

S-AK-1/2

NY & NJ Harbor Deepening Project Noise and Blast Monitoring and Compliance Program

Tom Shea
Project Manager
Harbor Programs Branch



US Army Corps of Engineers
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Agenda

- Introduction to the Port of NY and NJ
- Overall project purpose and schedule
- Why we are blasting
- Where we are blasting
- What we have done to limit impacts
- Inspection program
- How to contact us



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About the Port of New York & New Jersey



The Port of New York and New Jersey is the gateway to the most concentrated and affluent consumer market in the world. It is the largest port on the East Coast, and the third-largest in the nation.

The Port Authority of New York and New Jersey manages Port Newark, the Elizabeth-Port Authority Marine Terminal, the Howland Hook Marine Terminal, the Brooklyn-Port Authority Marine Terminal, the Red Hook Container Terminal, and Port Jersey.



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Significance of the Port of New York & New Jersey



- Largest Port on the East Coast (59% share)
- 3rd in US (13% share); 15th in World
- \$114.5 B in cargo (over 5 million TEUs per year)
- 1,031,540 automobiles
- 269,900 full time jobs (10/2011)
- \$11.2B in personal income (10/2011)
- \$2.2 B in NY/NJ state and local tax revenue
- 35 percent of US population served



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Over 269,900 direct and indirect jobs in port related activities. Through the Port's four major container terminals waterborne cargo moves to all parts of the United States and throughout the world.





Goods arrive every day on container ships (basically everything we buy on a daily basis) most of it is consumed in the immediate area. (source: Port Authority of NY and NJ)



Why water Transportation?

Economic Theory of Adam Smith, Water Transportation, and the Potential to Grow

The classical economist Adam Smith recognized the efficiency of water transportation in 1776, when he published his revolutionary book, *An Inquiry into the Nature and Causes of the Wealth of Nations*. Smith championed water over ground transportation when he analyzed why some nations are better off than others.

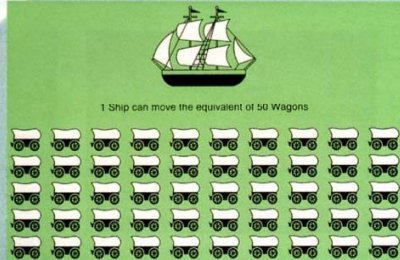
Smith stated:

"A broad wheeled wagon, attended by two men and drawn by eight horses, in about six weeks time carries and brings back between London and Edinburgh near four ton weight of goods. In about the same time, a ship navigated by six to eight men, and sailing between the ports of London and Leith, frequently carries and brings back two hundred ton weight of goods."



"Six or eight men, therefore, by the help of water-carriage, can carry and bring back in the same time the same quantity of goods between London and Edinburgh as fifty broad-wheeled wagons, attended by a hundred men, drawn by four hundred horses."

As a result of this comparison, Adam Smith came to a simple but important conclusion: "Countries are only wealthy when they have growth potential." This unprecedented concept was echoed in our Constitution, which empowered the United States government to form economic incentives. These incentives stimulated commerce, building the basis for the nation's economic development.



1 Ship

can move the equivalent of

100 Small Barges

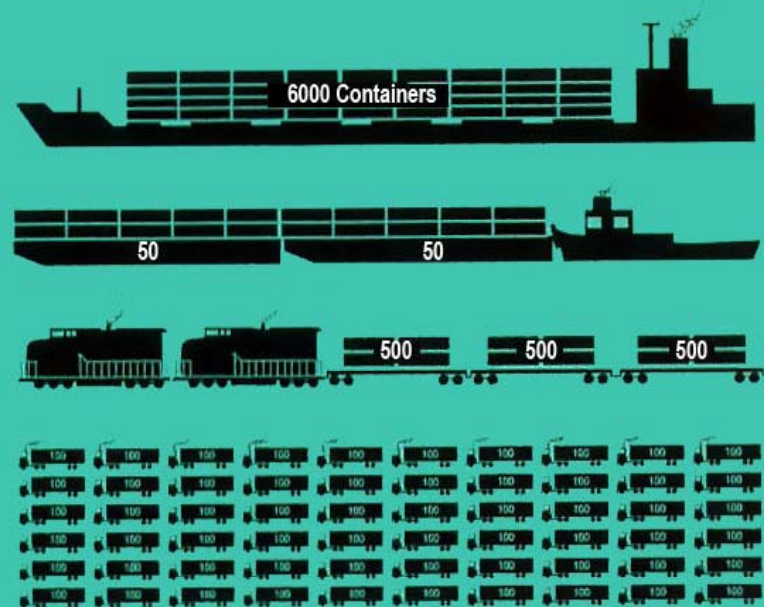
or

1500 Rail Cars

or

6000

Semi Trucks



Source: American Waterways Operators



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Panamax and Post-Panamax Container Vessels



	Panamax	Post-Panamax
Capacity:		
Containers/TEUs	4,500	12,000
Dimensions:		
Beam	32m (109')	49m (160')
Length	294m (965')	366m (1,200')
Draft	12m (39.5')	15m (50')

First (1956-1970)	Converted Cargo Vessel	135 m	< 9 m
	Converted Tanker	200 m	< 30 ft
Second (1970-1980)	Cellular Containership	215 m	10 m 33 ft
Third (1980-1988)	Panamax Class	250 m	11-12 m
		290 m	36-40 ft
Fourth (1988-2000)	Post Panamax	275 – 305 m	11-13 m 36-43 ft
Fifth (2000-2005)	Post Panamax Plus	335 m	13-14 m 43-46 ft
Sixth (2006-)	New Panamax	397 m	15.5 m 50 ft



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Why Do We Dredge?



Primary Benefits:

- Provide access to landside facilities
- Provide economically efficient loading of ships
- Maintain channels and anchorages for commerce

Secondary Benefits:

- Remove contaminated materials health and safety
- Provide source material for beach renourishment



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Three Broad Categories of Dredging

- **New Work**

- ▶ Dredge channels deeper than they currently are
- ▶ Example: NY & NJ Harbor Deepening

- **Maintenance**

- ▶ Maintain a specific channel depth due to shoaling
- ▶ Example: USS Intrepid Berth; Jamaica Bay Channels

- **Environmental**

- ▶ Remove contaminated material to reduce existing risks and to improve the ecological system
- ▶ Example: Lower Passaic River



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Types of Dredges



Clamshell



Cutter head



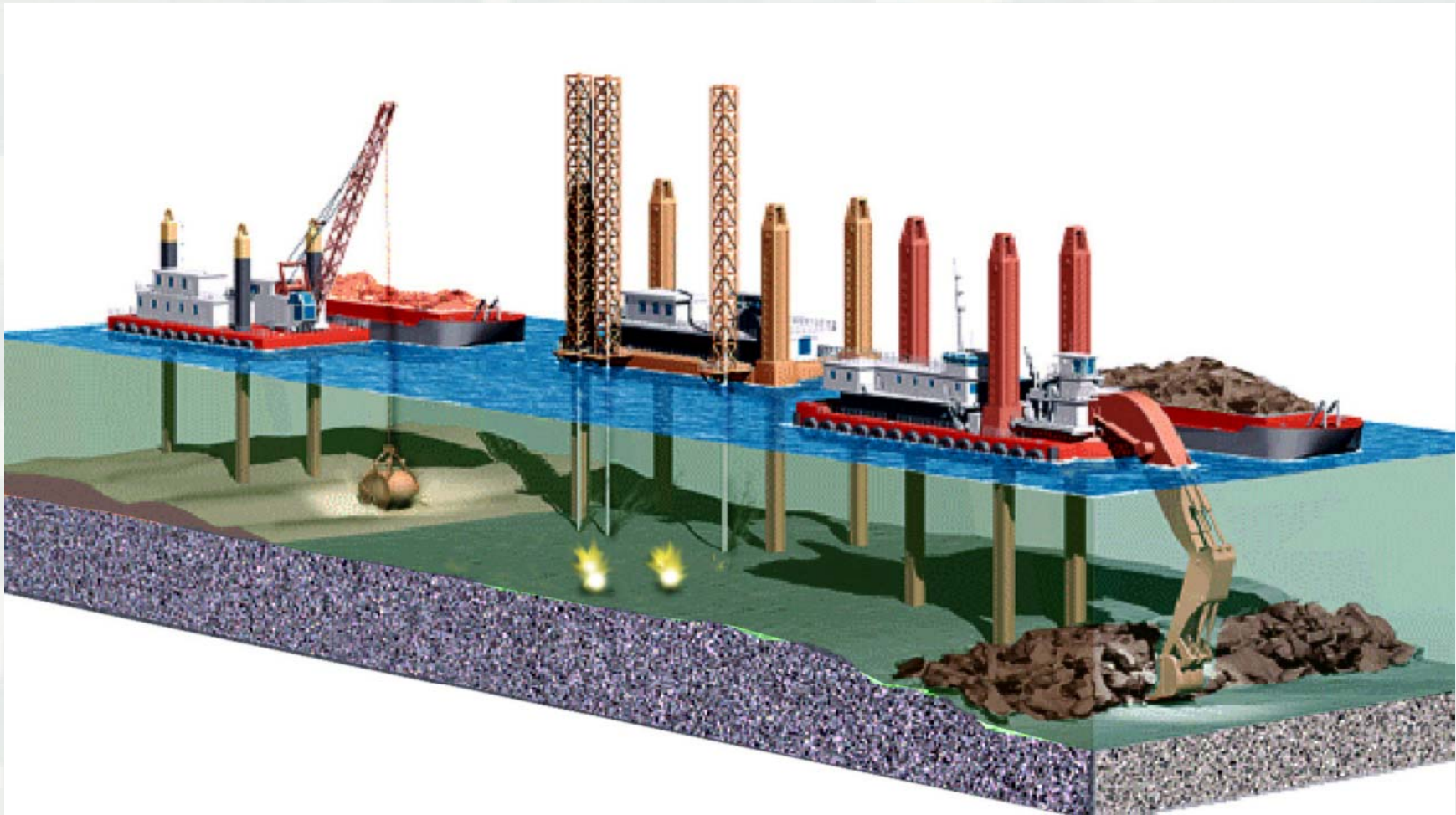
Backhoe



Drill Boats



Underwater dredging, drilling and blasting



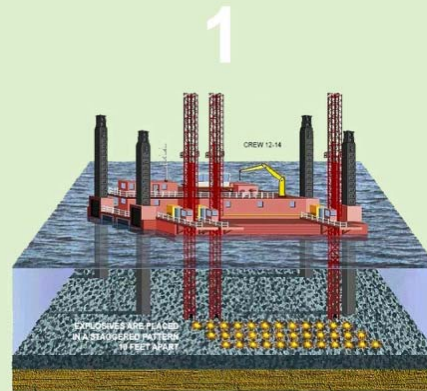
Credit: NY Times



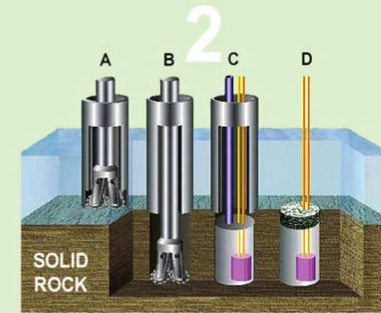
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Underwater drilling and blasting

- Drill Boats
- Explosives

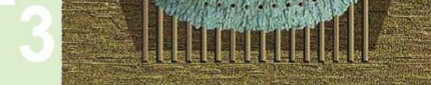


DRILL BOAT
MOUNTED ON SPUDS, THE DRILLBOAT HAS THREE DRILLING FRAMES THAT DRILL HOLES IN THE ROCK ON THE CHANNEL FLOOR FOR INSERTION OF EXPLOSIVES THAT FRAGMENT THE ROCK FOR EXCAVATION.



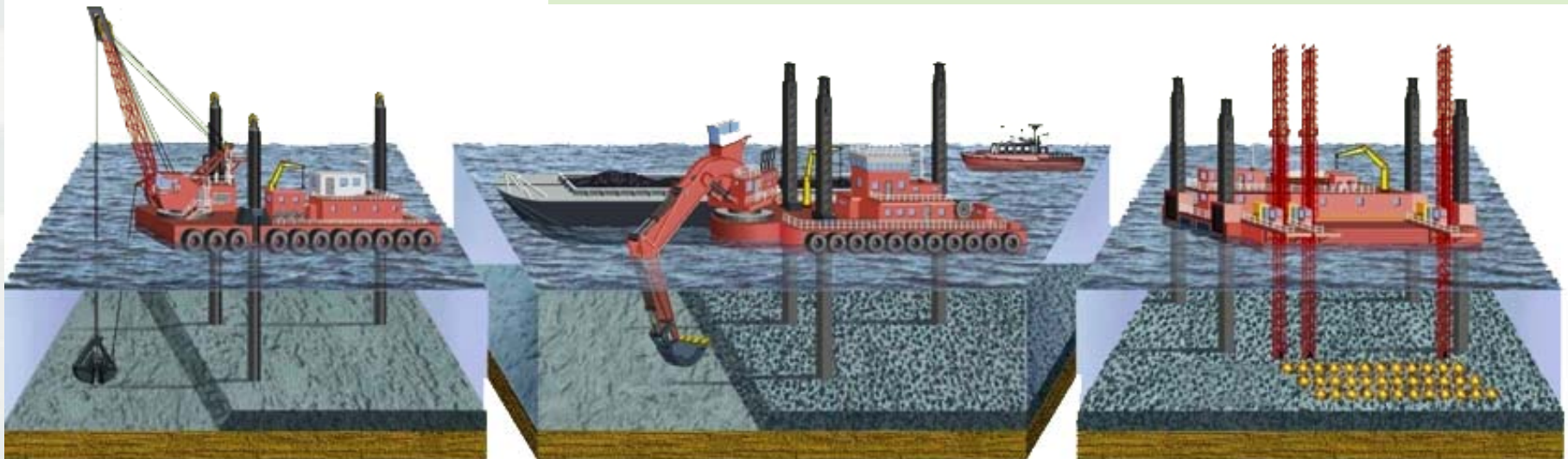
SETTING EXPLOSIVES

- A - THE DRILL IS LOWERED TO THE CHANNEL BED THROUGH A STEEL CASING SUSPENDED FROM THE DRILL TOWER.
- B - ONCE THE HOLE IS DRILLED TO 6 FEET BELOW REQUIRED CHANNEL DEPTH, DRILL IS WITHDRAWN, A HOSE, TWO EXPLOSIVE CORDS, AND A DETONATOR ARE LOWERED TO THE BOTTOM OF THE HOLE.
- C - A FLUID EXPLOSIVE MATERIAL IS PUMPED INTO THE HOLE THROUGH THE HOSE.
- D - A BAG OF GRAVEL IS PLACED AT THE TOP OF THE ARRANGEMENT TO KEEP COMPONENTS IN PLACE.



DRILLBOAT DRILLING AND BLASTING FOR NEW CHANNEL PROFILE

SOME CHANNELS INCLUDING THE KILL VAN KULL HAVE BEEN CARVED FROM HARD MATERIAL SUCH AS SHALE, SANDSTONE, SERPENTINITE AND DIABASE ROCK. DRILLING AND BLASTING IS USED TO BREAK UP THE HARD BOTTOM IN ORDER TO MAKE THE CHANNEL WIDER AND DEEPER. DRILLBOATS BORE HOLES IN THE CHANNEL BOTTOM. EXPLOSIVE MATERIAL IS PLACED AND DETONATED. AS MANY AS 100 HOLES SPACED 10 FEET APART, MAY BE DRILLED AND BLASTED FOR ONE DRILLBOAT SET-UP.



Drilling and underwater blast



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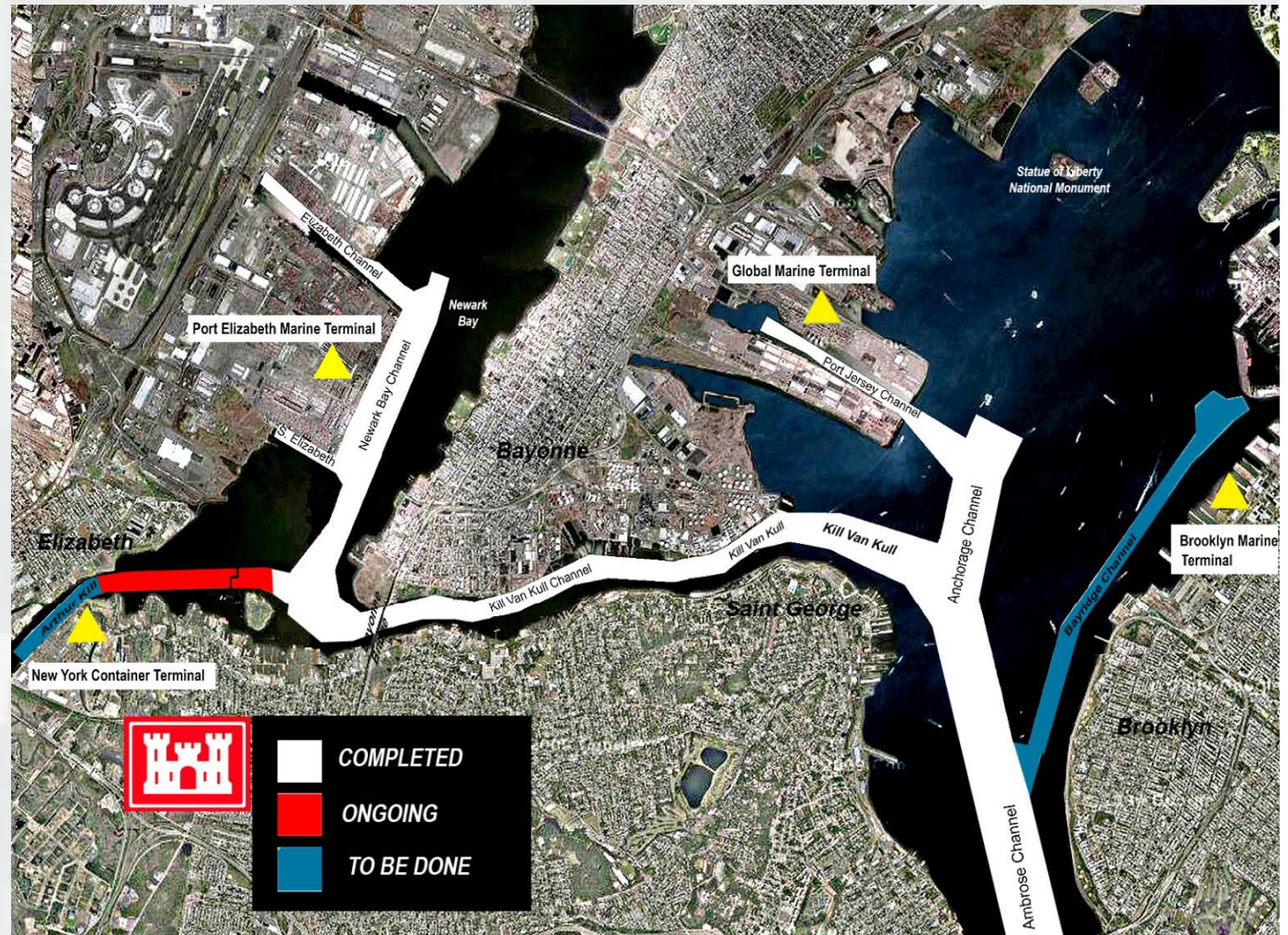
New York/New Jersey Harbor Project Overview

Description:

- Deepens 35 miles of navigation channels to 50 - 53 ft (mean low water) to provide deep draft access to the major container terminals within the Port of New York and New Jersey.
- Includes four separate authorized projects that were consolidated in 2002.
- Key features of the 50 ft. project include:
 - 17 large multiyear dredging contracts
 - Mitigation restoring 143 acres of tidal wetlands
 - Offsets NOx air emissions from project
 - Beneficial use of dredged material

Total Project Cost \$2.5 Billion

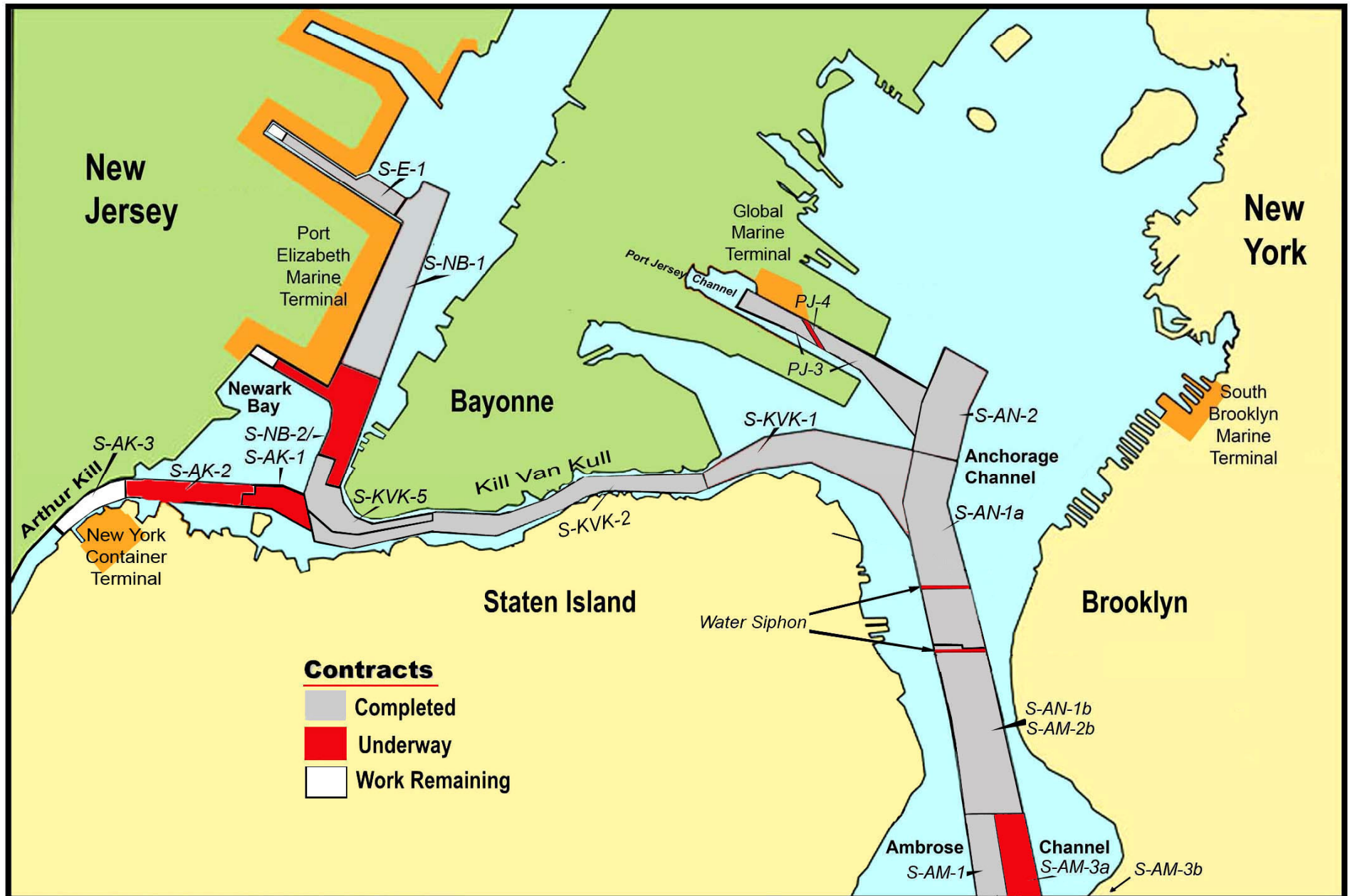
Sponsor
Port Authority of New York & New Jersey
New Jersey Department of Transportation Office of Maritime Resources



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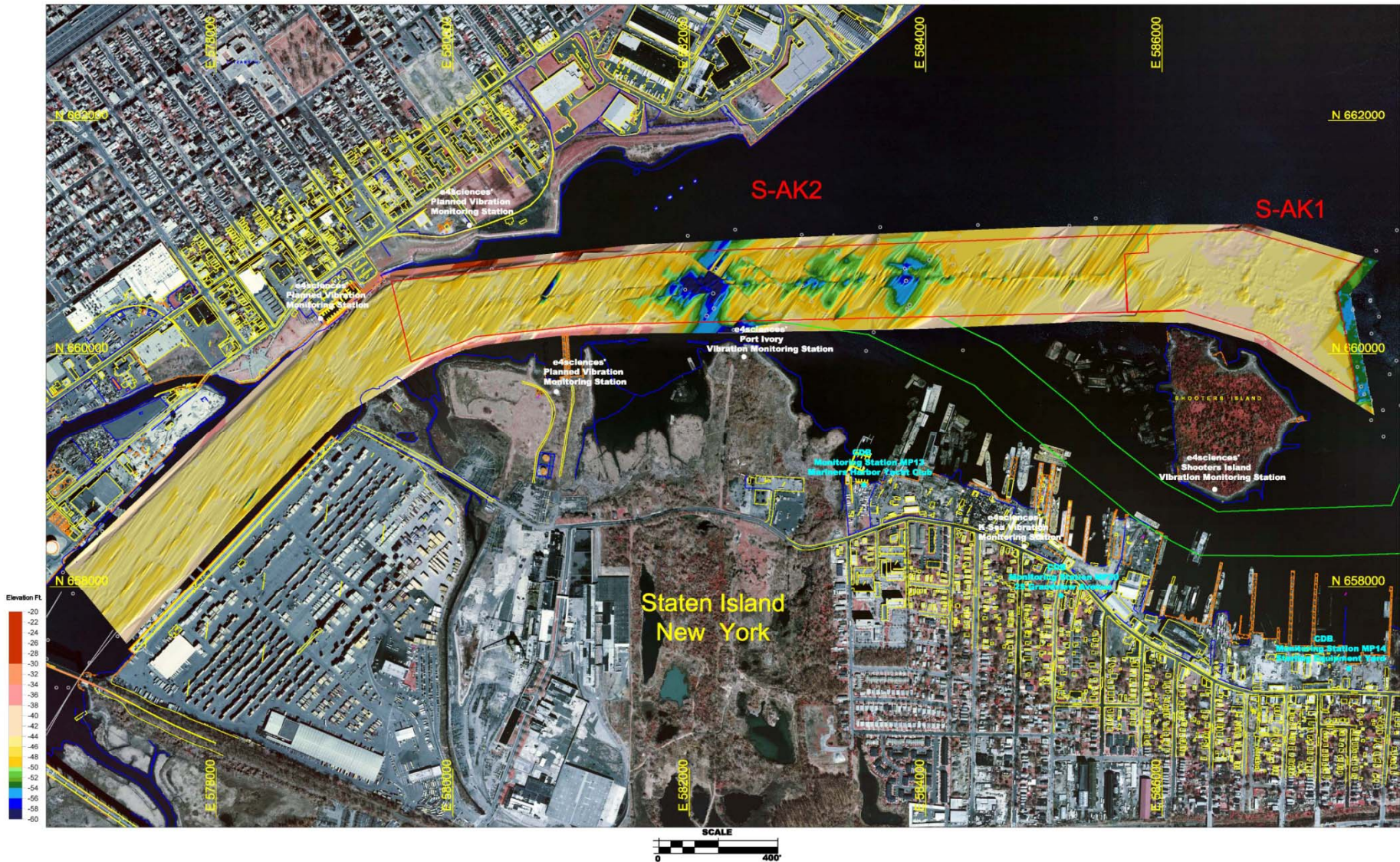
General Map of NY & NJ Harbor Deepening Contract Areas (50 ft)

As of March 12, 2012

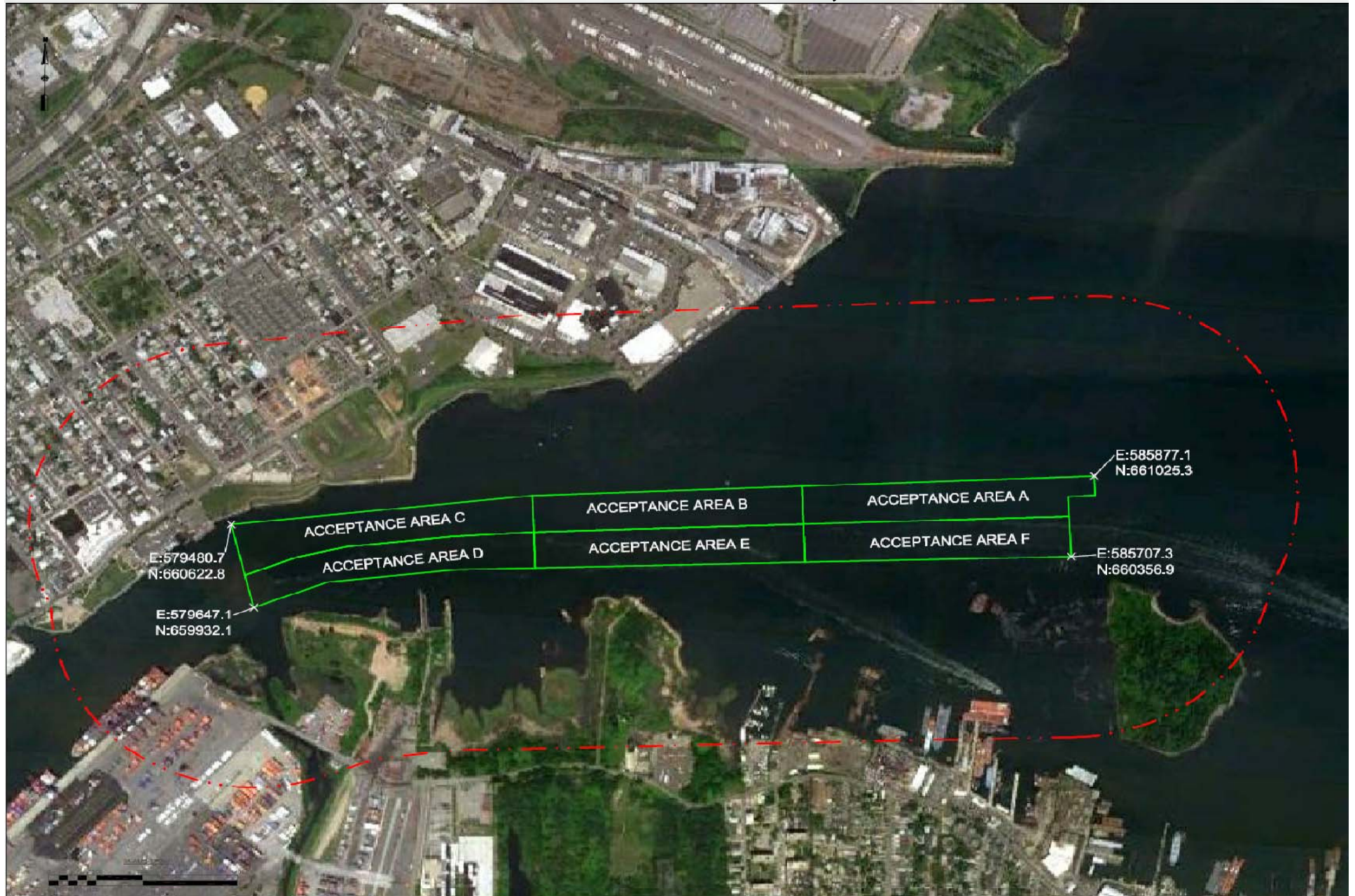


Material Types and Locations

Arthur Kill top of rock map for contract area S-AK-2 with planned and existing e4sciences' vibration monitoring stations



Contract Limit and 1,500 ft Zone



Construction Schedule

S-AK-2

Contract Award	Oct 11
Dredging Starts	Nov 11
Blasting Starts	Nov 11
Blasting Ends	Apr 13
Dredging Ends	May 13

S-AK-3

Contract award	~ Nov 12
Complete	~ Dec 13



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Regulatory Limits on Blasting

- Corps follows US Bureau of Mines Guidelines
- Vibration from Blasting may not exceed these limits

For type of Structure within
1,500 of blast area:

- ▶ Historic Structures
- ▶ Residential Structures
- ▶ All Other Structures

Peak Particle Velocity
May not Exceed"

0.5 in/sec (Standard for S-AK)

1.0 in/sec

2.0 in/sec

- Typical Vibrations encountered daily:

- ▶ Human threshold
- ▶ Phone calls
- ▶ Normal Door Slam

0.02 in/sec

0.3 in/sec

0.5 in/sec

- Average for KVK Contract S-AK-2 .029 to .049 in/sec



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Richter Scale based on powers of 10

Event	Richter scale (magnitude)
Major earthquake in Japan or NZ or Chile	7.0-9.0
2011 Virginia earthquake	5.8
1944 New York earthquake	5.8
2009 New Jersey earthquake	3.0
Rock breaking in mining	1.0
Bus hitting pot hole on Staten Island	<1.0
Rock blasting in Arthur Kill	<<1.0



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NYC Limits on Noise

- Limits:
 - ▶ Day Time (7am to 10pm): Operations must not exceed 10 dB over normal background noise (average 65 dB)
 - ▶ Night (10pm to 7am): Operations cannot exceed 7 dB over normal background noise (average 55 dB).
- Examples
 - ▶ 140 dB = firearms, air raid siren, jet engine
 - ▶ 130 dB = jackhammer
 - ▶ 100 dB = chain saw, pneumatic drill
 - ▶ 80 dB = alarm clock, busy street
 - ▶ 60 dB = conversation, dishwasher
 - ▶ 40 dB = quiet room
 - ▶ 30 dB = whisper, quiet library





Informing resident who reside with of drilling and underwater bla

Dredging to resume in Kill van Kull

Published: Tuesday, November 23, 2016, 6:55 AM Updated: Tuesday, November 23, 2016, 6:59 AM

Aurora Yates
Follow

STATEN ISLAND, N.Y. -- Dredging and blasting are set to resume in the Kill van Kull within the next two weeks.

The U.S. Army Corps of Engineers, along with the Port Authority, is deepening the main shipping channels leading to the New York Container Terminal in Mariners Harbor and the ports of New Jersey to a depth of 50 feet in order to accommodate the world's largest container ships. The project will continue through 2015.

The blasting is expected to take place for one week, and is needed to fracture bedrock in a small section at the mouth



Published: Tuesday, November 23, 2010, 6:38 AM Updated: Tuesday, November 23, 2010, 6:39 AM

Share this story

The U.S. Army Corps of Engineers, along with the Port Authority, is deepening the main shipping channels leading to the New York Container Terminal in Mariners Harbor and the ports of New Jersey to a depth of 50 feet in order to accommodate the world's largest container ships. The project will continue through 2013.



The U.S. Army Corps of Engineers and the Port Authority of New York and New Jersey plan to deepen the main shipping channels to allow large ships to reach the New York Container Terminal.

The drilling and blasting will be more than 1,500 feet away from homes and structures on both the Staten Island and Bayonne side of the Kill, and the Army Corps expects the surrounding communities won't be adversely affected.

Residents with concerns or issues related to the project can call the Army Corps of Engineers hotline at 201-326-6470.

THE GREAT LAKES Dredge & Dock Co. at work in Newark Bay off 16th Street in Bayonne

By TONI-ANN CERBO
JOURNAL STAFF WRITER

Drilling and blasting
tions resumed yesterday.

The distance from the drilling and blasting operations in New Jersey and New York, the U.S. Army Corps of Engineers announced.

The distance from the drilling and blasting operations in New Jersey and New York, the U.S. Army Corps of Engineers announced.

ment Act of 2000 that
18 dredging contract
New York/New Jersey
The first contract was
in August 2004 and
percent of the ma-
been removed to date

For more information or other concerns about the project, contact the H&M (201) 339-6470, or the Army Corps of Engineers (201) 433-9232.

FOR MORE INFORMATION...
We hope that this information will help relieve many of your concerns. If you have additional questions, please call us at:

As part of the overall Vibration Monitoring Program, Contract Drilling & Blasting LLC of Bayonne, New Jersey has been contracted by **Great Lakes Dredge & Dock Company, LLC** as an independent consultant to perform Free-Field Structural Surveys and conduct the Vibration Monitoring Program for this contract. They will be offering the inspections for residential and commercial structures within 1500' of the Right Area. Your firm/business is eligible for this inspection and the inspection is at no cost to you or the property owner. We encourage you to consider participating in the inspection program.

If you wish to have an inspection of your property, please call Contract Drilling & Blasting LLC at 201-339-6470 (Bayonne, NJ office), or 904-241-4015 (Jacksonville, FL office) to arrange a convenient time and to discuss any questions you may have.

Contract # W912DS-08-C-0004

WHERE	Kil van Kull Channels
BLASTING IS APPROACHING YOUR AREA	TBD
HOW LONG	TBD
DAYS	Monday thru Saturday
HOURS	9:00am to 6:00pm

United States Army Corps of Engineers
Kill Van Kull Field Office
Caven Port Marine Terminal
3 Chapel Avenue, Port Liberty
Jersey City, New Jersey 07305

Subject: New York and New Jersey
Channel Improvement 50
Kil van Kull Channels, Co
Y091209-05-C-0004

The New York District, U.S. Army Corps of Engineers is undertaking a project to deepen the Kill van Kull Channels at New York, New Jersey Harbor between Bayonne and Staten Island. The channels are being deepened from 45 feet to 52 feet in order to accommodate larger and deeper draft vessels calling on the port.

The fifth contract of the deepening project is taking place in the Kill van Kull Channels and is being accomplished by **Great Lakes Dredge & Dock Company, LLC**. Dredging has already begun with the excavation and removal of silt, sand, loose rock, and other hard material from the channel bottom. Some areas of the channel contain solid rock and underwater blasting may be required to reach the 50-foot depth. This requires drilling into the rock and subsequent controlled detonation of explosives placed in the rock. The dredge will then remove the resultant fractured rock.

Requirements for the project stipulate that vibrations from the underwater blasts will be well within established federal and state guidelines to ensure that your property is not adversely affected by this activity. An extensive monitoring program will be in place to guarantee strict adherence to these requirements.

As part of the overall Vibration Monitoring Program, Contract Drilling & Blasting LLC of Bayonne, New Jersey has been contracted by **Great Lakes Dredge & Dock Company, LLC**, as an independent consultant to perform Pre-Blast Structural Surveys and conduct the Vibration Monitoring Program for this contract. They will be offering Pre-Blast Structural Surveys for residential and commercial structures within 1,500 feet of the blasting areas. Your home/business is eligible for this inspection and the inspection is at no cost to the property owner.

If you wish to have an inspection of your property, please call Contract Drilling & Blasting LLC at 201-339-6470 (Bayonne, New Jersey office) or 904-241-4015 (Jacksonville Beach, Florida office) within the next ten (10) days to arrange a convenient time.

Thank you for your cooperation.

A woman with dark hair in a white lab coat is pointing at a man in a grey suit and striped tie. They are in a hallway with a display board on the right showing various images and text. The background includes a red door and a sign that says "EXIT".



Monitoring Program

In some instances, hard rock needs to be removed from the channels to reach these necessary depths, which requires the use of drilling and blasting techniques. The Corps only uses drilling and blasting as a last resort when it is determined that materials cannot be removed through dredging.

Seismographs are set up to monitor vibrations.

The Army Corps and other agencies involved perform various monitoring activities during this construction to ensure that the work conforms to all applicable federal, state and local requirements and ordinances.



Monitoring Drilling and Blasting Operations

The subcontractor and the Corps take concerns about damage claims to any property during blasting operations seriously.

Visits to residents and property owners logging concerns include documentation; observing a blast with the resident or property owner at his/her home or place of business; placing strain gauges on any cracks; and/or placing a geophone at the property to monitor vibrations, both of which will remain for the length of the project.

To ensure the safety of the communities, residents, and structures in the project area and minimize the level of disturbance the project may cause, the Corps uses the best available drilling and blasting technology, and adheres to all federal, state and local requirements.

The Corps monitors all blasting activities conducted by its subcontractors to ensure that vibration levels associated with each blast are within the allowable vibration limits that have been set for each project area.

Portable seismographs are used to measure and record the ground vibrations and air overpressure. The specialist conducting this work will analyze the recordings and keep updated information available at all times for the Corps, authorized agencies and concerned citizens to review.

Blasting event reports are kept for each blast and contain information about the vibration level as it compares to the Table of Safe Blasting Levels established by the explosive industry.

Residents or property owners who have concerns during the drilling and blasting activities may call (201) 339-6470.



Regular Sound Monitoring Stations
(levels monitored at stations within 1500' of equipment)



Blast summary reports are posted on the Army Corps' New York District website

www.nan.usace.army.mil/harbor

http://www.nan.usace.army.mil/harbor/index.php?ak



US Army Corps of Engineers
New York District

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KILL VAN KULL DEEPENING

ARTHUR KILL DEEPENING

BAYONNE BR AIR DRAFT ANALYSIS

HRE COMPREHENSIVE RESTORATION PLAN

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New York and New Jersey Harbor

Arthur Kill Deepening



The Arthur Kill deepening project is part of the overall NY & NJ Harbor Deepening (50 feet) \$1.6 billion project to deepen certain channels to 50 feet in order to allow the safe and economically efficient passage of the newest container ships serving the Port of NY & NJ.

The Arthur Kill Channel west of the Bayonne Bridge and north of Shooter's Island is being deepened to allow large ships to safely navigate to reach the New York Container Terminal in Staten Island, N.Y. - a critical component in providing safe navigation access to the port and a significant component of the broader effort of the Army Corps' navigation channel deepening project crucial for modern-day container ships fully loaded to navigate safely.



The project provides for deepening the existing Arthur Kill Channel from its confluence with the Kill Van Kull Channel to the New York Container Terminal (NYCT) in Staten Island, New York, and to 40 feet MLW from the New York Container Terminal (NYCT) to the Conoco Phillips (Tosco) Oil Terminal and GATX facilities in New



US Army Corps of Engineers
New York District

Home Event Summary Station Dredges History Links

Arthur Kill Blast Vibration Summary

This site summarizes the measured ground vibrations in northwest Staten Island, from rock blasting in the Arthur Kill and other possible sources. The site is updated daily. The data are intended for the use of the US Army Corps of Engineers - New York District, for managing and monitoring the performance of NY/NJ Harbor Deepening Project Contract in Arthur Kill starting 26 July 2011.



US Army Corps of Engineers
New York District

Home Event Summary Station Dredges History Links

Dredge Position Summary

This page summarizes dredge positions for the week. The Arthur Kill contract area is mapped with a topographic map. The navigation grid is superimposed. The map shows dredge locations by colored symbols, connected by colored lines to the week's past locations marked by gray symbols. The map needs to be loaded the Monday of each week.

Mousing over a dredge location produces a popup text box giving dredge name, date of location, and seating and mooring coordinates of the location in the NAD83 New Jersey State Plane coordinate system.

Click on a station for station information.



Department of the Army
New York District Corps of Engineers
JACOB K. JAVITS FEDERAL BUILDING
26 Federal Plaza
New York, NY 10278-0050

Week of October 31 – November 6, 2011

The following pages display the results from the USACE-NYD real-time website for the week of Monday, October 31, through Sunday, November 6, 2011.

There were six blasts this week in the S-AK-1 project area. Our monitoring stations are 1,350 to 3,000 feet away from the blasting area. We recorded vibrations triggered by the blasts. The maximum vibrations were 0.1420 in/s recorded at Shooter's Island, at a distance of 1,360 feet from the blast. Table 1 summarizes the blasts this week.

Page 2 summarizes dredge locations for this week. The map shows the week's last dredge locations by colored symbols, connected by colored lines to the week's previous locations marked by gray symbols. Drillboat Kraken and dredge JP Boussan operated in Arthur Kill all week. Dredge Capt AJ Fourrier was there on Thursday - Sunday.

The remaining odd pages display the home page showing the maximum vibration measured in all of the stations for most recent event for each day:

October 31
November 1
November 2
November 3
November 4
November 5
November 6

The even pages show the maximum vibration observed at each station along seating for each event.

The results for this week show the ambient results measured at the three active stations at Great Lakes Yard, Shooter's Island, and K-Sea Transportation. The station locations are on each page.

Ground vibrations at Great Lakes Yard were all below 0.0370 in/s. The station receives vibrations from Richmond Turnrow traffic during the daylight hours.

Ground vibrations at Shooter's Island were all below 0.1425 in/s.

Ground vibrations at K-Sea Transportation were all below 0.0795 in/s. The station receives vibrations from Richmond Turnrow traffic during the daylight hours. All blast vibration measurements are significantly below the contract vibration limits for this site.

Blast	Date & Time EDT of blast	Distance from blast to ed station (feet)	ed Max. vibration (in/s)
CB-072	2011-10-31 16:42	1,350 - 2,920	0.1370
CB-073	2011-11-01 13:40	1,360 - 2,940	0.1420
CB-074	2011-11-02 09:39	1,450 - 3,010	0.1250
CB-075	2011-11-02 16:31	1,460 - 3,080	0.0787
CB-076	2011-11-03 16:35	1,400 - 3,010	0.1000
CB-077	2011-11-04 16:24	1,480 - 3,080	0.0781



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Today's dredge locations are marked by colored dots. The drilling and blasting target is marked with the 'X' in yellow. The location of active seismograph stations are marked by triangles. Selecting a station activates the

ed for event summary:



seismic seismograph stations during the current observation at on 26 July 2011. The vertical axis gives the maximum curves above the project's contract limits, the average level-vibration level. The blue dots are blast-vibration levels.

ed time of last reading: Mon 31-Oct-2011 20:36:20

print out all seismograph station data

ed station

ed for each and every event. Selecting an event activates

SPV Max PPV

ed station

3 Shooter's Island

3 Shooter's Island

3 K-Sea Transportation

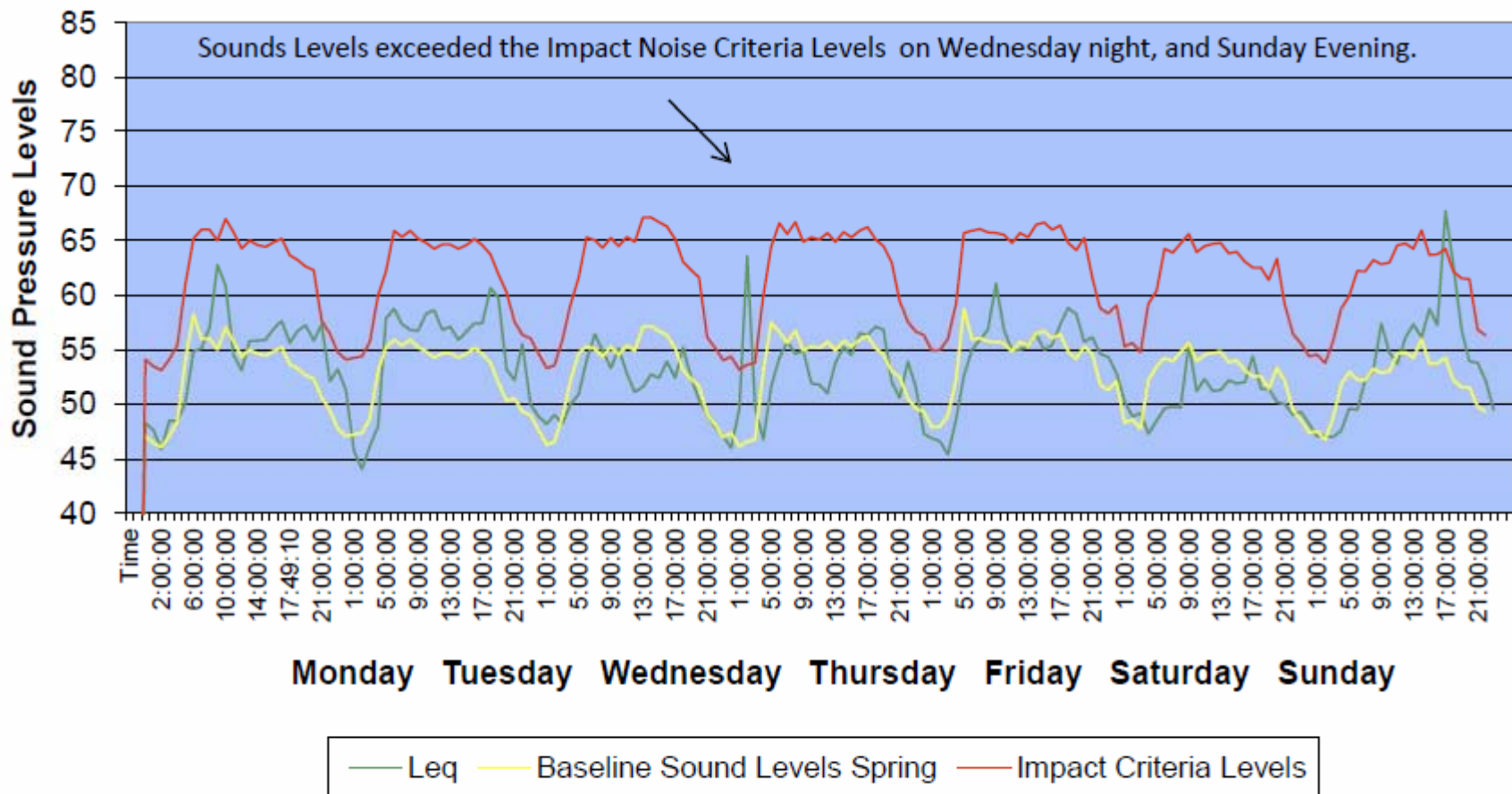
1 Shooter's Island

3 K-Sea Transportation

CT 16482 www.usace.army.mil

Noise Monitoring Report

**sAK-2- Site NAK-2 21 Arlington Avenue,
Staten Island, New York
04/30/2012 - 05/06/2012**



Getting In Touch During the Dredging

- Complaint Hotline: 201-339-6470
- USACE Project Office: 201-433-9228
- USACE Project Manager: 917-790-8304
- USACE Public Affairs: 917-790-8007



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Contact Information

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