AMENDED PUBLIC NOTICE

US Army Corps
of Engineers
New York District
Jacob K. Javits Federal Building
New York, N.Y. 10278-0090
ATTN: Regulatory Branch

In replying refer to:
Public Notice Number: **NAN-2022-00511-EBR-A**
Issue Date: November 15, 2023
Expiration Date: December 15, 2023

The New York District, of the U.S. Army Corps of Engineers has received an application for a Department of the Army permit pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), Section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 103 of the Marine Protection, Research & Sanctuaries Act of 1972, as amended (33 U.S.C. 1413):

APPLICANT: American Sugar Refining, Inc.
1 Federal Street
Yonkers, New York 10705

ACTIVITY: Maintenance dredging, with subsequent placement of the dredged material in the Historic Area Remediation Site (HARS) for the purpose of remediation. Barge overflow at the dredging site is not proposed. Decanting of barges at the dredging site is proposed.

WATERWAY: Hudson River

LOCATION: 1 Federal Street, City of Yonkers, Westchester County, New York

A detailed description and plans of the applicant's activity are enclosed to assist in your review.

The decision whether to issue a permit will be based on an evaluation of the probable impact, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general the needs and welfare of the people. The decision of whether to issue a Department of the Army Permit for placement of the dredged material at the Historic Area Remediation Site (HARS) will also be based on whether the material meets the requirements of applicable implementing regulations. This activity is also being evaluated to determine that the proposed placement of dredged material will not unreasonably degrade or endanger human health, welfare or amenities, the marine environment, ecological systems or economic potentialities.

On September 26, 2000, the U.S. Environmental Protection Agency (USEPA) and U.S. Army Corps of Engineers (USACE) signed a joint Memorandum of Agreement (MOA) outlining the steps to be taken to ensure that remediation of the HARS continues in a manner appropriately protective of human health and the aquatic environment. In making the determination evaluating placement of dredged material, the criteria established by the USEPA will be applied, including the interim change to one matrix value for polychlorinated biphenyls (PCB's) as described in the joint MOA. In addition, based upon an evaluation of the potential effect which the failure to utilize this ocean site will have on navigation, economic, and industrial development, and foreign and domestic commerce of the United States, an independent determination will be made of the need to place the dredged material

in ocean waters, other possible methods of disposal, and other appropriate locations.

The U.S. Army Corps of Engineers neither favors nor opposes permit issuance for the applicant's proposed activity. The purpose of this public notice is to solicit comments from the public; federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

ALL COMMENTS REGARDING THE PERMIT APPLICATION MUST BE PREPARED IN WRITING AND EMAILED TO William.Bruno@usace.army.mil BEFORE THE EXPIRATION DATE OF THIS NOTICE; otherwise, it will be presumed that there are no objections to the activity.

Comments submitted in response to this notice will be fully considered during the public interest review for this permit application. Comments provided will become part of the public record for this permit application. All written comments, including contact information, will be made a part of the administrative record, available to the public under the Freedom of Information Act. The Administrative Record, or portions thereof, may also be posted on a Corps of Engineers internet web site. Due to resource limitations, this office will normally not acknowledge the receipt of comments or respond to individual letters of comment.

Any person may request, in writing, before this public notice expires, that a public hearing be held to collect information necessary to consider this application. Requests for public hearings shall state, with particularity, the reasons why a public hearing should be held. It should be noted that information submitted by mail is considered just as carefully in the permit decision process and bears the same weight as that furnished at a public hearing.

The proposed project was 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), Based upon this review, and a review of the latest public listing of threatened and endangered species, it has been preliminarily determined that the proposed dredging and placement activities for which authorization is sought herein, may affect, but are not likely to adversely affect the following federally threatened or endangered species (humpback whales, finback whales, right whales, loggerhead turtles, leatherback turtles, green turtles, Kemp's Ridley turtles, Atlantic sturgeon and Shortnose sturgeon) or their critical habitat pursuant to Section 7 of the Endangered Species Act (ESA; 16 USC 1531). The USACE New York District is conducting informal consultations with the National Marine Fisheries Service in accordance with Section 7 of the Endangered Species Act.

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires all federal agencies to consult with the National Marine Fisheries Service on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect Essential Fish Habitat (EFH). Consultation with the National Marine Fisheries Service regarding EFH impacts and conservation recommendations is being conducted and will be concluded prior to the final decision.

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Based upon a review of the latest published version of the National Register of Historic Places, the only known wrecks on or eligible for inclusion on the National Register at the HARS are located in Primary Remediation Area Number 1. As noted in the designation of the HARS, Remediation Material would not be allowed to be placed within 0.27 nautical miles of the identified wrecks or other wrecks that might be found. Otherwise, there are no known sites eligible for, or included in, the National Register within the proposed permit area.

Reviews of the activity pursuant to Section 404 of the Clean Water Act will include application of the guidelines announced by the Administrator, US Environmental Protection Agency, under authority of Section 404(b) of the Clean Water Act. The applicant is required to receive a Water Quality Certification from New York State Department of Environmental Conservation in accordance with Section 401 of the Clean Water Act prior to any final permit decision.

Pursuant to Section 307 (c) of the Coastal Zone Management Act of 1972 as amended [16 U.S.C. 1456 (c)], for activities under consideration that are located within the coastal zone of a state which has a federally approved coastal zone management program, the applicant has certified in the permit application that the activity complies with, and will be conducted in a manner that is consistent with, the approved state coastal zone management program. The applicant is required to receive Coastal Zone Management Act concurrence from New York State Department of State prior to any final permit decision.

In addition to any required water quality certificate and coastal zone management program concurrence, the applicant has obtained or requested the following governmental authorization for the proposed activity under consideration: A Protection of Waters Permit from the New York State Department of Environmental Conservation

In addition to any required water quality certificate and coastal zone management program concurrence, the applicant has obtained or requested the following governmental authorization for the activity under consideration:

New York State Department of Environmental Conservation

It is requested that you communicate the foregoing information concerning this activity to any persons known by you to be interested and who did not receive a copy of this notice.

If you have any questions concerning this application, you may contact this office at (917) 790-8516 and ask for Mr. William T. Bruno, or email **CENAN.PublicNotice@usace.army.mil**. Questions about the HARS can be addressed to Mr. Mark Reiss, Chief, Dredging, Sediments and Oceans Section, Water Division, US Environmental Protection Agency, Region 2 at (212) 637-3799.

*****PLEASE USE THE 18-CHARACTER FILE NUMBER ON ALL CORRESPONDENCE WITH THIS OFFICE*****

In order for us to better serve you, please complete our Customer Service Survey located at http://www.nan.usace.army.mil/Missions/Regulatory/CustomerSurvey.aspx. For more information on New York District Corps of Engineers programs, visit our website at http://www.nan.usace.army.mil.

R. Miranda Digitally signed by Rosita Miranda

FOR AND IN BEHALF OF
Stephan A. Ryba
Chief, Regulatory Branch

Enclosures

DESCRIPTION OF PROPOSED WORK

The applicant, American Sugar Refining, Inc., has requested a Department of the Army permit to perform annual maintenance dredging activities at their sugar refining plant in the Hudson River at 1 Federal Street in the City of Yonkers, Westchester County, New York. The purpose of this proposed annual maintenance dredging is to maintain sufficient water depths for the continued safe navigation of cargo vessels that unload raw sugar from ocean going ships and barges and to maintain water flow associated with the refinery's cooling water intake.

Maintenance dredge approximately 80,000 cubic yards (CYs) of dredged material from Reach 1, an approximately 5.0-acre berth area that is irregular in shape with a length of approximately 650 feet along its inside edge, a length of approximately 850-feet along its outside edge, and a width of approximately 300 feet.

The berth has been historically dredged to depths ranging from 30 to 32 feet below the plane of Mean Low Water (MLW) plus an allowable maximum overdepth of 2 feet to assure the needed safe navigation depths. The shoreward portion of the berth will be dredged to 32-feet below the plane of MLW; the seaward portion of the berth will be dredged to 30-feet below the plane of MLW. Subsequent maintenance dredging of Reach 1 is estimated to be approximately 80,000 cubic yards each year over the 3 year life of the permit, if issued.

Maintenance dredge approximately 20,000 CYs of dredged material from Reach 2, an approximately 0.7 acre rectangular area, approximately 100-foot wide by 280-foot long. Reach 2 is proposed to be dredged to a depth of 15 feet below the plane of MLW, plus an allowable maximum overdepth of 2 feet to assure the needed safe navigation depths. Subsequent maintenance dredging of Reach 2 is estimated to be approximately 20,000 cubic yards each year over the 3 year life of the permit, if issued.

All dredging would be conducted using a closed clamshell environmental bucket dredge. No barge overflow at the dredging site is proposed. Decanting of excess water would occur at the dredging site when performed in accordance with a Water Quality Certificate issued by the New York State Department of Environmental Conservation. The dredged material would be transported by ocean-going barges from the project site for placement at the Historic Area Remediation Site (HARS) for the purpose of remediation (Figure 1).

The dredged material would be used for remediation purposes at the HARS by placing it over degraded sediments within the site, which is located in the Atlantic Ocean off of Sandy Hook, New Jersey. The proposed dredged material would be transported by bottom-opening barges to the placement site.

Should approval of the requested permit be issued, consideration is being given to issuance of a three-year permit for the annual maintenance work. Subsequent to an initial dredging cycle, the applicant would have to request authorization to perform maintenance dredging during the remaining life of the permit. Such authorization is dependent on the applicant demonstrating that each maintenance event requiring placement at the HARS is in compliance with the Ocean Dumping Regulations cited at 40 CFR Sections 220 - 229 in effect at that time and will be dependent upon the availability of an approved disposal or remediation site.

INTRODUCTION TO THE HISTORIC AREA REMEDIATION SITE (HARS):

In 1972, the Congress of the United States 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 (USEPA) and the US Army Corps of Engineers (USACE) to regulate dumping in ocean waters. The USEPA and the USACE share responsibility for MPRSA permitting and ocean disposal site management. Regulations implementing MPRSA can be 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. Determinations to issue MPRSA permits for dredged material are 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 re-designated as the HARS under authority of Section 102(c) of MPRSA 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 will be managed to reduce impacts of historic disposal activities at the site to acceptable levels in accordance with 40 CFR Section 228.11(c). The need to remediate the HARS is supported by the presence of toxic effects, dioxin bioaccumulation exceeding Category 1 levels in worm tissue (a definition of which appears in a memorandum reviewing the results of the applicant's testing), 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 conditions in the Study Area and the surveys performed may be found in the Supplemental Environmental Impact Statement (USEPA, 1997).

The designation of the HARS identifies an area in and around the former Mud Dump Site (MDS) that has exhibited the potential for adverse ecological impacts. The HARS will be remediated with dredged material that meets current Category 1 standards and 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 Historic Area Remediation Site (HARS)" or "HARS Material."

As of the end of September 2023, dredged materials from one hundred forty six (146) different completed and ongoing Department of the Army (DA) permitted 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 Historic Area Remediation Site (HARS) since the closure of the Mud Dump Site and designation of the HARS in September 1997. This represents approximately 83,650,000 cubic yards of Remediation Material.

The HARS, which includes the 2.2 square nautical mile area of the 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 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 (a map depicting the relative depths of water in a particular area) that capping is complete, the USEPA will take 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 the 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 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 will be on-board any barges carrying Remediation Material to the HARS. This equipment records vessel positions and scow drafts 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).

Additional information concerning the HARS can be obtained from Mr. Mark Reiss, Chief, Dredging, Sediments and Oceans Section, Water Division, US Environmental Protection Agency, Region 2 at (212) 637-3799.

HARS SUITABILITY TESTING:

A testing evaluation process was developed, which established a basic framework for assessing results of tissue analysis from bioaccumulation testing of dredged material proposed for ocean placement. The 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, to facilitate decisions in accordance with the Marine Protection, Research, and Sanctuaries Act of 1972. USEPA and USACE utilize this testing evaluation process for identifying Category 1 dredged material in determining suitability of dredged materials as material for remediation at the HARS. The Testing Evaluation Memo for this project may be obtained by contacting Mr. Mark Reiss, Chief, Dredging, Sediments and Oceans Section, Water Division, US Environmental Protection Agency, Region 2 at (212) 637-3799.

Sediment Grain Size Analysis:

As depicted on the attached drawings, the proposed maintenance dredging area has been characterized by 12 sediment core samples taken down to -30 feet and -32 feet MLW plus two feet allowable overdepth in Reach 1 and by 5 sediment core samples taken down to -15 feet MLW plus two feet allowable overdepth in Reach 2. The 12 samples from Reach 1 were then combined into one composite sample which was subjected to chemical and biological testing. The 5 samples from

Reach 2 were then combined into one composite sample which was subjected to chemical and biological testing. Based upon an analysis of sediment samples from the project area submitted by the applicant and their contract laboratory, the grain size characteristics of the proposed dredged material are summarized below.

Grain size characteristics of the proposed dredged material from Reach 1 are:

0.0% Gravel 2.7% Sand 51.4% Silt 45.9% Clay

Grain size characteristics of the proposed dredged material from Reach 2 are:

0.0% Gravel 3.8% Sand 55.4% Silt 40.8% Clay

Results of the chemical and biological testing are summarized below.

Evaluation of the liquid phase: Chemistry

Under the requirements of 40 CFR 227.6(c)(1) and 227.27(a), chemical analysis was conducted on project area site water and elutriate. Results of this evaluation are summarized in Table 1. Please note in reading Table 1 that detection limits have been listed for only those constituents which the laboratory reported as non-detected (ND) in the concentration column (this reporting convention was similarly applied in reporting the results of bioaccumulation potential testing discussed below). If the constituents were detected (above the detection limit), the measured value would appear.

Expected concentrations of chemical constituents in the water column following ocean placement, after allowing for initial mixing, were calculated using the Automated Dredging and Disposal Alternatives Management System (ADDAMS), a mixing model developed by the U.S. Army Corps of Engineers (USACE) Waterways Experiment Station (WES) and described in the joint USEPA/USACE implementation manual entitled "Evaluation of Dredged Material Proposed for Ocean Disposal" (commonly referred to as the National “Green Book”). The material can be considered suitable for ocean disposal only if the concentration of the Suspended Particulate Phase (SPP) of the dredged material, after allowance for the initial mixing, will not exceed the Limiting Permissible Concentration (LPC) beyond the boundaries of the disposal site within the first four hours following HARS placement or at any point in the marine environment after the first four hours. The ADDAMS Model predicted that applicable marine water quality criteria for listed constituents were not exceeded after allowance for initial mixing [40 CFR 227.29(a)]. Results of this analysis indicate that the LPC will be met for the proposed dredged material from the project area.

Bioassays:

In accordance with 40 CFR Part 227 of the Ocean Dumping regulations, bioassays were performed to assess the toxicities of the suspended particulate, liquid, and solid phases of the proposed dredged material from the proposed project area.

Evaluation of the liquid phase:

Liquid phase bioassays run as part of the suspended particulate phase on three appropriate sensitive marine organisms: a crustacean (a mysid shrimp, *Americamysis bahia*), an inland silverside (*Menidia beryllina*), and the planktonic larvae of a bivalve (the blue mussel, *Mytilus*sp.), show that after initial mixing (as determined under 40 CFR Sections 227.29(a)(2)), the liquid phase of the material would

not exceed a toxicity threshold of 0.01 of a concentration shown to be acutely toxic to appropriate sensitive marine organisms. Accordingly, it is concluded the liquid phase of the material would be in compliance with 40 CFR Sections 227.6(c)(1) and 227.27(a). The specific test results and technical analysis of the data underlying this conclusion are described and evaluated in a joint USACE New York District/US Environmental Protection Agency Region 2 memorandum (copies available upon request).

Evaluation of the suspended particulate phase:

The suspended particulate phase of the material was evaluated for compliance with 40 CFR Sections 227.6(c)(2) and 227.27(b). Bioassay testing of the suspended particulate phase of the material has been conducted using three appropriate sensitive marine organisms: the mysid shrimp, *Americamysis bahia*; the inland silverside, *Menidia beryllina*; and the planktonic larvae of a blue mussel, *Mytilus edulis.* Median lethal concentrations (LC50), those concentrations of suspended particulate phase resulting in 50% mortality, were determined for all three test species. In addition, the median effective concentration (EC50) based on normal larval development to the D-cell stage, was determined for bivalve larvae. The Limiting Permissible Concentration (LPC) was then calculated as 0.01 of the LC50 or EC50 of the most sensitive organism. In this case, the LPC was calculated at 0.441% for Reach 1 and 0.438% for Reach 2 based on the EC50 of *M. edulis.* This information shows that when placed in the HARS, and after initial mixing (as determined under 40 CFR Sections 227.29(a)(2)), the suspended particulate phase of this material would not exceed a toxicity threshold of 0.01 of a concentration shown to be acutely toxic in the laboratory bioassays, and thus would not result in significant mortality. Moreover, the fact that after placement, the suspended particulate phase would only exist in the environment for a short time, means the suspended particulate phase of the reach would not cause significant undesirable effects, including the possibility of danger associated with bioaccumulation, since these impacts require long exposure durations (see USEPA, 1994). Accordingly, it is concluded that the suspended phase of the material would be in compliance with 40 CFR Sections 227.6(c)(2) and 227.27(b). The results of bioassay tests conducted on proposed dredged sediments are presented in Table 2 of this public notice.

Evaluation of the solid phase:

The solid phase tests the whole dredged material before it has undergone processing that might alter its chemical or toxicological properties. The solid phase was evaluated for compliance with 40 CFR Sections 227.6(c)(3) and 227.27(b). This evaluation was made using the results of two specific types of evaluations on the solid phase of the material, one focusing on the acute (10-day) toxicity of the material, and the other focusing on the potential for the material to cause significant adverse effects due to bioaccumulation. Both types of tests used appropriate sensitive benthic marine organisms according to procedures approved by USEPA and the USACE. The following sections address the results of those tests and further analyze compliance with the regulatory criteria of 40 CFR Sections 227.6(c)(3), 227.27(b), and 228.15 and with USEPA Region 2/USACE New York District guidance.

1. <u>Toxicity</u>:

Ten-day toxicity tests were conducted on proposed project dredged material using a filter feeding mysid shrimp *(Americamysis bahia)* and a deposit feeding, burrowing amphipod (*Ampelisca abdita*), which are appropriate sensitive benthic marine organisms. The results from the proposed project material are then compared to results for the same organisms that are exposed to reference sediments. The reference sediments represent existing background conditions in the vicinity of the HARS, removed from the influence of any placement operations. These organisms are good

predictors of adverse effects to benthic marine communities (see USEPA, 1996). The toxicity of project sediments was not statistically greater than reference sediments for either mysid, or for amphipods, and the difference between percent survivals in test and reference sediments was less than 10% for mysid shrimp and less than 20% for amphipods for Reaches 1 and 2.

These results show that the solid phase of the material would not cause significant mortality and meets the solid phase toxicity criteria of Sections 227.6 and 227.27. The results of the ten-day toxicity test are summarized in Table 2.

2. Bioaccumulation:

Bioaccumulation tests for the sediment were conducted on the solid phase of the project material for contaminants of concern using two appropriate sensitive benthic marine organisms: a burrowing, deposit-feeding polychaete, *Alitta virens,* and a filter-feeding bivalve, *Macoma nasuta.* These species are considered to be good representatives of the phylogenetically diverse base of the marine food chain. Contaminants of concern were identified for the regional testing manual from the NY/NJ Harbor Estuary Program Toxics Characterization report (Squibb, *et al.* 1991). Table 3 of this Public Notice addresses the bioaccumulation of contaminants of concern. Additional information on more rigorous evaluations conducted on individual contaminant values may be found in the Testing Evaluation Memo for this project. Table 3 indicates that several contaminants bioaccumulated above reference in the clam and/or worm. All constituents identified in worm and clam tissue were compared to existing Food and Drug Administration (FDA) action levels for poisonous or deleterious substances in fish and shellfish for human food, regional disposal criteria, background concentrations, and risk-based criteria provided by USEPA. The testing memo further evaluates these contaminants and concludes that any contaminant that exceeded reference did not exceed any existing regional matrix or dioxin values. Several contaminants which did not have matrix values did exceed background levels, but in no case did any contaminant accumulate to toxicologically important concentrations, even when very conservative assumptions were used in the analysis. Any contaminants that exhibited bioaccumulation test results above reference were all below the acceptable human health risk range and acceptable aquatic effects range, again using conservative approaches and analyses. A discussion of this determination is available in the Testing Evaluation Memo for this permit applicant's dredging and disposal project. The bioaccumulation test results were used in evaluating the potential impacts of the material. The determination is that the combined results of the toxicity and bioaccumulation tests indicate that the material meets the criteria of 40 CFR Sections 227.6(c)(3) and 227.27(b) and 228.15(d)(6)(v)(A) of the Regulations, and that the material is suitable for placement at the HARS.

CONCLUSIONS:

Based upon the results of testing of the sediments proposed for dredging in the permit applicant's facility and ocean placement the USACE and USEPA have determined that the material is Category 1 meeting the criteria for ocean placement as described in 40 CFR Sections 227.6, 227.27, and 228.15, and is a Remediation Material as defined under the USEPA Region 2/USACE, New York District guidance. The specific test results and technical analysis of the data underlying this conclusion are described in the joint USACE, New York District/USEPA Region 2 memorandum mentioned previously.

Placement of this material at the HARS will serve to reduce impacts to acceptable levels and improve benthic conditions. Sediments in the HARS have been found to be acutely toxic to sensitive benthic marine organisms in laboratory tests, whereas project sediments used in laboratory acute toxicity tests with the same species were determined not to be toxic. Placement of project material over existing toxic sediments would serve to remediate those areas for toxicity. In addition, by covering the existing sediments in the site with this project material, surface dwelling organisms will be exposed to sediments exhibiting Category 1 qualities whereas the existing sediments exceed these levels.

ALTERNATIVES TO HARS PLACEMENT:

Regarding ocean placement of dredged material, the Ocean Dumping Regulations [Title 40 CFR Sections 227.16(b)] states that ". . . alternative methods of disposal are practicable when they are available at reasonable incremental cost and energy expenditures which need not be competitive with the costs of ocean dumping, taking into account the environmental impacts associated with the use of alternatives to ocean dumping . . ." The permit applicant has investigated the use of alternative placement sites for the dredged material that include beneficial re-use at upland placement locations. Beneficial re-use of the dredged material for material recycling has been considered, but the costs for handling and amending the material would be excessive. The applicant also investigated the use of upland placement of the dredged material. However, upland disposal locations in the metropolitan area are extremely limited. In addition, upland storage space is limited and there is virtually no commercial use for this type of material, thereby making upland placement not a practicable alternative. Therefore, alternative sites for the placement of the dredged material are either not available or not available at reasonable incremental costs, thus leaving HARS placement as the applicant's preferred alternative.

COMMUNICATIONS:

For additional information regarding this project or the HARS contact Mr. William T. Bruno, Regulatory Project Manager, USACE, New York District at (917) 790-8516 or Mr. Mark Reiss, Chief, Dredging, Sediments and Oceans Section, Water Division, US Environmental Protection Agency, Region 2 at (212) 637-3799. If the determination is made to issue a permit, the permittee will contact the US Coast Guard with the details of the authorized work.

Source: USGS Yonkers, N.Y. Quadrangle, Maptech, Inc 1998

MALCOLM PIRNIE

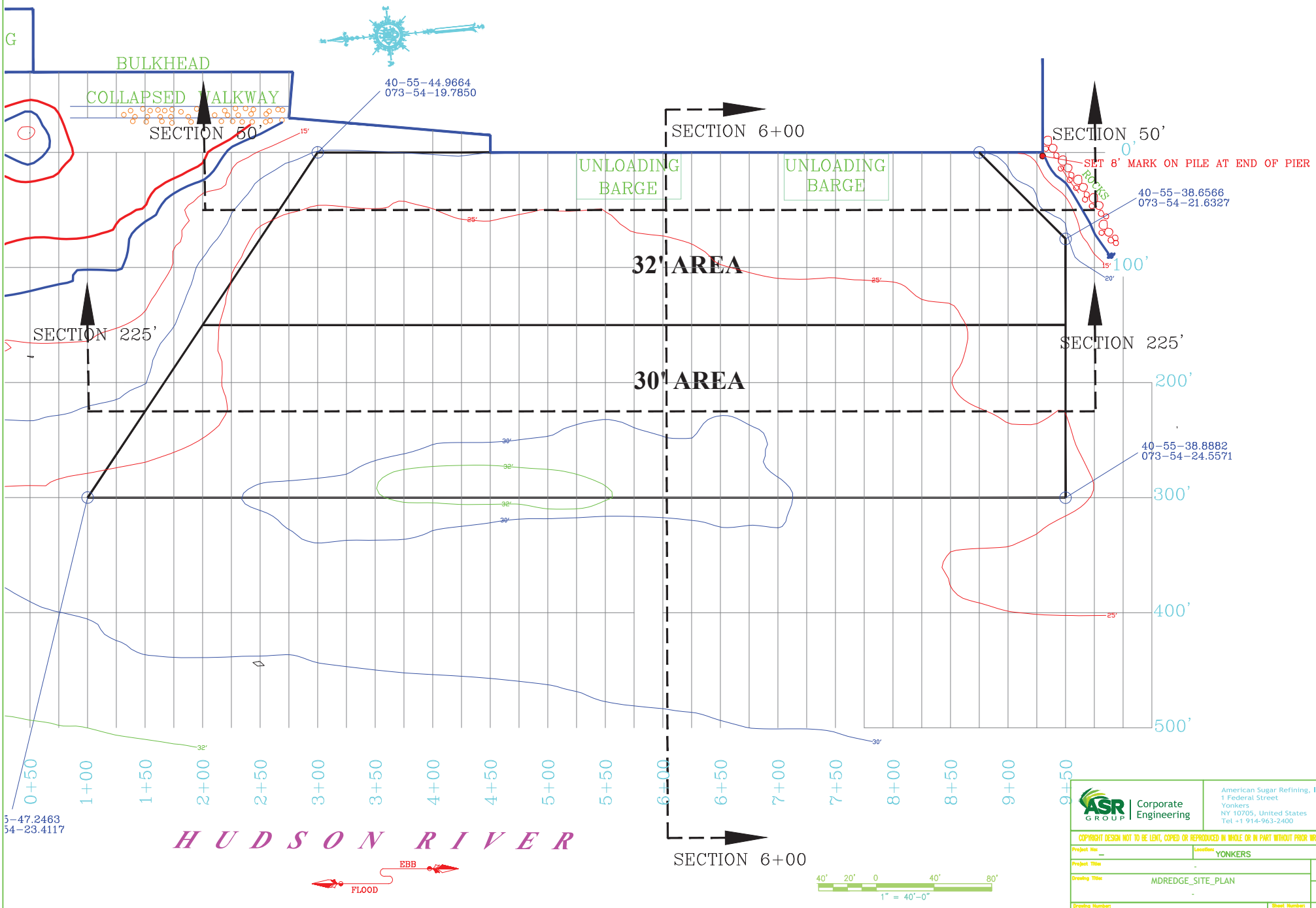
SITE LOCATION MAP
AMERICAN SUGAR REFINING, INC.
YONKERS, NEW YORK

Figure 1

USACE FILE: NAN-2022-00511-EBR

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE STATED | DO NOT SCALE – IF IN DOUBT – ASK

AMERICAN SUGAR REFINING, INC.



ASR GROUP | Corporate Engineering

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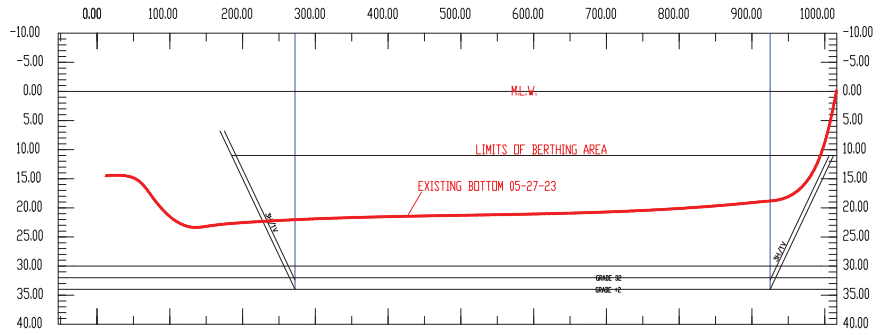
Project No:	–
Location:	YONKERS
Project Title:	-
Drawing Title:	MDREDGE_SITE_PLAN -
Drawing Number:	ASR-REFI-E002
Sheet Number:	2 OF 2
Revision Level:	REV
DRAWN BY:	YM
DATE:	10/10/2023



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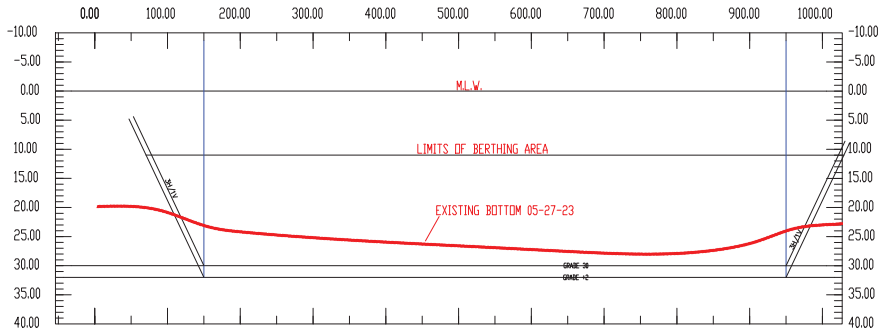

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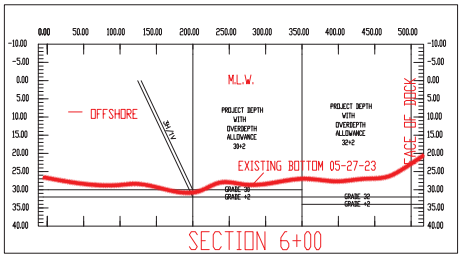

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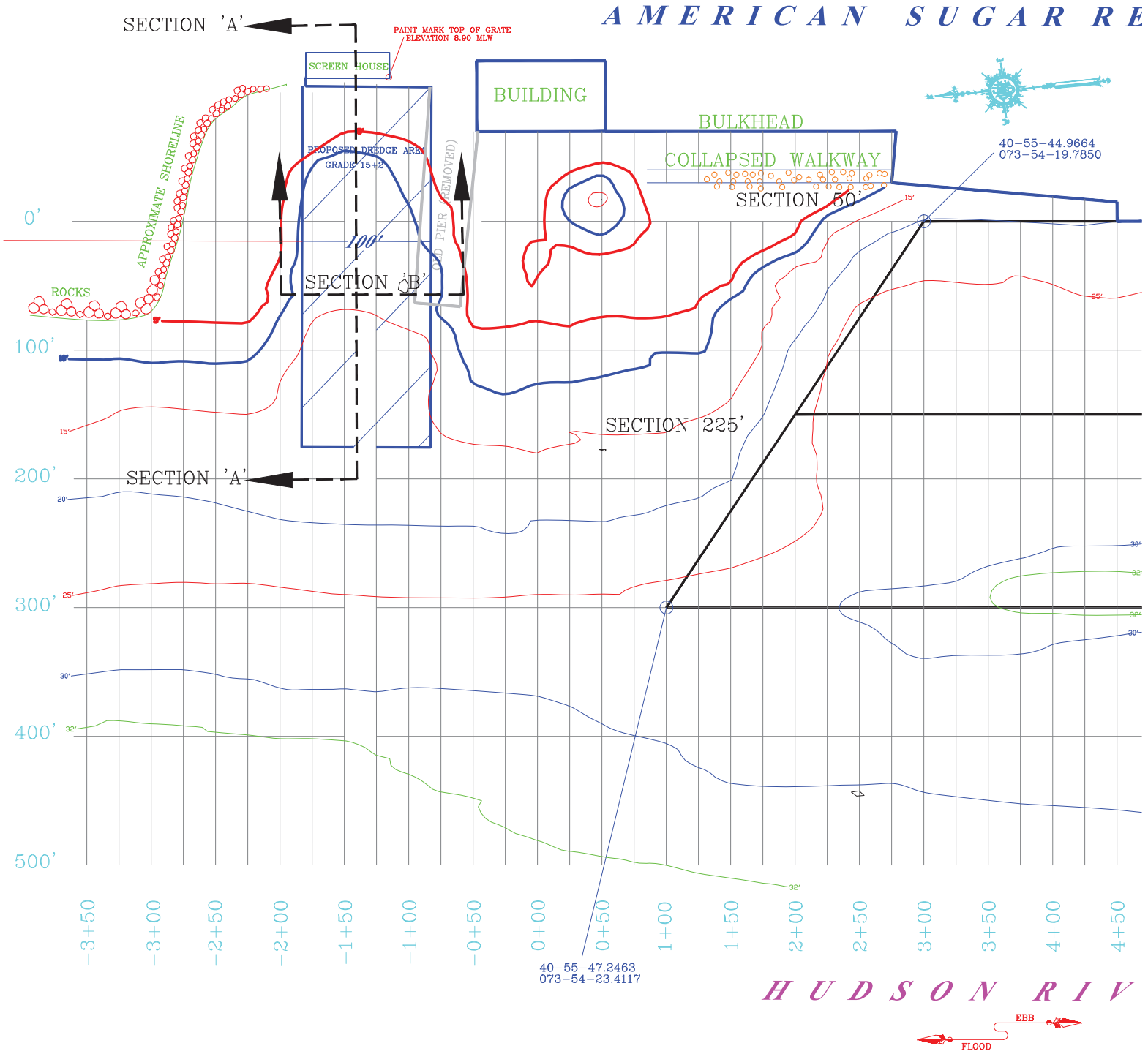

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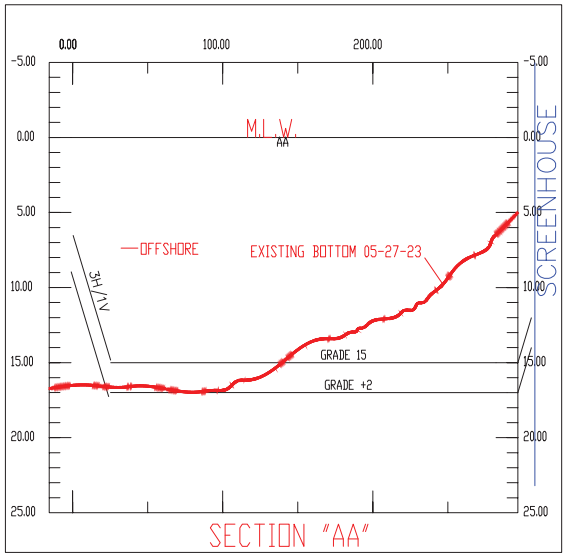
Project No: _
Location: YONKERS
Project Title: -
Drawing Title: MDREDGE_SITE_PLAN
Drawing Number: ASR-REFI-E002
Sheet Number: 1 OF 2
Revision Level: REV
DRAWN BY: YM
DATE: 10/10/2023



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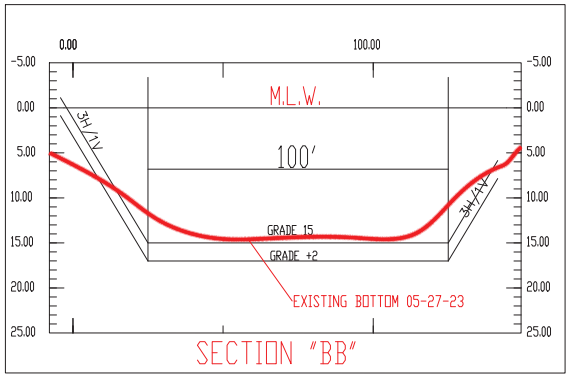

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Project No.: —
Location: YONKERS_REFINERY
Project Title: -
Drawing Title: DREDGE_SECTIONS -
Drawn By: YM
Date: 10/10/2023
Drawing Number: ASR-REFI-E003
Sheet Number: 1 OF 2
Revision Level: REV

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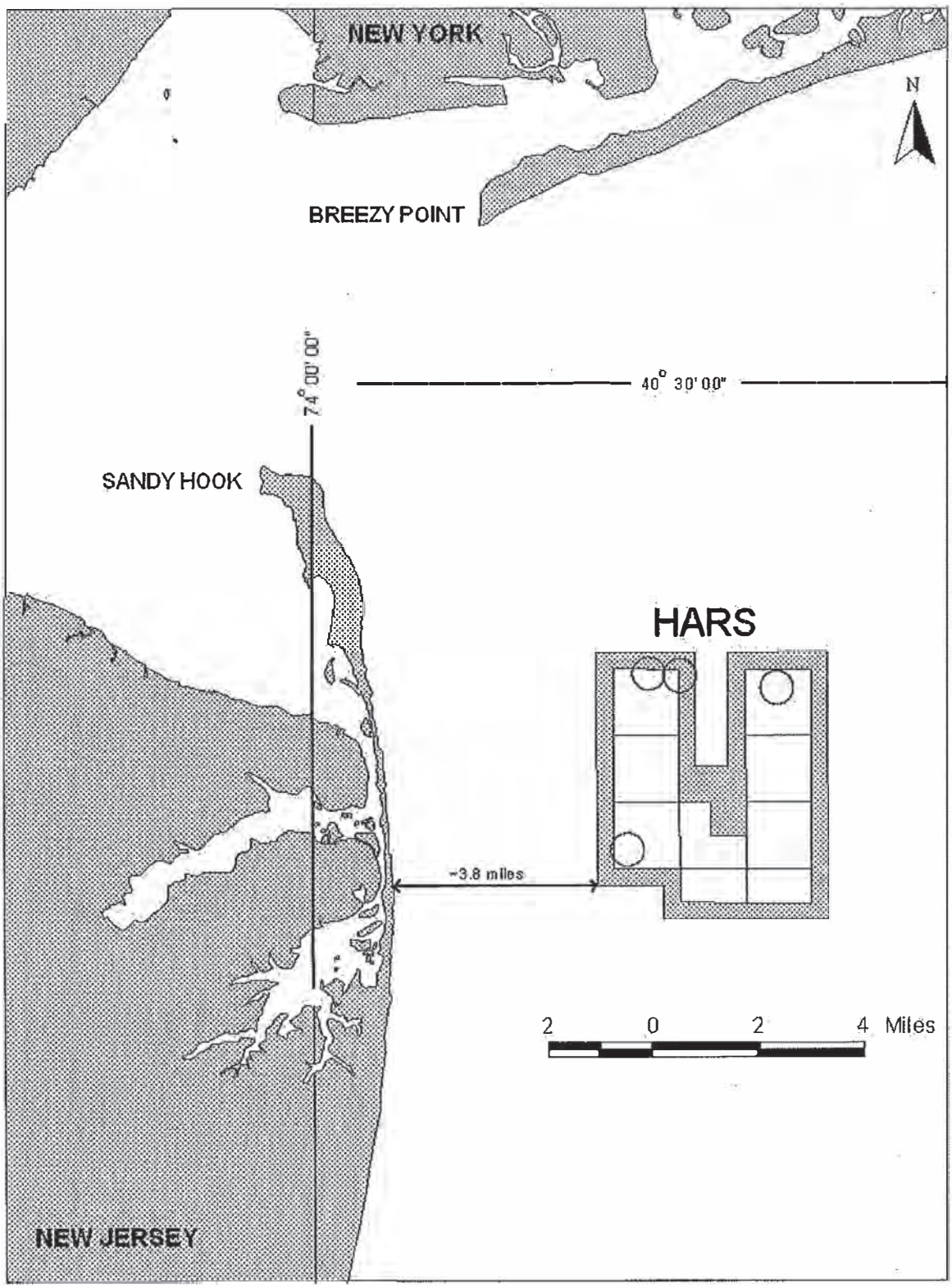
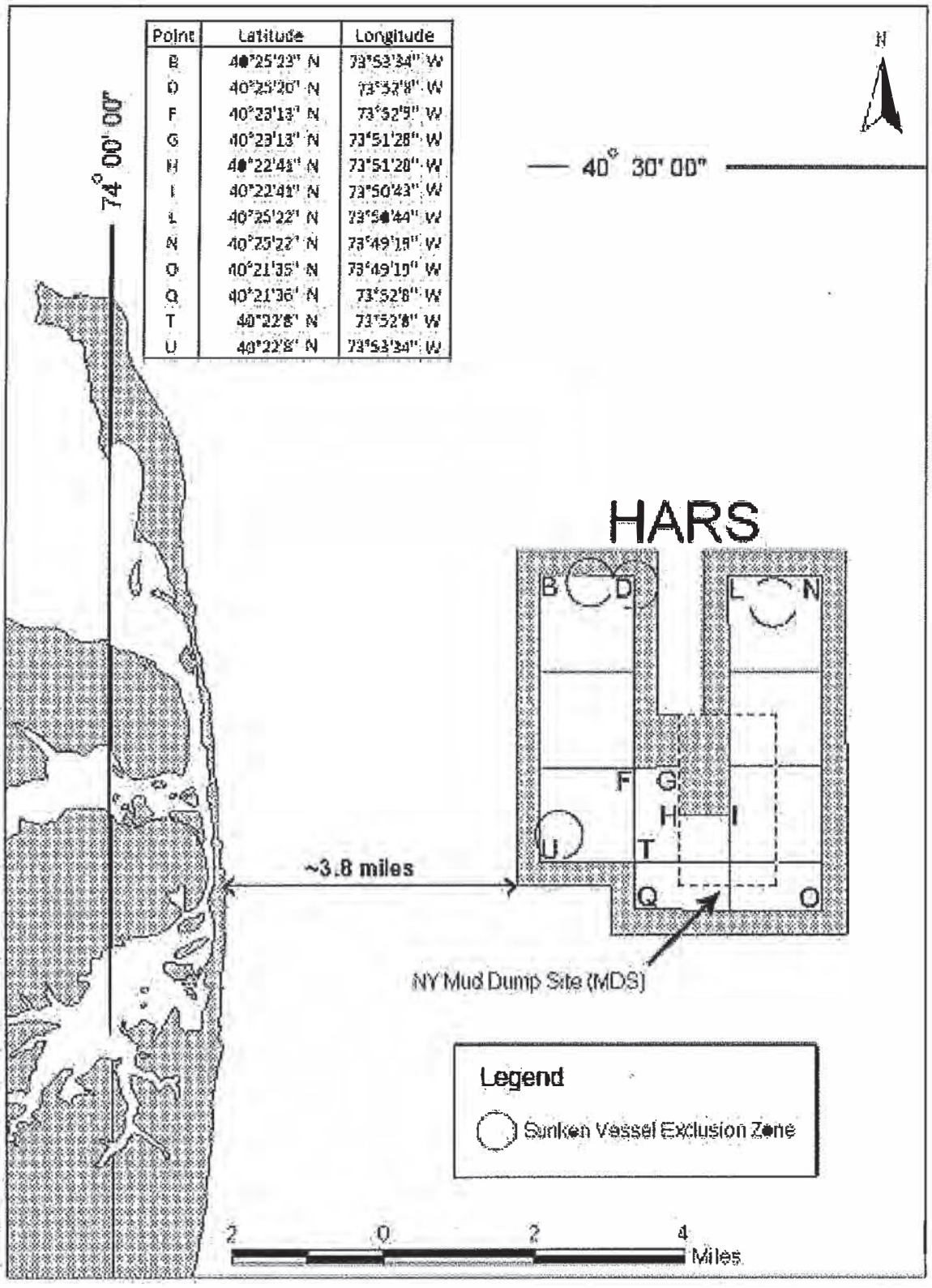
CENAN-OP-RE

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D | 40°25'20" N | 73°52'8" W
F | 40°23'13" N | 73°52'9" W
G | 40°23'13" N | 73°51'28" W
H | 40°22'41" N | 73°51'28" W
I | 40°22'41" N | 73°50'43" W
L | 40°25'22" N | 73°50'44" W
N | 40°25'22" N | 73°49'18" W
O | 40°21'35" N | 73°49'19" W
Q | 40°21'36" N | 73°52'8" W
T | 40°22'8" N | 73°52'8" W
U | 40°22'8" N | 73°53'34" W
N
74° 00' 00"
40° 30' 00"
HARS
B
D
L
N
F
G
H
I
U
T
Q
O
~3.8 miles
NY Mud Dump Site (MDS)
Legend
Sunken Vessel Exclusion Zone
2
0
2
4
Miles

USACE FILE: NAN-2022-00511-EBR

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE
American Sugar July 2023 - Sample R1-Comp, Hudson River, Yonkers, NY

	SITE WATER		ELUTRIATE	
CONSTITUENTS	**DETECTION LIMITS**	**CONCENTRATION**	**DETECTION LIMITS**	**CONCENTRATION**
Metals	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**
Ag	0.060	ND		0.07
Cd	0.100	ND	0.100	ND
Cr		1.220		2.69
Cu		1.73		4.11
Hg	0.200	ND	0.200	ND
Ni	1.000	ND		2.51
Pb		1.300		6.70
Zn	2.50	ND		5.08
Pesticides	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
Aldrin	0.531	ND	0.531	ND
a-Chlordane	0.442	ND		1.34
trans Nonachlor	0.436	ND		0.55
Dieldrin	0.544	ND	0.544	ND
4,4'-DDT	0.633	ND		0.56
2,4'-DDT	0.795	ND	0.795	ND
4,4'-DDD	0.531	ND		1.15
2,4'-DDD	0.582	ND	0.582	ND
4,4'-DDE		0.439		1.32
2,4'-DDE	0.557	ND	0.557	ND
Total DDT		**1.99**		**4.00**
Endosulfan I	0.531	ND	0.531	ND
Endosulfan II	0.525	ND	0.525	ND
Endosulfan sulfate	0.439	ND	0.439	ND
Heptachlor	0.534	ND	0.534	ND
Heptachlor epoxide	0.442	ND	0.442	ND
Industrial Chemicals	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
PCB 8	0.572	ND	0.572	ND
PCB 18	0.366	ND	0.366	ND
PCB 28	0.423	ND		9.60
PCB 44	0.534	ND		3.58
PCB 49	0.391	ND		3.1
PCB 52	0.499	ND		7.40
PCB 66	0.601	ND		1.70
PCB 87	0.461	ND	0.461	ND
PCB 101	0.388	ND		3.25
PCB 105	0.598	ND		0.36
PCB 118	0.576	ND		1.01
PCB 128	0.417	ND		0.164
PCB 138	0.493	ND		5.02
PCB 153	0.493	ND		2.00
PCB 170	0.452	ND		1.60
PCB 180	0.458	ND		1.06
PCB 183	0.410	ND		2.06
PCB 184	0.576	ND	0.576	ND
PCB 187	0.423	ND		0.88
PCB 195	0.429	ND		0.282
PCB 206	0.464	ND		0.87
PCB 209	0.445	ND		1.52
Total PCB		**ND**		**93.0**

ND = Not detected
For values reported as ND, one-half of the detection limit is used in the calculation of Total DDT and Total PCB

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = sum of congeners reported x 2
(If all PCB congeners are ND, the total is reported as ND)

ppb = parts per billion
ug/L = micrograms per liter
pptr = parts per trillion
ng/L = nanograms per liter

USACE FILE: NAN-2022-00511-EBR

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE
American Sugar July 2023 - Sample R2-Comp, Hudson River, Yonkers, NY

	SITE WATER		ELUTRIATE	
CONSTITUENTS	**DETECTION LIMITS**	**CONCENTRATION**	**DETECTION LIMITS**	**CONCENTRATION**
Metals	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**
Ag	0.060	ND		0.06
Cd	0.100	ND	0.100	ND
Cr		0.946		2.82
Cu		1.73		3.29
Hg	0.200	ND	0.200	ND
Ni	1.000	ND		2.39
Pb		1.200		5.10
Zn	2.50	ND		5.47
Pesticides	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
Aldrin	0.531	ND	0.531	ND
a-Chlordane	0.442	ND		0.80
trans Nonachlor	0.436	ND	0.436	ND
Dieldrin	0.544	ND	0.544	ND
4,4'-DDT	0.633	ND	0.633	ND
2,4'-DDT	0.795	ND	0.795	ND
4,4'-DDD	0.531	ND		0.44
2,4'-DDD	0.582	ND		0.76
4,4'-DDE	0.445	ND		0.61
2,4'-DDE	0.557	ND	0.557	ND
Total DDT		**ND**		**2.81**
Endosulfan I	0.531	ND	0.531	ND
Endosulfan II	0.525	ND		0.592
Endosulfan sulfate	0.439	ND		1.030
Heptachlor	0.534	ND	0.534	ND
Heptachlor epoxide	0.442	ND	0.442	ND
Industrial Chemicals	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
PCB 8	0.572	ND	0.572	ND
PCB 18	0.366	ND	0.366	ND
PCB 28	0.423	ND	0.423	ND
PCB 44	0.534	ND	0.534	ND
PCB 49	0.391	ND	0.391	ND
PCB 52	0.499	ND	0.499	ND
PCB 66	0.601	ND		1.63
PCB 87	0.461	ND	0.461	ND
PCB 101	0.388	ND		3.52
PCB 105	0.598	ND		0.28
PCB 118	0.576	ND		0.96
PCB 128	0.417	ND		0.127
PCB 138	0.493	ND		3.32
PCB 153	0.493	ND		3.88
PCB 170	0.452	ND		1.58
PCB 180	0.458	ND		2.01
PCB 183	0.410	ND		1.19
PCB 184	0.576	ND	0.576	ND
PCB 187	0.423	ND		1.70
PCB 195	0.429	ND		0.345
PCB 206	0.464	ND		0.42
PCB 209	0.445	ND		0.57
Total PCB		**ND**		**46.9**

ND = Not detected
For values reported as ND, one-half of the detection limit is used in the calculation of Total DDT and Total PCB

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = sum of congeners reported x 2
(If all PCB congeners are ND, the total is reported as ND)

ppb = parts per billion
ug/L = micrograms per liter
pptr = parts per trillion
ng/L = nanograms per liter

USACE FILE: NAN-2022-00511-EBR

TABLE 2. TOXICITY TEST RESULTS
American Sugar July 2023 - Sample R1-Comp

Suspended Particulate Phase

Test Species	Test Duration	LC_{50}/EC_{50}	LPC (a)
Menidia beryllina	96 hours	(b) >100%	1.000
Americamysis bahia	96 hours	(b) >100%	1.000
Mytilus edulis **(larval survival)**	48 hours	(b) >100%	1.000
Mytilus edulis (larval normal develop.)	48 hours	(c) 44.1%	0.441

(a) Limiting Permissible Concentration (LPC) is the LC_{50} or EC_{50} times 0.01.

(b) Median Lethal Concentration (LC_{50}) resulting in 50% mortality at test termination.

(c) Median Effective Concentration (EC_{50}) based on normal development to the D-cell, prodissoconch 1 stage.

Whole Sediment (10 days)

Test Species	% Survival in Reference	% Survival	% Difference Reference-Test	Is difference statistically significant? (a=0.05)
Americamysis bahia	95%	95%	0%	No
Ampelisca abdita	96%	92%	-4%	No

USACE FILE: NAN-2022-00511-EBR

TABLE 2. TOXICITY TEST RESULTS
American Sugar July 2023 - Sample R2-Comp

Suspended Particulate Phase

Test Species	Test Duration	LC_{50}/EC_{50}	LPC (a)
Menidia beryllina	96 hours	(b) >100%	1.000
Americamysis bahia	96 hours	(b) >100%	1.000
Mytilus edulis (larval survival)	48 hours	(b) >100%	1.000
Mytilus edulis (larval normal develop.)	48 hours	(c) 43.8%	0.438

(a) Limiting Permissible Concentration (LPC) is the LC_{50} or EC_{50} times 0.01.

(b) Median Lethal Concentration (LC_{50}) resulting in 50% mortality at test termination.

(c) Median Effective Concentration (EC_{50}) based on normal development to the D-cell, prodissoconch 1 stage.

Whole Sediment (10 days)

Test Species	% Survival in Reference	% Survival	% Difference Reference-Test	Is difference statistically significant? (a=0.05)
Americamysis bahia	95%	95%	0%	No
Ampelisca abdita	96%	92%	-4%	No

USACE FILE: NAN-2022-00511-EBR

TABLE 4
Bioaccumulation Table for NY/NJ Harbor Projects, ALL VALUES ARE IN WET WEIGHT
Project Name: American Sugar R1-Comp HARS, Yonkers Facility
Sample Area/Location: Hudson River, Yokers, NY

	PROJECT DATA												COMPARISON DATA						
Col. 1	Col. 2 [10]	Col. 3 [10]	Col. 4 [10]	Col 5	Col. 6 [10]	Col 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14	Col. 15	Col. 16	Col. 17	Col. 18	Col. 19	Col. 20
Sample I.D.	Reference	Reference	Test Sed.	[1]	Test Sed.	[1]	Conv.Fac. clam/worm	Test Sed. SS	Test Sed. SS	Carcinogenic	Test Sed. BaP Tox. Equiv.	Test Sed. BaP Tox. Equiv.	Human Health Cancer (10E-4)	Human Health Non-Cancer	Background	Background	FDA	Ecological Non-Specific	Regional
	(clam)	(worm)	(clam)		(worm)		[2]	(clam)	(worm)	TEF [3]	Conc.(clam)[3]	Conc.(worm)[3]	Level[4]	Level (HQ=1)[9]	(clam)	(worm)	Limits [6]	Effects Level	Matrix
Compound	(ug/Kg)	(ug/Kg)	(ug/Kg)		(ug/Kg)			(ug/Kg)	(ug/Kg)		(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)
PAHs																			
Acenaphthene	0.213	0.188	0.40	*	0.43	*	1/1	0.40	0.43					8,775,000	8.10	0.50		[13]	
Acenapthylene	0.116	0.223	0.45	*	0.367	*	1/1	0.45	0.367					[5]	4.60	1.30		[13]	
Anthracene	0.343	0.057	1.0	*	0.226	*	1/1	1.0	0.226					43,605,000	10.0	1.60		3,750	
Fluorene	0.419	0.185	0.68	*	0.290	*	1/1	0.68	0.290					5,805,000	7.40	0.30		[13]	
Naphthalene	1.55	1.624	1.79	*	1.790		1/1	1.79	1.790					[5]	26.4	4.50		[13]	
Phenanthrene	4.67	0.461	6.7		1.02	*	1/1	6.7	1.02					43,605,000	32.7	4.70		[13]	
Benzo(a)anthracene**	0.521	0.07U	3.4	*	0.52	*	2/2	7	1.04	0.1	0.7	0.104		[5]	25.1	4.80		[13]	
Benzo(a)pyrene**	0.514	0.115U	3.6	*	0.55		2/2	7.2	1.10	1	7.2	1.10		[5]	24.2	7.60		8,000 [7]	
Benzo(g,h,i)perylene	0.274	0.058U	1.8	*	0.419	*	3/3	5.4	1.26					[5]	22.2	7.60		[13]	
Benzo(b)fluoranthene**	0.71	0.058U	3.7	*	0.30		2/2	7.4	0.60	0.1	0.74	0.060		[5]	40.6	16.5		[13]	
Benzo(k)fluoranthene**	0.750	0.048U	4.4	*	0.34		2/2	8.8	0.68	0.01	0.088	0.007		[5]	81.6	5.60		[13]	
Chrysene**	1.04	0.265	6.2	*	2.07	*	2/2	12	4.1	0.001	0.012	0.004		[5]	29.4	6.70		[13]	
Dibenzo(a,h)anthracene**	0.047U	0.046U	0.37	*	0.143	*	2/2	0.74	0.286	1	0.74	0.286		[5]	8.50	1.10		[13]	
Fluoranthene	2.67	0.332	11	*	3.4	*	1/1	11	3.4		1			5,805,000	43.8	10.6		[13]	
Indeno(1,2,3-cd)pyrene**	0.195	0.052U	1.40	*	0.337	*	3/3	4.2	1.011	0.1	0.42	0.101		[5]	16.6	4.40		[13]	
Pyrene	2.96	0.222	12	*	3.8	*	1/1	12	3.8					4,387,000	51.3	26.6		[13]	
TOTAL PAHs								87	21.4		10.9	1.7	2,000 (BaP eqv.)		433	105		40,000 [8]	
PESTICIDES																			
Aldrin	0.014U	0.014U	0.014U		0.014U		2/2	0.014	0.014				33	167	0.900	0.100	300	299 [9]	
Dieldrin	0.012	0.087	0.125	*	0.394	*	2/2	0.25	0.788				65	518		0.100	300	4.37 [9]	
a-Chlordane	0.011U	0.026	0.113	*	0.344	*	2/2	0.226	0.688							0.700	300		
Trans nonachlor	0.014U	0.184	0.079	*	0.371	*	2/2	0.158	0.742							0.500			
Heptachlor	0.011U	0.011U	0.011U		0.394		2/2	0.011	0.788							0.050	300		
Heptachlor epoxide	0.017U	0.017U	0.017U		0.017U		1/1	0.009	0.009							0.200	300		
Total Residual Chlordane/Heptachlor								0.40	2.23				114	135		1.70		64# [9]	
Endosulfan I	0.015U	0.015U	0.015U		0.015U		1/1	0.008	0.008				[5]			0.200			
Endosulfan II	0.017U	0.08	0.05		0.17	*	1/1	0.050	0.170				[5]			0.100			
Endosulfan sulfate	0.04	0.10	0.10		0.16	*	1/1	0.100	0.160				[5]			0.100			
Total Endosulfans								0.158	0.338					87,000		0.400		2.86# [9]	
4,4-DDT	0.012U	0.012U	0.012U		0.012U		11/11	0.1	0.066						0.600	1.00			
2,4-DDT	0.017U	0.017U	0.017U		0.017U		2/2	0.017	0.017							0.400			
4,4-DDD	0.064	0.129	0.236	*	0.578	*	3/3	0.71	1.73							3.90			
2,4-DDD	0.017U	0.057	0.095	*	0.267	*	2/2	0.190	0.534							1.40			
4,4-DDE	0.128	0.049	0.429	*	0.295	*	2/2	0.86	0.590						3.50	4.30			
2,4-DDE	0.009U	0.009U	0.009U		0.009U		2/2	0.009	0.009							0.100			
Total DDT								1.9	2.95							11.1			40
TOTAL PCBs	1.910	12.4	9.1	*	26.8	*	1/2	9.1	53.6						107	88.1	2,000		100(clam) 113(worm)
1,4-Dichlorobenzene	0.488	0.470	0.538		0.477		1/1	0.538	0.477				60,000	[5]				11,820 [9]	
METALS	(mg/Kg)	(mg/Kg)	(mg/Kg)		(mg/Kg)			(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
Arsenic	4.85	2.12	4.66		1.94		1/1	4.66	1.94				[14]	[14]		4.89		12.6 [9]	
Cadmium	0.112	0.112	0.087		0.067		1/1	0.087	0.067						1.21	0.110			0.3
Chromium (total)	0.174	0.090	0.212		0.151		1/1	0.212	0.151				[5]	73	1.28	1.31		11.8 [9]	
Copper	1.64	1.21	1.69		1.32		1/1	1.69	1.32				[5]	540	5.58	2.78		9.6 [9]	
Lead	0.230	0.131	0.429	*	0.231	*	1/1	0.429	0.231				[5]	1.3	1.41	1.64		11.9 [9]	
Mercury	0.01U	0.01U	0.01U		0.01U		1/1	0.005	0.005						0.040	0.030	1		0.2
Nickel	0.733	0.305	0.617		0.237		1/1	0.617	0.237				[5]	290	1.10	0.770		3.8 [9]	
Silver	0.035	0.033	0.037		0.020		1/1	0.037	0.020				[5]	73		0.150		1.4 [9]	
Zinc	16.9	14.7	16.8		9.27		1/1	16.8	9.27				[5]	4,400	11.5	20.6		1,517 [9]	

USACE FILE: NAN-2022-00511-EBR

TABLE 4 (continued)
Bioaccumulation Table for NY/NJ Harbor Projects, ALL VALUES ARE IN WET WEIGHT

	Project Data												COMPARISON DATA						
Col. 1	Col. 2 [10]	Col. 3 [10]	Col. 4 [10]	Col 5	Col. 6 [10]	Col 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14	Col. 15	Col. 16	Col. 17	Col. 18	Col. 19	Col. 20
Sample I.D.	Reference	Reference	Test Sed.	[1]	Test Sed.	[1]	Conv.Fac.	Test Sed.	Test Sed.		Test Sed.	Test Sed.	Human Health	Human Health				Ecological	Regional
							clam/worm	SS	SS		TEQ	TEQ	Cancer (10E-4)	Non-Cancer	Background	Background	FDA	Non-Specific	Dioxin
	(clam)	(worm)	(clam)		(worm)		[2]	(clam)	(worm)	TEF [3]	(clam)	(worm)	Level[4]	Level (HQ=1)[9]	(clam)	(worm)	Limits [6]	Effects Level	Value
Compound	(pptr)	(pptr)	(pptr)		(pptr)			(pptr)	(pptr)		(pptr)	(pptr)	(pptr)	(pptr)	TEQ (pptr)	TEQ (pptr)	(pptr)	(pptr)	(pptr) [11]
DIOXINS																			
2,3,7,8,-TCDD	0.079U	0.101U	0.096		0.09U					1	0.096	0.045			1.73	2.50			1
1,2,3,7,8-PeCDD	0.159U	0.391U	0.205U		0.324U					0.5	0.051	0.081				0.410			
1,2,3,4,7,8-HxCDD	0.204U	0.478U	0.27U		0.4U					0.1	0.014	0.02				0.100			
1,2,3,6,7,8-HxCDD	0.196U	0.439U	0.257U		0.378U					0.1	0.013	0.0189				0.170			
1,2,3,7,8,9-HxCDD	0.2U	0.457U	0.264U		0.389U					0.1	0.013	0.01945				0.080			
1,2,3,4,6,7,8-HpCDD	0.355	0.714U	0.991	*	0.524U					0.01	0.00991	0.00262				0.130			
OCDD	2.36	1.98	7.83	*	2.41					0.001	0.00783	0.00241				0.110			
2,3,7,8-TCDF	0.617	0.62U	0.801		1.049					0.1	0.0801	0.1049				0.270			
1,2,3,7,8-PeCDF	0.142U	0.318U	0.183U		0.265U					0.05	0.004575	0.006625				0.050			
2,3,4,7,8-PeCDF	0.128U	0.283U	0.166U		0.242U					0.5	0.0415	0.0605				0.390			
1,2,3,4,7,8-HxCDF	0.123U	0.274U	0.142U		0.22U					0.1	0.0071	0.011				0.080			
1,2,3,6,7,8-HxCDF	0.108U	0.263U	0.148U		0.228U					0.1	0.0074	0.0114				0.090			
1,2,3,7,8,9-HxCDF	0.18U	0.467U	0.225U		0.372U					0.1	0.01125	0.0186				0.110			
2,3,4,6,7,8-HxCDF	0.127U	0.272U	0.142U		0.236U					0.1	0.0071	0.0118				0.080			
1,2,3,4,6,7,8-HpCDF	0.16U	0.283U	0.288		0.241U					0.01	0.00288	0.001205				0.040			
1,2,3,4,7,8,9-HpCDF	0.217U	0.463U	0.317U		0.349U					0.01	0.001585	0.001745				0.020			
OCDF	0.69U	1.708U	0.901U		1.277U					0.001	0.0004505	0.0006385				0.010			
1,2,3,4,7,8,9-HpCDF																			
TEQs - non 2,3,7,8-TCDD											0.2726805	0.3727935				2.14			**4.5** [12]
TEQs (all)											0.3686805	0.4177935			1.73	4.64			**10**

**: Carcinogenic PAHs.
#: Levels represent the conservative level of protection for the sum of the related compounds and their metabolites.
na: Not Available

1. An "*" in this column indicates that the analyte concentration in the test sediment-exposed organisms are statistically greater than in those exposed to reference sediment. Means and statistical comparisons were determined using ½ the detection limit to estimate concentrations of analytes that were below the detection limit.

2. Conversion factors from 28-day bioaccumulation results to steady state (see discussion in Appendix).

3. Toxic equivalencies (TEFs) for the carcinogenic PAHs are from EPA (1993); Dioxin TEFs are from: EPA (1989).

4. This value represents the 10^{-4} cancer risk level for the carcinogenic PAHs. The total concentration of carcinogenic PAHs is expressed in BaP equivalents (see discussion in the text of the memo).

5. Cancer risk factor or reference dose are not assigned by EPA in IRIS (EPA 1995).

6. FDA limits are from EPA/USACE (1991).

7. This value represents the benthic level expected to result in a no-effect level for possible mutagenic and teratogenic effects in fish from exposure to BaP, which is the most toxic PAH.

8. This value represents the non-specific narcosis effects level (see discussion in Appendix). This value is compared to the sum of all PAHs measured.

9. Calculations are included in Appendix.

10. Means of five tissue replicates calculated using 1/2 detection limits to estimate concentrations of analytes that were not detected; "U" indicates that all five replicates were not detected.

11. Levels are based on the Regional Dioxin Values (EPA 1997a).

12. Level is the sum of TEQs of all dioxin congeners other than 2,3,7,8-TCDD.

13. For this PAH, the no-effect level for possible mutagenic and teratogenic effects in fish is estimated from exposure to BaP, which is the most toxic PAH.

14. Cancer and non-cancer protection levels, based on inorganic arsenic as contained in EPA's IRIS database, are not appropriate for evaluating the potential human health impacts of arsenic bioaccumulation from dredged material, and therefore, are not included in Table 4 (see discussion in Appendix).

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TABLE 4
Bioaccumulation Table for NY/NJ Harbor Projects, ALL VALUES ARE IN WET WEIGHT
Project Name: American Sugar R2-Comp HARS, Yonkers Facility
Sample Area/Location: Hudson River, Yokers, NY

	PROJECT DATA												COMPARISON DATA						
Col. 1	Col. 2 [10]	Col. 3 [10]	Col. 4 [10]	Col 5	Col. 6 [10]	Col 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14	Col. 15	Col. 16	Col. 17	Col. 18	Col. 19	Col. 20
Sample I.D.	Reference	Reference	Test Sed.	[1]	Test Sed.	[1]	Conv.Fac. clam/worm	Test Sed. SS	Test Sed. SS	Carcinogenic	Test Sed. BaP Tox. Equiv.	Test Sed. BaP Tox. Equiv.	Human Health Cancer (10E-4)	Human Health Non-Cancer	Background	Background	FDA	Ecological Non-Specific	Regional
	(clam)	(worm)	(clam)		(worm)		[2]	(clam)	(worm)	TEF [3]	Conc.(clam)[3]	Conc.(worm)[3]	Level[4]	Level (HQ=1)[9]	(clam)	(worm)	Limits [6]	Effects Level	Matrix
Compound	(ug/Kg)	(ug/Kg)	(ug/Kg)		(ug/Kg)			(ug/Kg)	(ug/Kg)		(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)
PAHs																			
Acenaphthene	0.213	0.188	0.39	*	0.41	*	1/1	0.39	0.41					8,775,000	8.10	0.50		[13]	
Acenapthylene	0.116	0.223	0.34	*	0.366	*	1/1	0.34	0.366					[5]	4.60	1.30		[13]	
Anthracene	0.343	0.057	1.3	*	0.240	*	1/1	1.3	0.240					43,605,000	10.0	1.60		3,750	
Fluorene	0.419	0.185	0.72	*	0.290	*	1/1	0.72	0.290					5,805,000	7.40	0.30		[13]	
Naphthalene	1.55	1.624	1.71		1.894		1/1	1.71	1.894					[5]	26.4	4.50		[13]	
Phenanthrene	4.67	0.461	8.5	*	1.01	*	1/1	8.5	1.01					43,605,000	32.7	4.70		[13]	
Benzo(a)anthracene**	0.521	0.07U	2.8	*	0.38	*	2/2	6	0.76	0.1	0.6	0.076		[5]	25.1	4.80		[13]	
Benzo(a)pyrene**	0.514	0.115U	2.6	*	0.47	*	2/2	5.2	0.94	1	5.2	0.94		[5]	24.2	7.60		8,000 [7]	
Benzo(g,h,i)perylene	0.274	0.058U	1.2	*	0.164		3/3	3.6	0.49					[5]	22.2	7.60		[13]	
Benzo(b)fluoranthene**	0.71	0.058U	3.0	*	0.38	*	2/2	6.0	0.76	0.1	0.60	0.076		[5]	40.6	16.5		[13]	
Benzo(k)fluoranthene**	0.750	0.048U	3.6	*	0.62	*	2/2	7.2	1.24	0.01	0.072	0.012		[5]	81.6	5.60		[13]	
Chrysene**	1.04	0.265	5.3	*	2.00	*	2/2	11	4.0	0.001	0.011	0.004		[5]	29.4	6.70		[13]	
Dibenzo(a,h)anthracene**	0.047U	0.046U	0.23	*	0.071		2/2	0.46	0.142	1	0.46	0.142		[5]	8.50	1.10		[13]	
Fluoranthene	2.67	0.332	15	*	5.9	*	1/1	15	5.9		1			5,805,000	43.8	10.6		[13]	
Indeno(1,2,3-cd)pyrene**	0.195	0.052U	1.00	*	0.107		3/3	3.0	0.321	0.1	0.30	0.032		[5]	16.6	4.40		[13]	
Pyrene	2.96	0.222	14	*	5.8	*	1/1	14	5.8					4,387,000	51.3	26.6		[13]	
TOTAL PAHs								84	24.6		8.2	1.3	2,000 (BaP eqv.)		433	105		40,000 [8]	
PESTICIDES																			
Aldrin	0.014U	0.014U	0.014U		0.014U		2/2	0.014	0.014				33	167	0.900	0.100	300	299 [9]	
Dieldrin	0.012	0.087	0.070	*	0.241	*	2/2	0.14	0.482				65	518		0.100	300	4.37 [9]	
a-Chlordane	0.011U	0.026	0.074	*	0.230	*	2/2	0.148	0.460							0.700	300		
Trans nonachlor	0.014U	0.184	0.030		0.284	*	2/2	0.060	0.568							0.500			
Heptachlor	0.011U	0.011U	0.011U		0.241		2/2	0.011	0.482							0.050	300		
Heptachlor epoxide	0.017U	0.017U	0.017U		0.017U		1/1	0.009	0.009							0.200	300		
Total Residual Chlordane/Heptachlor								0.23	1.52				114	135		1.70		64# [9]	
Endosulfan I	0.015U	0.015U	0.015U		0.015U		1/1	0.008	0.008				[5]			0.200			
Endosulfan II	0.017U	0.08	0.14	*	0.34	*	1/1	0.140	0.340				[5]			0.100			
Endosulfan sulfate	0.04	0.10	0.32	*	0.43	*	1/1	0.320	0.430				[5]			0.100			
Total Endosulfans								0.468	0.778					87,000		0.400		2.86# [9]	
4,4-DDT	0.012U	0.012U	0.012U		0.012U		11/11	0.1	0.066						0.600	1.00			
2,4-DDT	0.017U	0.017U	0.017U		0.07		2/2	0.017	0.140							0.400			
4,4-DDD	0.064	0.129	0.176	*	0.567	*	3/3	0.53	1.70							3.90			
2,4-DDD	0.017U	0.057	0.179	*	0.488	*	2/2	0.358	0.976							1.40			
4,4-DDE	0.128	0.049	0.377	*	0.431	*	2/2	0.75	0.862						3.50	4.30			
2,4-DDE	0.009U	0.009U	0.009U		0.009U		2/2	0.009	0.009							0.100			
Total DDT								1.8	3.75							11.1			40
TOTAL PCBs	1.910	12.4	12.0	*	38.3	*	1/2	12.0	76.6						107	88.1	2,000		100(clam) 113(worm)
1,4-Dichlorobenzene	0.488	0.470	0.511		0.460		1/1	0.511	0.460				60,000	[5]				11,820 [9]	
METALS	(mg/Kg)	(mg/Kg)	(mg/Kg)		(mg/Kg)			(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
Arsenic	4.85	2.12	4.62		1.98		1/1	4.62	1.98				[14]	[14]		4.89		12.6 [9]	
Cadmium	0.112	0.112	0.134		0.069		1/1	0.134	0.069						1.21	0.110			0.3
Chromium (total)	0.174	0.090	0.266		0.118		1/1	0.266	0.118				[5]	73	1.28	1.31		11.8 [9]	
Copper	1.64	1.21	2.09		1.23		1/1	2.09	1.23				[5]	540	5.58	2.78		9.6 [9]	
Lead	0.230	0.131	0.464	*	0.149		1/1	0.464	0.149				[5]	1.3	1.41	1.64		11.9 [9]	
Mercury	0.01U	0.01U	0.01U		0.01U		1/1	0.005	0.005						0.040	0.030	1		0.2
Nickel	0.733	0.305	0.631		0.260		1/1	0.631	0.260				[5]	290	1.10	0.770		3.8 [9]	
Silver	0.035	0.033	0.041		0.023		1/1	0.041	0.023				[5]	73		0.150		1.4 [9]	
Zinc	16.9	14.7	17.6		10.18		1/1	17.6	10.18				[5]	4,400	11.5	20.6		1,517 [9]	

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TABLE 4 (continued)
Bioaccumulation Table for NY/NJ Harbor Projects, ALL VALUES ARE IN WET WEIGHT

	Project Data												COMPARISON DATA						
Col. 1	Col. 2 [10]	Col. 3 [10]	Col. 4 [10]	Col 5	Col. 6 [10]	Col 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12	Col. 13	Col. 14	Col. 15	Col. 16	Col. 17	Col. 18	Col. 19	Col. 20
Sample I.D.	Reference	Reference	Test Sed.	[1]	Test Sed.	[1]	Conv.Fac.	Test Sed.	Test Sed.		Test Sed.	Test Sed.	Human Health	Human Health				Ecological	Regional
							clam/worm	SS	SS		TEQ	TEQ	Cancer (10E-4)	Non-Cancer	Background	Background	FDA	Non-Specific	Dioxin
	(clam)	(worm)	(clam)		(worm)		[2]	(clam)	(worm)	TEF [3]	(clam)	(worm)	Level[4]	Level (HQ=1)[9]	(clam)	(worm)	Limits [6]	Effects Level	Value
Compound	(pptr)	(pptr)	(pptr)		(pptr)			(pptr)	(pptr)		(pptr)	(pptr)	(pptr)	(pptr)	TEQ (pptr)	TEQ (pptr)	(pptr)	(pptr)	(pptr) [11]
DIOXINS																			
2,3,7,8,-TCDD	0.079U	0.101U	0.120		0.105U					1	0.120	0.053			1.73	2.50			1
1,2,3,7,8-PeCDD	0.159U	0.391U	0.2U		0.327U					0.5	0.050	0.08175				0.410			
1,2,3,4,7,8-HxCDD	0.204U	0.478U	0.236U		0.421U					0.1	0.012	0.02105				0.100			
1,2,3,6,7,8-HxCDD	0.196U	0.439U	0.236U		0.395U					0.1	0.012	0.01975				0.170			
1,2,3,7,8,9-HxCDD	0.2U	0.457U	0.236U		0.408U					0.1	0.012	0.0204				0.080			
1,2,3,4,6,7,8-HpCDD	0.355	0.714U	0.866	*	1.061					0.01	0.00866	0.01061				0.130			
OCDD	2.36	1.98	7.44		2.42					0.001	0.00744	0.00242				0.110			
2,3,7,8-TCDF	0.617	0.62U	0.751		0.905					0.1	0.0751	0.0905				0.270			
1,2,3,7,8-PeCDF	0.142U	0.318U	0.165U		0.286U					0.05	0.004125	0.00715				0.050			
2,3,4,7,8-PeCDF	0.128U	0.283U	0.15U		0.254U					0.5	0.0375	0.0635				0.390			
1,2,3,4,7,8-HxCDF	0.123U	0.274U	0.135U		0.226U					0.1	0.00675	0.0113				0.080			
1,2,3,6,7,8-HxCDF	0.108U	0.263U	0.127U		0.226U					0.1	0.00635	0.0113				0.090			
1,2,3,7,8,9-HxCDF	0.18U	0.467U	0.201U		0.375U					0.1	0.01005	0.01875				0.110			
2,3,4,6,7,8-HxCDF	0.127U	0.272U	0.134U		0.23U					0.1	0.0067	0.0115				0.080			
1,2,3,4,6,7,8-HpCDF	0.16U	0.283U	0.226		0.337U					0.01	0.00226	0.001685				0.040			
1,2,3,4,7,8,9-HpCDF	0.217U	0.463U	0.23U		0.511U					0.01	0.00115	0.002555				0.020			
OCDF	0.69U	1.708U	0.875U		1.394U					0.001	0.0004375	0.000697				0.010			
1,2,3,7,8,9-HxCDD																			
TEQs - non 2,3,7,8-TCDD											0.2525225	0.374917				2.14			**4.5** [12]
TEQs (all)											0.3725225	0.427917			1.73	4.64			**10**

**: Carcinogenic PAHs.
#: Levels represent the conservative level of protection for the sum of the related compounds and their metabolites.
na: Not Available

1. An "*" in this column indicates that the analyte concentration in the test sediment-exposed organisms are statistically greater than in those exposed to reference sediment. Means and statistical comparisons were determined using ½ the detection limit to estimate concentrations of analytes that were below the detection limit.

2. Conversion factors from 28-day bioaccumulation results to steady state (see discussion in Appendix).

3. Toxic equivalencies (TEFs) for the carcinogenic PAHs are from EPA (1993); Dioxin TEFs are from: EPA (1989).

4. This value represents the 10^{-4} cancer risk level for the carcinogenic PAHs. The total concentration of carcinogenic PAHs is expressed in BaP equivalents (see discussion in the text of the memo).

5. Cancer risk factor or reference dose are not assigned by EPA in IRIS (EPA 1995).

6. FDA limits are from EPA/USACE (1991).

7. This value represents the benthic level expected to result in a no-effect level for possible mutagenic and teratogenic effects in fish from exposure to BaP, which is the most toxic PAH.

8. This value represents the non-specific narcosis effects level (see discussion in Appendix). This value is compared to the sum of all PAHs measured.

9. Calculations are included in Appendix.

10. Means of five tissue replicates calculated using 1/2 detection limits to estimate concentrations of analytes that were not detected; "U" indicates that all five replicates were not detected.

11. Levels are based on the Regional Dioxin Values (EPA 1997a).

12. Level is the sum of TEQs of all dioxin congeners other than 2,3,7,8-TCDD.

13. For this PAH, the no-effect level for possible mutagenic and teratogenic effects in fish is estimated from exposure to BaP, which is the most toxic PAH.

14. Cancer and non-cancer protection levels, based on inorganic arsenic as contained in EPA's IRIS database, are not appropriate for evaluating the potential human health impacts of arsenic bioaccumulation from dredged material, and therefore, are not included in Table 4 (see discussion in Appendix).