (a definition of which appears in an evaluation memorandum reviewing the results of the testing) in worm tissue, as well as TCDD/PCB contamination in area lobster stocks. Individual elements of those data do not establish that sediments within the Study Area are imminent hazards to the New York Bight Apex ecosystem, living resources, or human health. However, the collective evidence presents cause for concern, and justifies the need for remediation. Further information on the surveys performed and the conditions in the HARS Study Area may be found in the Supplemental Environmental Impact Statement (USEPA, 1997).

The HARS designation identifies an area in and around the former MDS that has exhibited the potential for adverse ecological impacts. The HARS will be remediated with dredged material that shall be selected so as to ensure it will not cause significant undesirable effects including through bioaccumulation or unacceptable toxicity, in accordance with 40 CFR 227.6. This dredged material is referred to as "Material for HARS Remediation" or "HARS Remediation Material".

As of the end of April 2011, dredged materials from seventy-five different completed and ongoing private and federal dredging projects in the Port of New York and New Jersey have been dredged and placed as Remediation Material in the ocean at the HARS since the closure of

the Mud Dump Site and designation of the HARS in 1997. This represents approximately 46,160,000 CY of Remediation Material.

The HARS, which includes the 2.2 square nautical mile area of the former MDS, is an approximately 15.7 square nautical mile area located approximately 3.5 nautical miles east of Highlands, New Jersey and 7.7 nautical miles south of Rockaway, New York. The former MDS is located approximately 5.3 nautical miles east of Highlands, New Jersey and 9.6 nautical miles south of Rockaway, New York. When determined by bathymetry that capping is complete, the USEPA will undertake any necessary rulemaking to de-designate the HARS. The HARS includes the following three areas:

Priority Remediation Area (PRA): A 9.0 square nautical mile area to be remediated with at least 1 meter of Remediation Material. The PRA encompasses an area of degraded sediments as described in greater detail in the SEIS.

Buffer Zone: An approximately 5.7 square nautical mile area (0.27 nautical mile wide band around the PRA) in which no placement of the Material for Remediation will be allowed, but which may receive Material for Remediation that incidentally spreads out of the PRA.

No Discharge Zone: An approximately 1.0 square nautical mile area in which no placement or incidental spread of Material for Remediation is allowed.

To improve management and monitoring of placement activities at the HARS, electronic monitoring equipment is used on-board vessels carrying Remediation Material to the HARS. This equipment records vessel positions and scow draft throughout the duration of each trip to the HARS and during remediation operations. To improve communication reliability between tugs and scows, a prescribed formal communication procedure has been put in place (copies of this procedure are available upon request).

Over the past years, U.S. Environmental Protection Agency – Region 2 and the U.S. Army Corps of Engineers – New York District have been refining the approach to the technical review and scientific and regulatory analysis of dredging projects' dredged materials proposed for placement at the HARS. Sediment testing evaluation processes are evolving, which establish a responsible framework for assessing results of physical, chemical and bioaccumulation test results, to include tissue analysis from bioaccumulation testing of dredged materials proposed for ocean placement. The bioaccumulation framework defines a standard approach for assessing each analyte (an item to be analyzed for as part of the testing), in relation to regulatory standards and human health and environmental risk factors. The framework's purpose is to facilitate decision, and final decision making, in accordance with the Marine Protection, Research and Sanctuaries Act of 1972. The U.S. Environmental Protection Agency – Region 2 and the U.S. Army Corps of Engineers – New York District utilize these testing evaluation processes for identifying HARS-suitable dredged materials for remediation of the HARS.

Additional information concerning the HARS itself can be obtained from Mr. Douglas Pabst of U.S. Environmental Protection Agency – Region 2, Team Leader of the Dredged Material Management Team, at telephone number (212) 637-3797.

HARS SUITABILITY TESTING FOR PLEISTOCENE RED-BROWN CLAY AND GLACIAL TILL:

Pleistocene red-brown clay (from the Newark Bay complex) and Pleistocene glacial till (from the New York Harbor area) were previously tested to determine their suitability for use as remediation material at the HARS. Testing was conducted in accordance with test protocols for ocean placement established by the USEPA and USACE.

Notification of the Pleistocene red-brown clay test results and a determination of suitability for HARS remediation purposes were provided in USACE Public Notice Supplement FP63-345678CC issued on July 14, 2000. Those test results are included in this Public Notice (Tables 2A-2C) for informational purposes only. A Joint Memorandum for Record (MFR) signed by both agencies on January 26, 2000, concluded that the Pleistocene red-brown clay found throughout the Newark Bay Complex, including the northern end of the Arthur Kill, was suitable for HARS placement and would not require further testing.

Notification of the Pleistocene glacial till test results and a determination of suitability for HARS remediation purposes were provided in USACE Public Notice FP63-AKCA1-2003 issued on October 14, 2003 for Arthur Kill Contract Area 1A. Those test results are included in this Public Notice (Tables 3A-3C) for informational purposes only. A Joint MFR signed by both agencies on July 29, 2003, concluded that the Pleistocene glacial till from selected areas of New York Harbor (including the Kill Van Kull) was suitable for HARS placement and would not require further testing.

ALTERNATIVES TO HARS PLACEMENT:

The New York District has evaluated the regional practicability of potential alternatives for dredged material disposal in the August 2008 Update of the "Dredged Material Management Plan for the Port of New York and New Jersey". The Recommended Plan within the report addresses both the short and long term dredged material placement options in two specific timeframes, 2005-2014 and 2015-2065, respectively. The Plan relies heavily on the creation, remediation, and restoration of a variety of existing degraded or impacted sites in the region with material that would or would not be considered suitable for HARS remediation. The Plan anticipates that a considerable volume of HARS-suitable material will be placed at alternative beneficial use sites currently under development. Use of these sites results in habitat creation (for shellfish, oyster, and bird), habitat restoration at existing degraded pit sites, landfill and quarry remediation, provision of construction material, and beach nourishment. Many dredged material management options presented in the Plan are not presently permitted and/or are presently under construction, and are unavailable for the purposes of this notice. However, as alternative sites are developed and permitted, they may be evaluated and designated for use for the remaining dredged material from the NY & NJ Harbor Deepening Project. As specific alternative sites and their applicable testing/regulatory criteria are subject to change, future Public Notices on the remaining NY & NJ Harbor Deepening Project contracts may be issued as evaluations and testing of the material to be dredged are performed and as other alternative placement sites are developed.

Based upon the lowest responsible bid received on September 1, 2011 for the Arthur Kill-2 (S-AK-2) contract, the cost for dredging and then using an upland placement site for silty material was $61.50 per cubic yard as compared to approximately $40.00 per cubic yard for dredging and placing HARS suitable till or clay as well as rock material at the HARS and designated reef sites. This is a substantial increase of $21.50 per cubic yard over the cost of dredging and placing the material at the HARS. The additional costs are shared by the United States and the Port Authority of New York and New Jersey.

S-AK-3 contract dredged material currently has no economically viable alternative site for the HARS-suitable material. The District will continue to evaluate all reasonable and beneficial alternatives, as practicable, that may become available during the advertisement and post-advertisement periods of the contract.

Conclusion

The USACE and the USEPA have determined that the material to be dredged meet the criteria for ocean placement as described in 40 CFR parts 227.6 and 227.27, and in USEPA, Region 2/USACE, New York District guidance. The material is also suitable for placement at the HARS as Remediation Material as described at 40 CFR Part 228.15.

Placement of this material at the HARS would serve to reduce impacts at the HARS to acceptable levels and improve benthic conditions. Unremediated sediments in the HARS have been found to adversely impact benthic marine organisms. Placement of project material over existing unremediated HARS sediments would serve to remediate those areas. In addition, by covering the existing sediments at the HARS with this project material, surface dwelling organisms will be exposed to sediments exhibiting Category 1 qualities, which will ameliorate the existing sediment conditions.

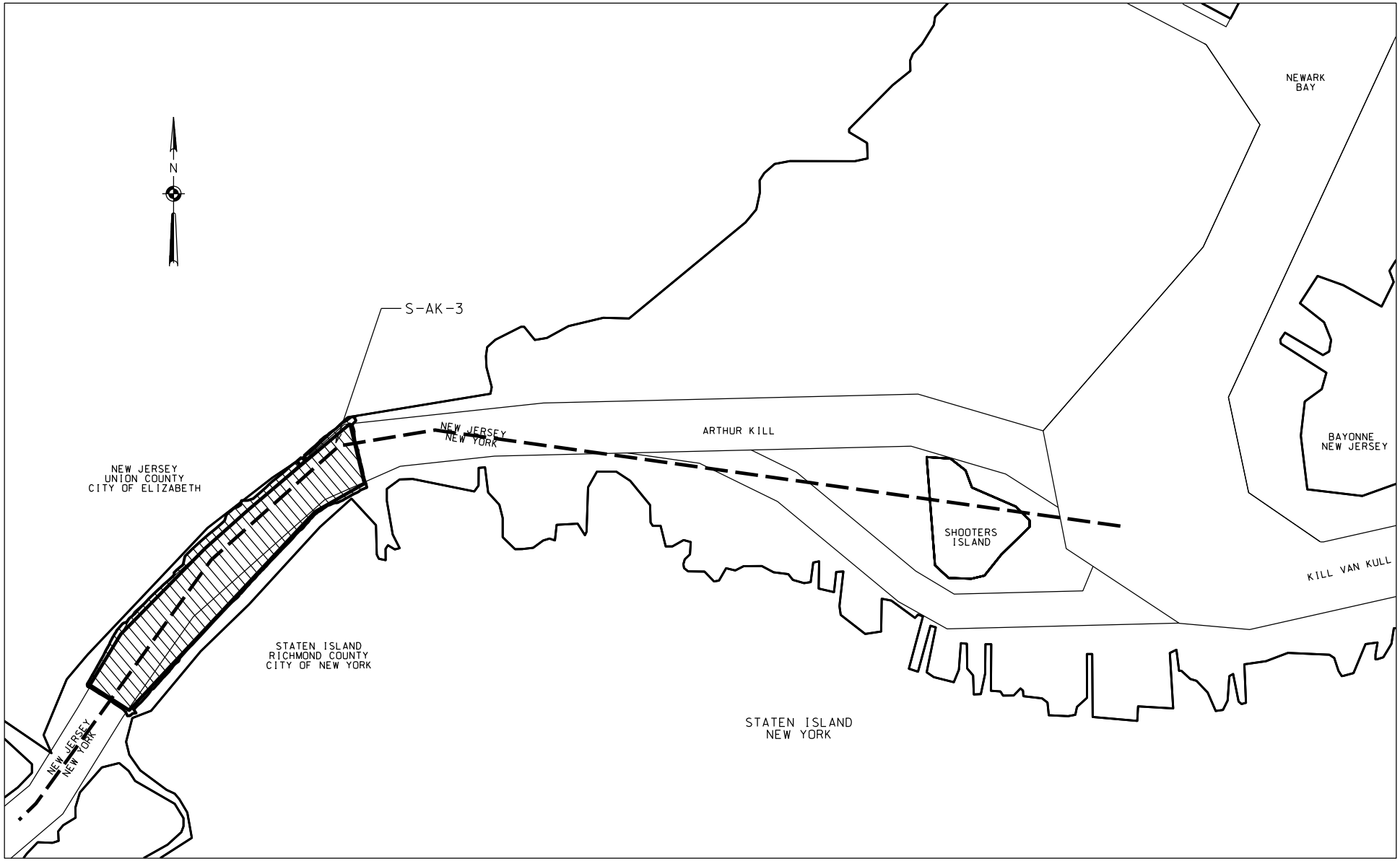
If you have questions regarding this Public Notice or general questions on the NY & NJ Harbor Deepening Project, please contact Mr. Thomas Shea at (917) 790-8304. Comments or questions may be FAXED to (212) 264-2924.

For more information on New York District programs, visit our website at http://www.nan.usace.army.mil.

We request that you communicate the foregoing information concerning the proposed work to any persons known by you to be interested and who did not receive a copy of this notice.

William F. Slezak
Chief, Harbor Programs Branch

Enclosures



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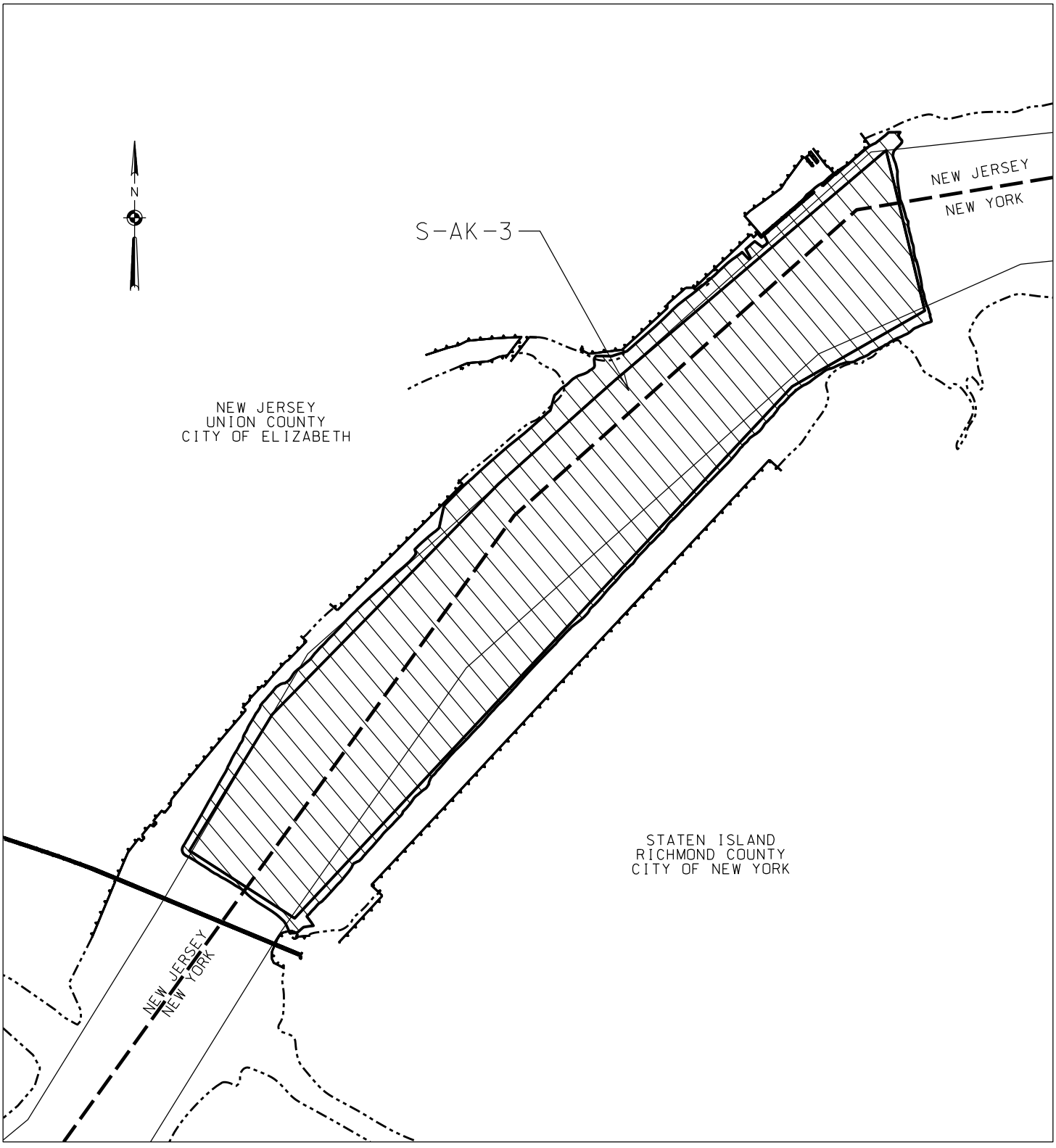
NY and NJ Harbor Deepening
Federal Navigation Project
S-AK-3
Contract Area Map
Figure 1



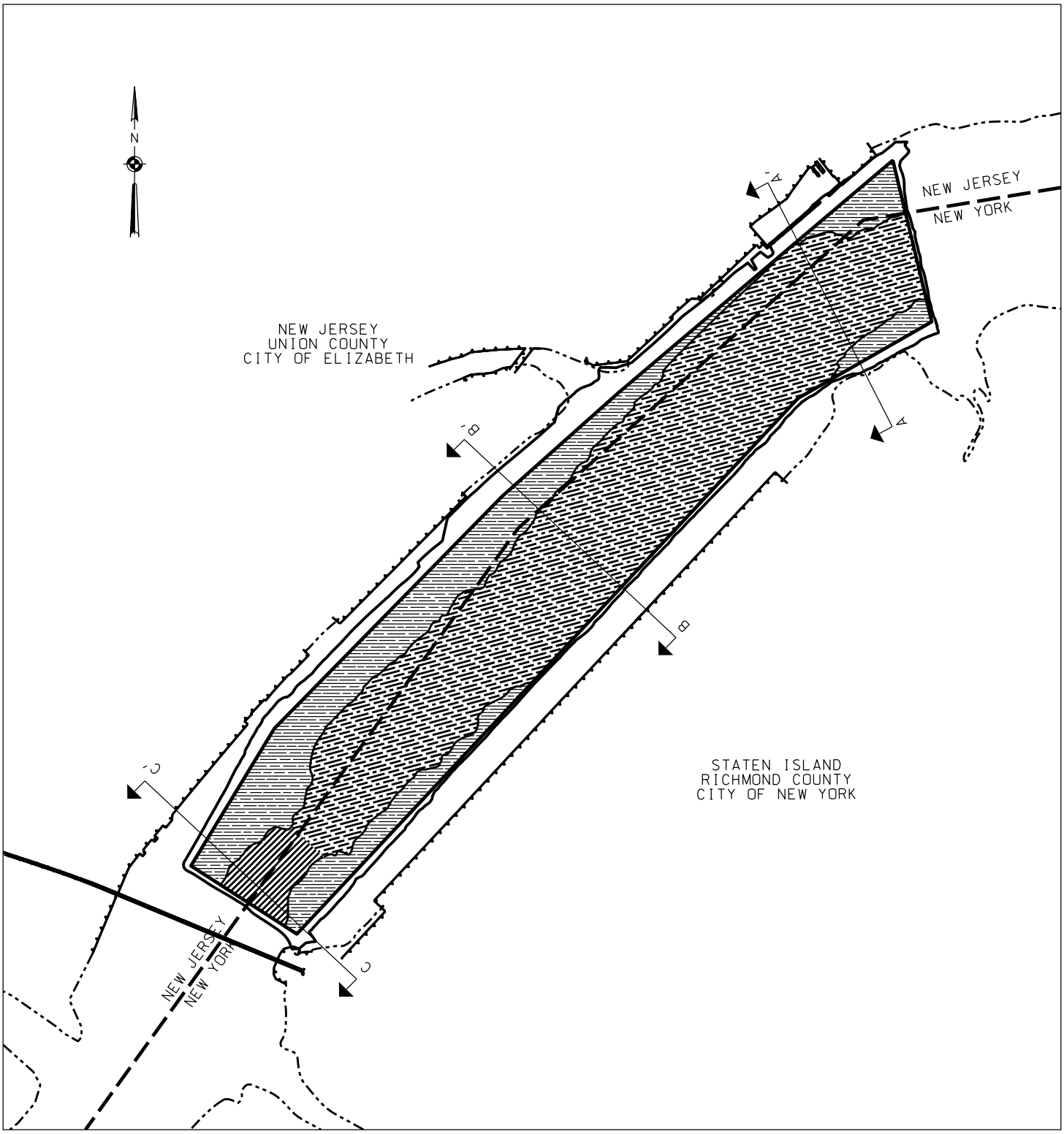
Dredging Elevation Depth (Feet MLW)

50+2+1.5

NY and NJ Harbor Deepening
Federal Navigation Project
S-AK-3
Dredging Depths Map
Figure 2

800 400 0 800 1600

SCALE: 1" = 800'



Holocene Black Silt

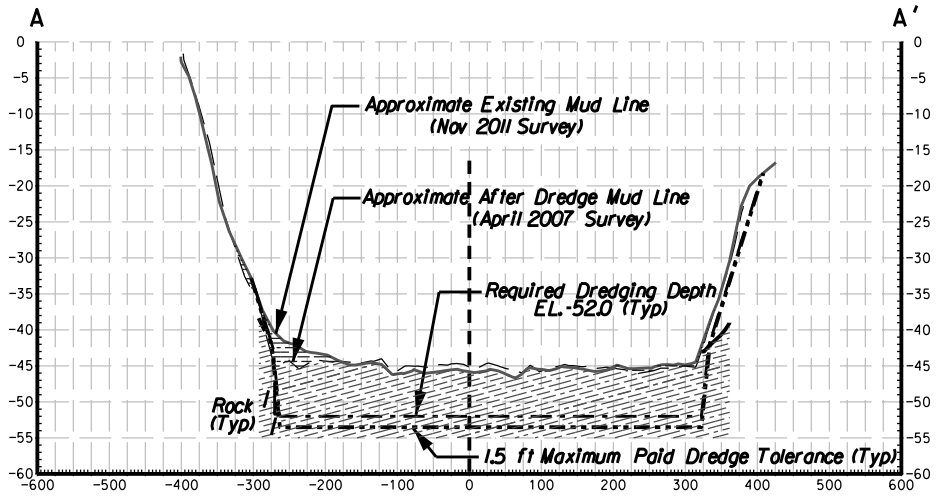
Pleistocene Clay

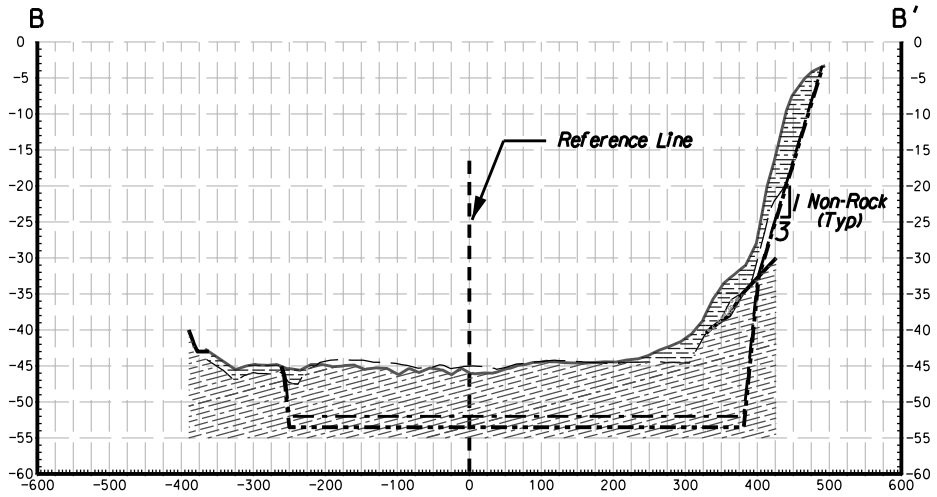
Shale Bedrock

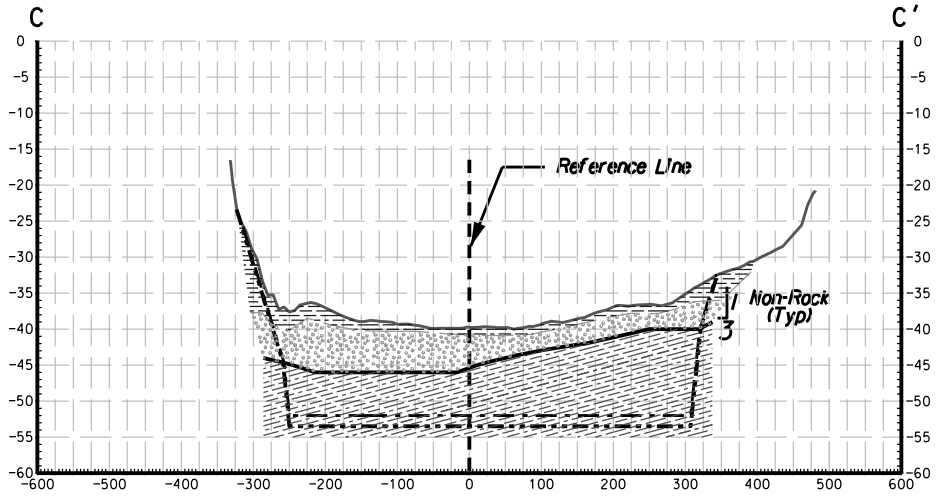
NY and NJ Harbor Deepening
Federal Navigation Project
S-AK-3
Subcrop Map
Figure 3A

800 400 0 800 1600

SCALE: 1" = 800'







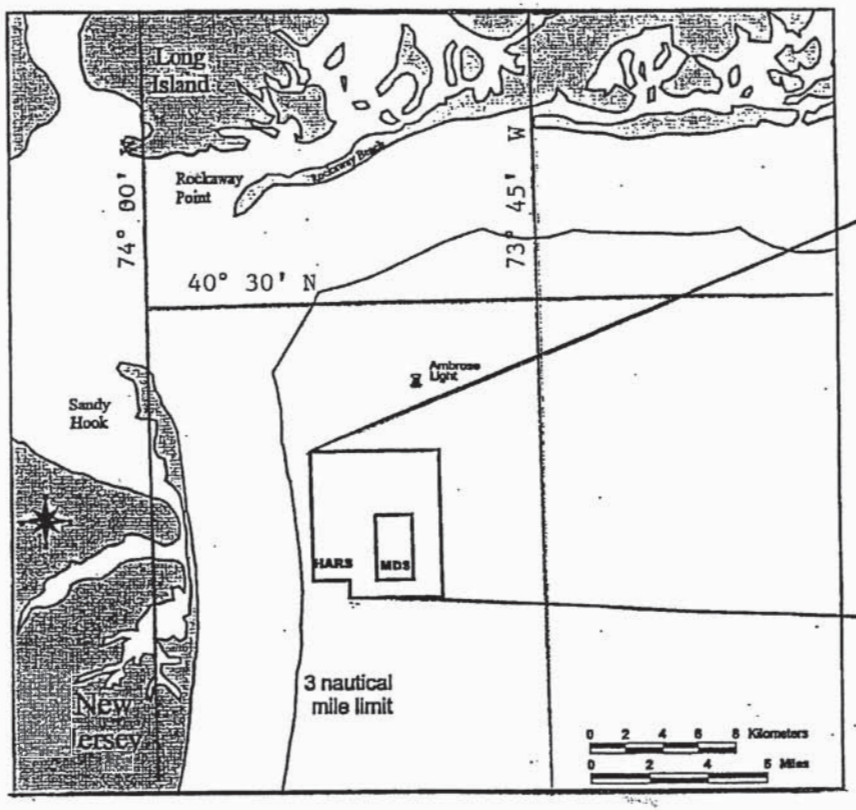
Holocene Black Silt

Shale Bedrock

HARS Suitable Pleistocene Till & Clay

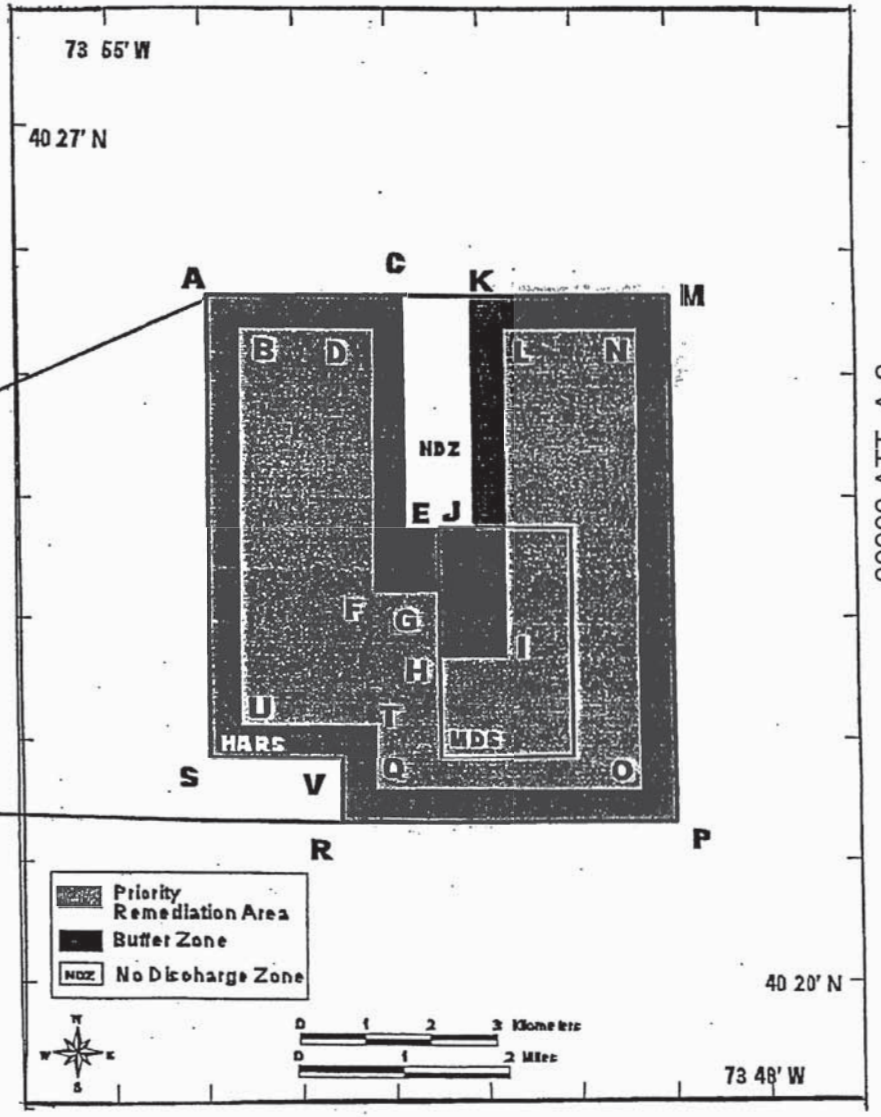
NY and NJ Harbor Deepening
Federal Navigation Project
S-AK-3
Cross Sections
Figure 3B

HISTORIC AREA REMEDIATION SITE LOCATION MAP



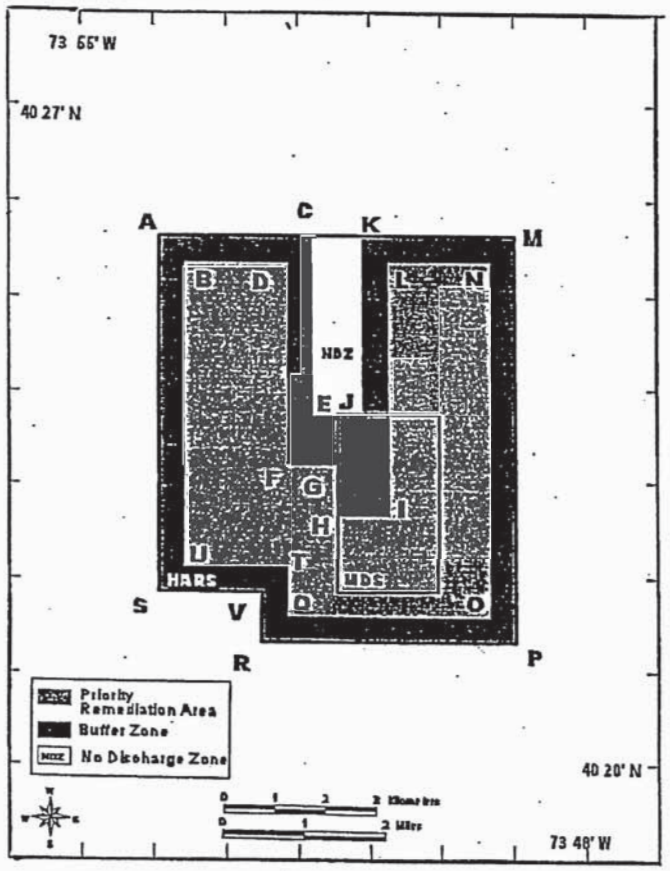
A

LOCATITON OF PRIMARY REMEDIATION AREA WITHIN THE HISTORIC AREA REMEDIATION SITE



B

Figure 4



Priority Remediation Area (PRA): 9.0 square nautical mile area to be remediated with at least one meter of Remediation Material, bounded by the following coordinates:

Point	Latitude DMS *	Longitude DMS	Latitude DDM **	Longitude DDM
B	40° 25' 23" N	73° 53' 34" W	40° 25.38' N	73° 53.57' W
D	40° 25' 22" N	73° 52' 08" W	40° 25.37' N	73° 52.13' W
F	40° 23' 13" N	73° 52' 09" W	40° 23.22' N	73° 52.15' W
G	40° 23' 13" N	73° 51' 28" W	40° 23.22' N	73° 51.47' W
H	40° 22' 41" N	73° 51' 28" W	40° 22.68' N	73° 51.47' W
I	40° 22' 41" N	73° 50' 43" W	40° 22.68' N	73° 50.72' W
L	40° 25' 22" N	73° 50' 44" W	40° 25.37' N	73° 50.73' W
N	40° 25' 22" N	73° 49' 19" W	40° 25.37' N	73° 49.32' W

* -- DMS = Degrees, Minutes, Seconds

** -- DDS = Degrees, Decimal Minutes

Figure 5

TABLE 2A. NEWARK BAY/STATEN ISLAND KILLS COMPLEX - NATURAL CLAYS
RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE

CONSTITUENTS	SITE WATER		ELUTRIATE	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
Metals	ppb (ug/L)	ppb (ug/L)	ppb (ug/L)	ppb (ug/L)
Cadmium		0.093		0.267
Chromium		1.42		1.11
Copper		2.45		6.42
Lead		1.46		0.259
Mercury		0.011		0.002
Nickel		1.58		1.70
Silver		0.054		0.016
Zinc		11.7		3.56
Pesticides	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)
Aldrin	0.8	ND	0.8	ND
alpha-Chlordane		1.9		1.1
trans-Nonachlor		3.7		1.8
Dieldrin	0.3	ND		3.1
4,4'-DDT		4.6		3.1
2,4'-DDT	0.7	ND	0.7	ND
4,4'-DDD		2.5		5.0
2,4'-DDD		1.7		1.0
4,4'-DDE		4.6		6.0
2,4'-DDE	1.4	ND	1.4	ND
Total DDT		14.45		16.15
Endosulfan I		2.0		1.2
Endosulfan II	0.5	ND		1.8
Endosulfan sulfate	2.4	ND		2.7
Heptachlor		3.3		4.0
Heptachlor epoxide		11		5.3
Industrial Chemicals	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)
PCB BZ-8		0.9	0.2	ND
PCB BZ-18		7.6	0.1	ND
PCB BZ-28	0.1	ND	0.1	ND
PCB BZ-44	0.1	ND	0.1	ND
PCB BZ-49	0.1	ND	0.1	ND
PCB BZ-52	0.1	ND	0.1	ND
PCB BZ-66		0.6	0.1	ND
PCB BZ-87	0.1	ND	0.1	ND
PCB BZ-101		0.7	0.1	ND
PCB BZ-105	0.1	ND	0.1	ND
PCB BZ-118	0.1	ND	0.1	ND
PCB BZ-128	0.1	ND	0.1	ND
PCB BZ-138	0.1	ND	0.1	ND
PCB BZ-153	0.1	ND	0.1	ND
PCB BZ-170	0.1	ND	0.1	ND
PCB BZ-180	0.1	ND	0.1	ND
PCB BZ-183	0.1	ND	0.1	ND
PCB BZ-184	0.1	ND	0.1	ND
PCB BZ-187	0.1	ND	0.1	ND
PCB BZ-195	0.2	ND	0.2	ND
PCB BZ-206	0.2	ND		0.5
PCB BZ-209	0.1	ND	0.1	ND
Total PCB		21.6		3.3

ND = Not detected
Total PCB = sum of all congeners * 2.
Total DDT = sum of 2,4' and 4,4' DDD, DDE, and DDT.

NEWARK BAY/STATEN ILAND KILLS COMPLEX - NATURAL CLAYS

TABLE 2B. TOXICITY TEST RESULTS

Suspended Particulate Phase - Raw Clay

Test Species	Test Duration	LC50/EC50	LPC (a)
Menidia beryllina	96 hours	>100% (b)	> 1
Mysidposis bahia	96 hours	>100% (b)	> 1
Mytilus sp. (larval survival)	48 hours	>100% (b)	> 1
Mytilus sp. (larval normal development)	48 hours	>100% (c)	> 1

(a) Limiting Permissible Concentration (LPC) is the LC50 or EC50 times 0.01.

(b) Median Lethal Concentration (LC50) resulting in 50% mortatlity at test termination.

(c) Median Effective Concentration (EC50) based on normal development to the D-cell, prodissoconch 1 stage.

Whole Sediment (10 days) - Raw Clay

Test Species	% Survival in Reference	% Survival in Test	% Difference Reference -Test	Is Difference statistically significant? (a=0.05)
Ampelisca abdita	89%	86%	3%	No
Mysidopsis bahia	93%	95%	0%[(a)]	No

(a) Survival in the test material was greater than in the Reference.

TABLE 2C. NEWARK BAY / STATEN ISLAND KILLS COMPLEX - NATURAL CLAYS
28-DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE (in wet weight concentration)

	Macoma nasuta				*Nereis virens*			
	REFERENCE		TEST		REFERENCE		TEST	
Constituents	Detection Limits	Mean Concentration	Detection Limits	Mean Concentration	Detection Limits	Mean Concentration	Detection Limits	Mean Concentration
Metals	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g
Arsenic		3.5		3.36		3.26		3.2
Cadmium		0.05		0.048		0.068		0.064
Chromium		0.948		0.768		0.338		0.328
Copper		8.84		10.18		2.32		2.14
Lead		0.536		0.47		0.704		0.558
Mercury		0.16		0.088		0.13		0.138
Nickel		1.18		1.176		0.648		0.666
Silver		0.08		0.072		0.036	0.04	ND
Zinc		23.68		22.52		24		14.56
Pesticides	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g
Aldrin		1.793	0.164	ND		4.36		5
alpha-Chlordane		0.601		0.16		0.2		0.625
trans-Nonachlor		0.469		0.445	0.18	ND	0.182	ND
Dieldrin		1.234		1.314		1.814		1.278
4,4'-DDT		0.185		0.27		1.108		0.521
2,4'-DDT		1.224		0.634	0.532	ND		* 0.908
4,4'-DDD		2.82		2.52		3.88		5.92
2,4'-DDD		0.738		0.493		0.67		0.616
4,4'-DDE		3.98		4.66		1.505		0.589
2,4'-DDE	0.14	ND	0.138	ND		0.762		0.77
Total DDT		9.152		8.646		7.925		9.324
Endosulfan I		1.96		1.6		1.88		2.08
Endosulfan II		0.175		0.127	0.216	ND		0.196
Endosulfan sulfate		0.36	1.106	* ND	1.16	ND	1.16	* ND
Heptachlor	0.252	ND		0.157	0.258	ND		* 0.582
Heptachlor epoxide		1.62		1.92		1.128		1.04
Industrial Chemicals	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g
PCB BZ-08		1.542		0.976		1.235		1.563
PCB BZ-18		1.404		0.902		0.62		0.798
PCB BZ-28	0.54	ND	0.508	* ND		0.22		* 0.738
PCB BZ-44		0.738		0.498		0.486		0.397
PCB BZ-49		0.959	0.36	ND		0.974	0.36	ND
PCB BZ-52		0.134	0.47	* ND	0.486	ND		* 0.628
PCB BZ-66		1.04	1.008	ND	1.06	ND	1.012	* ND
PCB BZ-101		1		0.798		0.906		0.614
PCB BZ-105	0.394	ND	0.37	ND		0.363		0.324
PCB BZ-118	0.578	ND	0.544	* ND		0.812		0.604
PCB BZ-87		0.138	0.46	* ND	0.476	ND	0.46	* ND
PCB BZ-128	0.658	ND	0.618	* ND	0.642	ND	0.616	* ND
PCB BZ-138	0.412	ND	0.386	* ND		1.144		0.848
PCB BZ-153	0.384	ND	0.36	ND		1.94		1.634
PCB BZ-170	0.354	ND	0.334	ND	0.346	ND	0.332	ND
PCB BZ-180	0.344	ND	0.324	ND		0.382		0.244
PCB BZ-183	0.422	ND	0.376	* ND	0.412	ND	0.396	ND
PCB BZ-184	0.568	ND	0.534	* ND		1.2		0.928
PCB BZ-187	0.304	ND	0.286	ND	0.296	ND		0.239
PCB BZ-195	0.254	ND	0.238	ND		0.306		0.298
PCB BZ-206	0.254	ND	0.238	ND	0.248	ND	0.238	ND
PCB BZ-209	0.206	ND	0.194	ND	0.2	ND	0.194	ND
Total PCB		16.562		20.536		22.424		25.58

1,4-Dichlorobenzene	0.2	ND	0.2	ND	0.2	ND	0.2	ND
Dioxins and Furans	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g	pg/g
2378-TCDD	0.115	ND	0.105	ND		0.237		0.177
12378-PeCDD	0.172	ND	0.134	ND		0.431		0.252
123478-HxCDD		0.197	0.177	ND		0.296		0.172
123678-HxCDD		3.250		1.632		3.230		1.580
123789-HxCDD		1.410		0.665		1.423		0.661
1234678-HpCDD		16.250		7.424		10.308		5.255
OCDD		12.441		7.929		11.220		6.714
2378-TCDF	0.239	ND	0.145	ND		1.001		0.691
12378-PeCDF		0.650		0.317		1.130		0.442
23478-PeCDF	0.874	ND		0.336		0.713		0.259
123478-HxCDF		0.410		0.282		0.631	0.347	ND
123678-HxCDF		0.689		0.348		0.919		0.384
123789-HxCDF	0.668	ND	0.310	ND	0.155	ND	0.407	* ND
234678-HxCDF		0.900		0.476		1.145		0.279
1234678-HpCDF		4.140		2.194		2.473		1.515
1234789-HpCDF		0.276	0.273	ND	0.347	ND	0.446	ND
OCDF		2.022		2.355		0.809		0.731
PAHs	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g
Acenaphthene		4.29		3.84	3.75	ND	3.78	ND
Acenaphthylene	56.4	ND	56.2	* ND	56.5	ND	56.4	* ND
Anthracene	1.98	ND	2.0	ND	2.0	ND	2.0	ND
Fluorene	3.56	ND	3.6	ND	3.55	ND	3.58	ND
Naphthalene	1.7	ND	1.7	ND	1.7	ND	1.7	ND
Phenanthrene		0.78	1.3	ND	1.3	ND	1.3	ND
Benzo[a]anthracene	1.6	ND	1.6	ND	1.6	ND	1.6	ND
Benzo[a]pyrene		0.8	1.3	ND	1.3	ND	1.3	ND
Benzo[g,h,i]perylene	1.4	ND	1.4	ND	1.4	ND	1.4	ND
Benzo[b]fluoranthene	1.4	ND	1.4	ND	1.4	ND	1.4	ND
Benzo[k]fluoranthene	1.2	ND	1.2	ND	1.2	ND	1.2	ND
Chrysene		2.44	2	ND	2	ND	2	ND
Dibenz[a,h]anthracene	1.6	ND	1.6	ND	1.6	ND	1.6	ND
Fluoranthene	3.16	ND	3.2	ND	3.15	ND	3.18	ND
Indeno[1,2,3-cd]pyrene	0.822	ND	0.822	ND	0.812	ND	0.822	ND
Pyrene		2.12		1.68		1.263		1.1
Total PAHs		19.64		* 73.281		11.72		* 70.931

Concentrations shown are the mean of 5 replicate analyses in wet weight with the following exceptions:
PAH concentrations for *Nereis virens* Reference tissue are the mean of 4 replicate analyses;
1,4 dichlorobenzene concentration for *Nereis virens* Test tissue is the mean of 4 replicate analyses due to limited tissue volume;
1,4 dichlorobenzene concentration for *Nereis virens* Reference tissue is the result of one set of analyses due to limited tissue volume.

*** Significantly higher than reference at 95% confidence.**

ND = Not Detected
Total PAHs = sum of all PAHs
Total PCB = sum of congeners reported * 2
Total DDT = sum of 2.4'- and 4,4'-DDD, DDE, and DDT
Means and statistical comparisons were determined using conservative estimates of concentrations of constituents that were at concentrations below the detection limit.

TABLE 3A. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE
ARTHUR KILL - CONTRACT AREA 1A

	SITE WATER		ELUTRIATE	
CONSTITUENTS	**DETECTION LIMITS**	**CONCENTRATION**	**DETECTION LIMITS**	**CONCENTRATION**
Metals	**ppb**	**ppb**	**ppb**	**ppb**
Ag		0.073		0.027
Cd		0.069		0.020
Cr		1.823		2.333
Cu		3.31		2.430
Hg		0.029		0.001
Ni		1.52		2.83
Pb		2.13		0.67
Zn		8.15		8.61
Pesticides	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
Aldrin	2.83	ND	2.83	ND
a-Chlordane	1.08	ND	1.08	ND
trans Nonachlor	1.01	ND	1.01	ND
Dieldrin	0.98	ND	0.98	ND
4,4'-DDT	0.56	ND	0.56	ND
2,4'-DDT	1.98	ND	1.98	ND
4,4'-DDD	0.59	ND	0.59	ND
2,4'-DDD	0.75	ND	0.75	ND
4,4'-DDE	0.84	ND	0.84	ND
2,4'-DDE	1.71	ND	1.71	ND
Total DDT		**3.2**		**3.2**
Endosulfan I	1.11	ND	1.11	ND
Endosulfan II	0.51	ND	0.51	ND
Endosulfan sulfate	0.56	ND	0.56	ND
Heptachlor	1.17	ND	1.17	ND
Heptachlor epoxide	0.95	ND	0.95	ND
Industrial Chemicals	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
PCB 8	16.00	ND	16.00	ND
PCB 18	1.38	ND	1.38	ND
PCB 28	1.73	ND	1.73	ND
PCB 44	1.45	ND	1.45	ND
PCB 49	1.49	ND	1.49	ND
PCB 52	1.43	ND	1.43	ND
PCB 66	1.49	ND	1.49	ND
PCB 87	1.13	ND	1.13	ND
PCB 101	1.14	ND	1.14	ND
PCB 105	0.57	ND	0.57	ND
PCB 118	0.87	ND	0.87	ND
PCB 128	1.40	ND	1.40	ND
PCB 138	1.32	ND	1.32	ND
PCB 153	1.06	ND	1.06	ND
PCB 170	1.01	ND	1.01	ND
PCB 180	0.96	ND	0.96	ND
PCB 183	0.93	ND	0.93	ND
PCB 184	0.92	ND	0.92	ND
PCB 187	0.86	ND	0.86	ND
PCB 195	1.08	ND	1.08	ND
PCB 206	1.22	ND	1.22	ND
PCB 209	1.26	ND	1.26	ND
Total PCB		**81.4**		**81.4**

ND = Not detected
Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
Total PCB = sum of congeners reported x 2
Concentrations shown are the mean of three replicate analyses.
Means were determined using conservative estimates of concentrations of constituents that were at concentrations below the detection limit.

TABLE 3B. ARTHUR KILL - CONTRACT AREA 1A

TOXICITY TEST RESULTS

Suspended Particulate Phase

Test Species	Test Duration	LC_{50}/EC_{50}	LPC (a)
Menidia beryllina	96 hours	>100% (b)	1.00
Mysidposis bahia	96 hours	>100% (b)	1.00
Mytilus edulis **(larval survival)**	48 hours	>100% (b)	1.00
Mytilus edulis **(larval normal development)**	48 hours	>100% (c)	1.00

(a) Limiting Permissible Concentration (LPC) is the LC 50 or EC 50 times 0.01.

(b) Median Lethal Concentration (LC50) resulting in 50% mortatlity at test termination.

(c) Median Effective Concentration (EC50) based on normal development to the D-cell, prodissoconch 1 stage.

Whole Sediment (10 days)

Test Species	% Survival in Reference	% Survival in Test	% Difference |Reference -Test|	Is difference statistically significant? (a=0.05)
Ampelisca abdita	80%	95%	15%	No
Mysidopsis bahia	99%	97%	2%	No

ARTHUR KILL - CONTRACT AREA 1A
TABLE 3C. 28-DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations

CONSTITUENTS	*Tapes japonica*				*Nereis virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCEN-TRATION	DETECTION LIMITS	CONCEN-TRATION	DETECTION LIMITS	CONCEN-TRATION	DETECTION LIMITS	CONCEN-TRATION
Metals	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)
Ag		0.11		0.11		0.01	0.01	ND
As		1.99		1.94		3.33		3.11
Cd		0.25		0.24		0.06		0.06
Cr		0.04		* 0.06		0.06		0.06
Cu		1.10		1.00		1.40		1.37
Hg		0.01		0.01		0.02		0.02
Ni		0.73		0.71		0.26		* 0.37
Pb		0.02		0.02		0.20		0.17
Zn		8.35		7.55		21.11		24.58
Pesticides	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Aldrin	0.010	ND	0.01	ND	0.02	ND	0.08	ND
a-Chlordane		0.04		0.02		0.13		0.11
trans Nonachlor		0.02		0.01		0.45		0.41
Dieldrin	0.01	ND		0.02		0.16		0.13
4,4'-DDT	0.01	ND	0.01	ND		0.02	0.09	ND
2,4'-DDT	0.02	ND	0.02	ND		0.08	0.12	ND
4,4'-DDD		0.03		0.01		0.18		0.18
2,4'-DDD	0.01	ND	0.01	ND		0.10		0.06
4,4'-DDE		0.03		0.01	0.02	ND	0.13	* ND
2,4'-DDE	0.05	ND	0.05	ND	0.06	ND	0.33	* ND
Total DDT		**0.11**		**0.07**		**0.42**		**0.80**
Endosulfan I	0.02	ND	0.02	ND	0.02	ND	0.12	* ND
Endosulfan II	0.03	ND	0.03	ND		0.11	0.17	ND
Endosulfan sulfate	0.03	ND	0.03	ND		0.20		0.17
Heptachlor	0.01	ND	0.01	ND	0.02	ND	0.10	ND
Heptachlor epoxide	0.01	ND	0.01	ND		0.04		0.06
Industrial Chemicals	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
PCB 8	0.17	ND	0.17	ND	0.22	ND		* 0.80
PCB 18	0.02	ND	0.02	ND	0.02	ND	0.13	* ND
PCB 28		0.10	0.02	ND	0.03	ND	0.16	* ND
PCB 44		0.14		0.12	0.02	ND	0.11	* ND
PCB 49	0.01	ND	0.01	ND	0.02	ND	0.09	ND
PCB 52	0.01	ND	0.01	ND	0.02	ND	0.08	ND
PCB 66	0.02	ND	0.02	ND	0.02	ND	0.10	ND
PCB 87		0.05		0.03		0.05		0.11
PCB 101		0.16		0.11		0.42		0.34
PCB 105	0.02	ND	0.02	ND		0.17	0.15	ND
PCB 118	0.02	ND	0.02	ND		0.16	0.13	ND
PCB 128	0.05	ND	0.05	ND		0.17		0.12
PCB 138		0.32		0.13		1.46		1.20
PCB 153		0.08		0.04		2.04		2.20
PCB 170		0.10		0.11		0.39	0.13	ND
PCB 180	0.02	ND	0.02	ND		1.00		0.15
PCB 183	0.02	ND	0.02	ND		0.35		0.30
PCB 184	0.03	ND	0.03	ND	0.03	ND	0.18	* ND
PCB 187	0.02	ND	0.02	ND		0.83		0.69
PCB 195	0.02	ND	0.02	ND		0.12		0.11
PCB 206		0.02	0.02	ND		0.18	0.12	ND
PCB 209	0.02	ND	0.02	ND		0.22		* 0.38
Total PCB		**2.39**		**1.54**		**15.51**		**15.15**
1,4-Dichlorobenzene		0.19		0.25		0.42		0.76

TABLE 3C. (Continued) **ARTHUR KILL - CONTRACT AREA 1A**

CONSTITUENTS	*Tapes japonica*				*Nereis virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION
PAH's	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Naphthalene		0.51		0.57		2.10		2.16
Acenaphthylene		0.05		0.05		0.16		0.13
Acenaphthene		0.07		0.08		0.30		0.21
Fluorene		0.12		0.15		0.19		0.11
Phenanthrene		0.55		0.67		0.23		0.31
Anthracene		0.08		0.06		0.07		0.07
Fluoranthene		0.66		0.79		0.50		0.44
Pyrene		0.41		0.78		0.39		0.38
Benzo(a)anthracene		0.57		0.60		0.12		0.12
Chrysene		0.67		0.72		0.32		0.30
Benzo(b)fluoranthene		0.17		0.14		0.13		0.12
Benzo(k)fluoranthene		0.10		0.06		0.13		0.11
Benzo(a)pyrene		0.04		0.05		0.20		0.23
Indeno(1,2,3-cd)pyrene	0.01	ND		0.06	0.02	ND	0.06	* ND
Dibenzo(a,h)antracene	0.03	ND		0.04	0.03	ND		0.07
Benzo(g,h,i)perylene	0.02	ND		0.07	0.03	ND		* 0.19
Total PAH's		**4.03**		**4.89**		**4.88**		**4.97**
Dioxins	pptr (ng/kg)	pptr (ng/kg)	pptr (ng/kg)	pptr (ng/kg)	pptr (ng/kg)	pptr (ng/kg)	pptr (ng/kg)	pptr (ng/kg)
2,3,7,8 TCDD	0.10	ND	0.08	ND		0.24		0.14
1,2,3,7,8 PeCDD	0.12	ND	0.10	ND		0.06	0.24	ND
1,2,3,4,7,8 HxCDD	0.06	ND		0.03		0.03		* 0.06
1,2,3,6,7,8 HxCDD		0.04		0.05		0.13		* 0.08
1,2,3,7,8,9 HxCDD	0.07	ND		0.04		0.05		0.09
1,2,3,4,6,7,8 HpCDD		0.20		0.31		0.91		0.75
1,2,3,4,7,8,9 OCDD		1.33		1.85		5.85		5.70
2,3,7,8 TCDF		0.14		0.10		1.52		0.91
1,2,3,7,8 PeCDF		0.07		0.06		0.12	0.25	ND
2,3,4,7,8 PeCDF		0.07		0.05		0.20		0.15
1,2,3,4,7,8 HxCDF		0.09		0.07		0.12		0.13
1,2,3,6,7,8 HxCDF		0.03		0.03		0.05		0.06
2,3,4,6,7,8 HxCDF		0.03		0.03		0.04		0.11
1,2,3,7,8,9 HxCDF		0.03	0.05	ND	0.06	ND	0.11	* ND
1,2,3,4,6,7,8 HpCDF		0.06		0.06		0.32		0.32
1,2,3,4,7,8,9 HpCDF	0.08	ND		0.04	0.10	ND		* 0.23
1,2,3,4,6,7,8,9 OCDF		0.11		0.10		0.42		0.55

ND = Not detected
Total PAH = Sum of all PAH's.
Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
Total PCB = 2(x), where x = sum of PCB congeners
Concentrations shown are the mean of 5 replicate analyses in wet weight.
Means were determined using conservative estimates of concentrations of constituents that were at concentrations below the detection limit.
* = Statistically significant at the 95% confidence level