

DREDGE MATERIAL PILOT STUDY
PENNSYLVANIA AVENUE LANDFILL
PROPOSED SCOPE OF WORK

The following is the anticipated scope of work (SOW) for the Pennsylvania Avenue Landfill Dredge Pilot Study. It was developed to provide a basic framework for selecting viable sampling and dredging locations within the New York City Harbor region, and for evaluating dredged material as a source for each soil layer required in the closure of Pennsylvania and Fountain Avenue Landfills. Certain assumptions, described in the attached SOW, had to be made in developing this framework in order to derive a proposed schedule and budget. As the study proceeds, the SOW could be changed based on findings and conclusions of individual tasks. These changes, which could involve such items as the number of samples taken per area, additional analyses to be performed, or test pad locations, would be discussed at the appropriate TEAC meetings.

DREDGE PILOT STUDY
PENNSYLVANIA AVENUE LANDFILL

SCOPE OF WORK
SUMMARY

- Task 1 Sample and Analyze Sediments
 - 1.1 Review Documents and Search Database
 - 1.2 Select Sampling Locations
 - 1.3 Sampling and Analysis
 - 1.4 Bench Scale Testing of Sediment Stabilization
 - 1.5 Evaluate Data and Select Final Dredge Sites
 - 1.6 Evaluate Technology

- Task 2 Dredge Preferred Materials
 - 2.1 Proposal Preparation and Contractor Selection
 - 2.2 Coordinate Permits
 - 2.3 Dredging Operations
 - 2.4 Off-Load and Test Dredged Material

- Task 3 Construct Test Pads and Monitor
 - 3.1 Haul and Stockpile Dredged Material
 - 3.2 Dredged Material Stabilization
 - 3.3 Monitor Stockpiled Materials for Compliance with Specifications
 - 3.4 Construct Test Pads
 - 3.5 Install Monitoring Equipment
 - 3.6 Monitoring Program

- Task 4 Present Results and Public Outreach
 - 4.1 Present Results
 - 4.2 Public Outreach

APPENDIX A

Pilot Project

for the Beneficial Reuse of Dredged Material

at the Pennsylvania Avenue Landfills

Borough of Brooklyn

All definitions set forth in Consulting Contract # 11480001, to which this Scope of Services is attached as Appendix A, shall have the same meaning herein.

A. INTRODUCTION

The New York City Department of Environmental Protection (DEP) and EDC have proposed a pilot project to test the suitability of dredged materials for the closure of the Pennsylvania and Fountain Avenue Landfills (PAL/FAL) in Brooklyn, New York (the "Project"). These facilities are under a Consent Order, dated May 15, 1992, between the City, Department of Sanitation (DOS), and the New York State Department of Environmental Conservation (DEC), to be closed in accordance with DEC regulations. The landfills are owned by the National Park Service (NPS), but DEP

is responsible for the closure and the operation and maintenance for up to thirty (30) years.

At a minimum, the Project will identify the type of material available, evaluate the organic and inorganic characteristics of the material, assess need for material amendment, assess ability of amended material to support plant growth, and quantify all costs related to dredged material placement. The goals of the project are to demonstrate that dredged material may be used beneficially in the following ways:

- 1) As a grading material below an impermeable liner;
- 2) As a barrier protection layer immediately above the liner;
and
- 3) As a topsoil material to support growth of plants above the barrier protection layer of the impermeable liner.

B. BACKGROUND

The Port of New York & New Jersey is the third largest deepwater port in the United States, handling over 2.3 million 20-foot equivalent container units (TEUs) in 1998. Port activity

accounts for a substantial portion of the New York region's local economy, employing over 166,000 workers and generating over \$20 billion in economic activity.¹ While the port boasts an excellent natural harbor, its natural depth averages only 19 feet. As a result, the port has relied on regular dredging to maintain depths for modern vessels. This task has historically been divided among the Federal government, which is responsible for the main approach channels, and local sponsors, including the States of New York and New Jersey, the City, and the Port Authority of New York & New Jersey (Port Authority).

Since 1994, the management of dredged materials in New York Harbor has changed in response to the U.S. Environmental Protection Agency's (EPA) adoption of more stringent disposal criteria. EPA's decision resulted in the de-designation of the former ocean disposal site, known as the Mud Dump Site (MDS), and its redesignation, along with adjacent areas, as the Historic Area Remediation Site (HARS). The stricter regulation of dredged material suitable for ocean disposal has spurred regional efforts to find beneficial upland reuse options for dredged material.

¹ Port Authority of New York and New Jersey, 1998

Dredged Material Management Plan

Responding to a Congressional mandate to manage dredged material in a safe and beneficial manner, the New York District of the US Army Corps of Engineers (USACE) developed a draft Dredged Material Management Plan (DMMP) in August 1999. The DMMP provides a long-range strategy for handling both HARS and HARS unsuitable material based on projects advanced by several sponsors, including the USACE, New York State, New Jersey, and the Port Authority. DMMP management options emphasize contaminant reduction, land remediation, HARS remediation, habitat creation, mine reclamation, and subchannel cell placement.

The DMMP proposed the use of dredged material as fill for rough grading prior to placement of a planned geomembrane liner, as fill for the barrier protection layer, and topsoil layer, for the restoration of coastal and upland plant communities at PAL/FAL with suitable material that meets established DEP specifications. The beneficial reuse of dredged material is preferred over upland soils since it prevents the potentially destructive impacts of obtaining soil from upland sources and

may have economic advantages. The establishment of coastal grassland, wetland and upland habitats at these sites will greatly improve the environment of the Jamaica Bay area. An estimate of the quantity of dredged material to be used at these two sites is predicated on the material meeting DEP soil testing requirements for alternate grading material below the cap and barrier protection and topsoil above the cap, and having the support of involved agencies and groups. It is envisioned that material to be placed above the liner will consist mostly of HARS-suitable sandy type material with a percentage of organic material to be determined. Material to be placed below the liner could consist of HARS-unsuitable material that meets the specifications for placement at the landfill. However, the purpose of this study is to investigate all appropriate options.

Initial estimates of the quantity of dredged material that could be potentially placed at the two landfill sites are as follows:

	Above	Below
	Liner	Liner
Pennsylvania	800,000	250,000
Avenue		
Fountain	1,400,000	750,000
Avenue		
Total	2,200,000	1,000,000

Pennsylvania and Fountain Avenue Landfills Closure Plan

Pennsylvania Avenue Landfill (PAL) began operations in 1956 for receipt of residential and commercial wastes. Operations were suspended from 1962 to 1968, when it was re-opened for receipt of construction and demolition wastes. Disposal of all waste at PAL was ceased in 1980, when it was added to DEC's registry of inactive hazardous waste sites. Fountain Avenue Landfill (FAL) received municipal and industrial wastes between 1961 and 1985. FAL was also added to DEC's registry of inactive hazardous waste sites. The Consent Order issued by DEC in May 1992, obligated the City to develop and implement remedial plans for the closure of PAL/FAL.

Remedial Investigations and Feasibility Studies were prepared by DEP for both landfills and submitted to DEC in September, 1994. In October 1994, DEC issued proposed Remedial Action Plans for both sites for public comment, and in February 1995, DEC issued Record of Decisions, defining the final remedial alternatives approved for each site. Numerous pre-design studies were conducted at both sites. Final bid documents for all four contracts associated with PAL/FAL's closures are currently being finalized.

The final construction workplan includes landscaping of both landfills, with the restoration of natural habitats. Tidal marsh communities will be established along the shoreline of both landfills, with dune and upland communities distributed at higher elevations. All native species will be used to establish these communities.

Monitoring of both sites will take place after construction is complete to make sure that plant communities have been successfully established before the sites are returned to the National Park Service, the owner of record for both sites.

C. PROJECT DESCRIPTION

The purpose of the Project is to evaluate the characteristics of dredged material as compared to the established DEP specifications and its suitability for placement at PAL/FAL both as a grading material below the impermeable liner, barrier protection material immediately above the liner, and as topsoil that will support the growth of plants. The Project will determine whether full-scale placement of dredged materials at PAL/FAL is feasible and cost-effective.

In order to determine the utility of HARS-suitable and HARS-unsuitable material at PAL/FAL, the following major research questions will be evaluated in the Project:

- Where will the dredged material come from? *It is preferable for material to come from harbor areas in New York that will require dredging via deepening projects or from maintenance projects over the next four years.*

- What are the physical and chemical characteristics of the material? Can it be used for grading? *(Material will be tested for agricultural, geotechnical and hazardous characteristics.)*
- Does the material require additional processing to make it acceptable for placement at the landfills? How much will this cost? *(Under the pilot study, dredged material will be amended with admixtures to develop optimum structural properties and growing medium.)*
- Are dredged materials more cost-effective and environmentally sound for landfill closure than materials from other sources? *(The cost savings from using dredged material can be significant. The use of dredged materials eliminates the need to mine large amounts of upland soil and the requirement to dispose of large amounts of dredged material.)*

D. SCOPE OF SERVICES

The services (the "Services") to be performed by the Consultant in connection with the Project will be as follows:

Task 1. Sample and Analyze Sediments

The Consultant will provide, at a minimum, the following services:

1.1 REVIEW DOCUMENTS AND SEARCH DATABASE

Document Review

There currently exists a large collection of documents and reports, which discuss the location, soil gradation, and chemical composition of the sediments in the New York Harbor (NY Harbor).

The Consultant, with the assistance of DEP and EDC, will contact these various agencies and review their records to document the various locations where dredging has occurred or studies have been conducted that identify the nature of the sediments in the study area.

This information will be transferred to a harbor wide map (via GIS) to assist the Consultant and DEP in selecting preferred dredging locations for the pilot study. Each proposed dredging

location shall be verified and plotted using a Global Positioning System (GPS). Additional information shall include cross-sections, estimated quantities and other applicable information required by the permitting agencies. A computer disk containing this complete information from each dredge location shall be delivered to DEP. According to DEC's Draft Dredge Material Assessment and Management Guidance (3/4/99), copper, dioxin, chlordane, and mirex are case specific parameters. The analysis and evaluation of these case specific parameters is recommended if the chemicals are suspected or known to be present at a specific dredging location. If past chemical data (within past ten years) are available indicating that the chemicals are not present at a specific dredging location, sampling for the case specific parameters will not be undertaken. Therefore, if the document review reveals any of the above case specific parameters were detected during past sampling in excess of DEC maximum allowable concentrations or is an area known to contain these chemicals, an alternative dredge location will be selected since the dredged materials would not be satisfactory for upland disposal.

Database Search

The Consultant will conduct a search of existing computer databases (government agencies, universities and that of the Consultant) to locate existing relative information concerning the topography, sediment composition, survey data, tidal flows, etc. of the NYC Harbor. This information will provide the details needed to guide the dredging operations and support the technical information gathered from the document review. This information will be added to the harbor wide map developed above, providing the Consultant and the DEP/EDC with as comprehensive planning tool as possible to choose sampling locations.

1.2 Select Sampling Locations

Location Point Selection Criteria

The criteria for selection of the sampling points will be based on the specifications developed for the closures of PAL/FAL and the locations which are planned to be dredged in the next 3-5 years. This time frame corresponds to the period when the closure of PAL and FAL would be on-going.

The construction specifications have detailed requirements for chemical contamination, soil gradation, and nutrient requirements necessary to support the final cover vegetation. Upon conclusion of Task 1.1, the Consultant will meet with EDC, DEP, Port Authority, USACE and potentially other agencies to discuss potentially viable dredging areas along the shipping channels. At this meeting, the Consultant will present tables summarizing pertinent file information, as appropriate, to support selection of sampling locations for further evaluation. Based on the collective input and agreements at this meeting, the selection of sampling locations will be finalized. The Consultant will prepare minutes of this meeting and distribute the minutes to all attendees. The Services include six primary sampling locations and a minimum of two alternate sites.

1.3 Sampling and Analysis

The Consultant will prepare and administer separate bid documents for the following:

- Water-based driller
- Contract laboratory for chemical analyses
- Contract laboratory for agricultural parameters analyses

The bid documents for the driller will include a location map for all primary and alternate sampling areas, as well as a detailed description of coring locations (i.e., sampling grid), depth of coring, coring and sample collection methodology, coordination requirements with the Consultant's sampling personnel, and health and safety plan preparation and enforcement requirements. Sample collection methodology may include vibracoring or split-spoons with casings, depending upon the location. It is also feasible that samples may be obtained from approved dredging operations (i.e., Ambrose Channel). The Consultant has developed a preliminary sampling plan, for budget estimating purposes, based on an average water depth of 35'-40', and an average depth of sediment to be sampled of ten feet. The intent of the sampling grids is to obtain representative samples from approximately 8000 cubic yards of in-place sediment. This is the volume anticipated to be needed for construction of three one-half acre plots on PAL. At an average depth of ten feet, the surface area for the volume of dredged material from the primary and alternate sampling sites would be approximately 147 feet by 147 feet. In excavating this material, realistically, boundaries of the material will vary somewhat. Therefore, material dredged will be sampled across a

200-foot by 200-foot grid, with 6 coring points per sampling area.

At each coring point, sediment will be continuously sampled to a depth of ten feet or to a maximum depth of two feet below proposed depth of dredging to account for the potential uneven depth of recovery. Samples for chemical and agricultural analyses will be collected as accurately as possible from each coring sampling point at the following depth intervals:

0 - 1 feet

1 - 2 feet

2 - 5 feet

5 - 10 feet

All of the sediment samples will be analyzed for Target Compound List (TCL) organics including organo-chlorine pesticides and polychlorinated biphenyl compounds (PCBs) and Target Analyte List (TAL) metals including total cyanide, asbestos fiber content, and pH following the applicable EPA SW-846 procedures. If a sediment sample is detected with concentrations exceeding DEC Cover Soil Use Criteria (Jan 1994), the sample will be analyzed for hazardous water characteristics consistent with the Resource Conservation and Recovery Act (RCRA), including Characteristic

Leaching Procedure (TCLP), sulfides and ammonia. The sediment sample will be analyzed for dioxin at a rate of 20% of total samples due to the expense of dioxin analysis. These samples will be analyzed by contract laboratories in accordance with the PAL specifications. Quality Assurance/Quality Control (QA/QC) samples will be collected and analyzed in accordance with DEC requirements. Duplicate samples will be collected at the rate of 10% of field samples, field blanks will be collected at the rate of 1 per day, a rinseate blank will be collected at rate of one per grid location, and matrix spike/matrix spike duplicate (MS/MSD) will be collected at a rate of one per 20 samples collected.

Two samples from each sampling point would be collected for geotechnical analyses, which will be conducted in accordance with the PAL specifications (Appendix C) by the Consultant's soil laboratory.

The total number of analyses included in this proposal for all primary and alternate sampling sites is 573.

The chemical analyses will be completed before the other testing is started. See Section 1.4 - Bench Scale Testing of Sediment Stabilization.

The draft drilling and sampling bid document will be submitted to EDC/DEP for review. The Consultant will incorporate revisions, and then solicit competitive bids. The Consultant will the develop a cost estimate for this work for use in bid evaluation. Three competitive bids should be obtained. In the event three bids are not received, the Consultant's cost estimate will be used to determine reasonableness of the bids received.

The Consultant will also prepare separate bid documents for contract laboratories to perform the specified chemical, geotechnical and agricultural testing. These draft laboratory analyses bid documents will be submitted to EDC/DEP for review. The Consultant will incorporate revisions and then solicit competitive bids. As with the drilling phase, a cost estimate will be prepared for this work for use in bid evaluation. Three competitive bids should be obtained. In the event three bids are not received, the Consultant's cost estimates will be used to determine their reasonableness.

The successful drilling contractor will be mobilized and the drilling operations will commence upon agency approval. The Consultant will provide day-to-day supervision and sampling control.

During the laboratory testing phase of the Project, the consultant will coordinate data analyses with all available and interested beneficial use contractors. Soils from various sites will be evaluated for the practicality of blending the materials together in order to meet the PAL geotechnical specifications. Included in this testing phase will be bench-scale study analysis to determine the correct percentage of admixture to be added to the soils to create a stable sub-base material and topsoil mixture. In this phase, the Consultant will also conduct a focused bench-scale study to evaluate desalinization of the dredge through rinsing. Rinsing rates to be used will be calculated to simulate anticipated rainfall rates for the PAL/FAL area. Analytical data and their evaluation will be documented for suitability with respect to proposed study and submitted to DEP for review and approval.

1.4 Bench Scale Testing of Sediment Stabilization

A dredged material stabilization program will be undertaken. The scope of this study will investigate ways to stabilize silty/clayey material to create geotechnical and chemical properties suitable for use as an alternate grade material.

Wet silty/clayey soils constitute a portion of the harbor sediments and as such will have to be removed during the harbor-dredging program. Unlike sandy materials, their shear strength is unsuitable as a sub-base for a liner system. Therefore, in order to utilize this material as a sub-base, its strength needs to be increased. The most economical method to accomplish this is to admix these soils with a percentage of fly ash or lime. Currently there exists a good body of information available covering this subject (i.e., Parsons Brinkerhoff Study), which will be prepared for review and approval.

After approval of the workplan, the first phase of this bench scale testing program is to take samples of the silty/clayey material and conduct trial mixes in the laboratory. In the laboratory, various percentages of admixtures, as determined in Task 1.1, would be added to the material, and after a period of stabilization, the mix will be tested for shear strength. The required strength would be based on the maximum loading it will be subjected to under various slope ratios (e.g., 4:1, 3:1, 2:1).

This mixing and testing process will continue until a suitable mix is determined. This final mix will then be tested in accordance with the analytical soil testing parameters from the

PAL specifications. The mix must pass both standards as would any source of material being brought to the site.

1.5 Evaluate Data and Select Final Dredge Site(s)

Upon completion of Task 1.3, the Consultant will meet with EDC, DEP, DEC, and USACE to discuss the location for dredging.

The data evaluation will be a composite of the historical data from Task 1.1 and the new data from Task 1.3. The new data will be compared to the PAL final closure specifications. The recommended admixtures (nutrients, compost, stabilizing agents) will be presented and the procedures for adding the admixtures discussed. The data and recommendations/conclusions will be presented in a final report to DEP for review and approval. This task will complete the investigation phase of the Project.

Task 1.6 Evaluate Technology

Currently there are a number of proposals being advanced as remedial treatment and soil stabilization that may have some application to the blending, de-watering and desalinization of the dredge material to be used under and over the landfill barrier layer. The Consultant will meet with up to three of

these local vendors and evaluate their technology and its applicability to the PAL/FAL closure programs. The Consultant will, in particular, assess the viability of utilizing the desalinization process developed by USACE.

Deliverable: Identify potential sites where dredged materials could be obtained for the Project, development of a competitive selection process for selecting driller and contract labs, select driller and labs, conduct field sampling of dredged material, analyze samples, evaluate data and determine suitability for use in the Project.

Task 2. Dredge Preferred Materials

The Consultant will provide, at a minimum, the following services:

2.1 Proposal Preparation And Contractor Selection

The dredging contractor will be competitively selected from a minimum of three local dredging companies. The successful bidder will be selected on qualifications as well as cost.

The successful firm will be required to mobilize its equipment quickly to meet the aggressive schedule.

2.2 Coordinate Permits

The Project will require a number of State and Federal permits in order to be completed. These include a Nationwide permit to conduct a drilling program in the NY Harbor area. It is anticipated that this permit will be granted by USACE with the submittal of a simple letter application and detailed map of the drilling sites. After the sampling program is completed, formal permit applications will be required for both the dredging of materials and the placement of the dredged material on the landfill.

USACE will require a site specific dredging permit with a possible public hearing.

DEC will require, at a minimum, the following permits:

- Article 15
- Section 401 Water Quality Permit

New York State Department of State will require a Federal Consistency Review for a Coastal Zone Management Permit. The United States Coast Guard will require coordination to work in the shipping channel. The USACE and DEC have indicated that a 60+day turn-around time is to be expected in order to complete their reviews.

2.3 Dredging Operations

Dredging will take place at sites identified by EDC and DEP. Material, as it is removed from the water, will be loaded into a barge, anticipated to be approximately 1600 cubic yards in capacity. The barge will be transported with the assistance of a tugboat to PAL. Full time oversight of dredging operations will be provided by the Consultant.

2.4 Off-Load And Test Dredged Material

The dredged material will be unloaded at the landfill utilizing a clamshell mounted on a barge. Decanting will be done, as necessary, to reduce free liquids. It is anticipated that the decanted liquid would be allowed by DEC to be discharged in the source area of the dredge. It is anticipated herein that one barge load (1600 cy) will be off-loaded per day at PAL, up to a

maximum of 8000 cy of dredged material. The sandy material will be loaded directly into off-road dump trucks and taken to an area on PAL specifically prepared to dry the material. Three samples of the delivered dredged material will be analyzed for TCL and TAL compounds. Any samples not meeting specifications will either be used in dedicated sections of the test cells or placed in an appropriate area on PAL and covered with six inches of suitable material for ultimate handling by the PAL Closure Contractor. No off-site disposal of material delivered to PAL is included in this scope of work.

Deliverable: Includes selection of dredge site(s),
USACE/DEC permitting, dredging of site(s),
delivery of dredged material to PAL via barge.

Task 3. Construct Test Pads and Monitor

The Consultant will provide, at a minimum, the following services:

3.1 Haul and Stockpile Dredged Material

At PAL, the material will be hauled to the drying bed prepared earlier. This material will be spread in thin lifts, turned

regularly and left to sun-dry. Based on the bench-scale test results, suitable air monitoring will be conducted to determine odor detection. Equipment and locations for air monitoring will be developed by staff in the DEP's Office of Environmental Planning and Assessment (OEPA) in accordance with test results of the bench-scale studies. A draft final protocol shall be submitted for OEPA's review and approval.

3.2 Dredged Material Stabilization

Based on the results of the bench scale study conducted during Task 1.3, the silty materials will be stabilized during the task.

The silty material will be brought to the PAL pier, where the contractor will admix in the approved stabilizing agent in the barge, after mixing, the material will be tested, off-loaded, and handled as described above in Task 2.4.

The approved material will then be spread and allowed to cure prior to being used as a sub-base material under the liner and tested for long-term stability (geotechnical). The selection of

one option will be made based on the bench scale test results and logistical considerations for the full-scale application.

3.3 Monitor Stockpiled Materials For Compliance With Specifications

The contractor will demobilize from the site while awaiting the stockpiled material to desalinate and dry.

The first step in the soil preparation phase will be to spray irrigate the soil in the drying bed. This irrigation is intended to desalinate the dredge material to $.4\text{mmhos cm}^{-1}$. The water application, combined with any rainfall, will be measured against the empirical model determined in the laboratory during Task 1. Should the results of Task 1.6 technology evaluation indicate that a different desalinization technique is viable, the Consultant will discuss with DEP the incorporation of the method(s) into project test plots.

After desalinization, the material will be allowed to dry naturally. The Consultant will monitor the pile weekly until construction for moisture content. The moisture content will control the timing of the next phase of construction due to structural reasons. The goal is to dry the material to as close

as possible to optimum moisture, in accordance with the final closure specifications for PAL/FAL, before placing the material.

3.4 Construct Test Pads

A five-acre area to be utilized for the drying of the dredged material will be prepared by clearing and grading utilizing a bulldozer. This area will be prepared prior to the arrival of the material in order that it may be immediately placed after unloading. The dredged material will be placed in a one-foot lift. It is anticipated it will take approximately one month for the material to dry to a workable consistency. To help facilitate the drying, the material will be tilled on a once-a-week basis, or more often if required.

Three, ½ acre test pads are to be constructed to simulate the actual closure cap for both landfills. This cap will consist of, from the top down, the following components:

- Erosion Control Fabric (1/2 covered)

- Seeding (warm season)

- 6" Topsoil

- 12" Barrier Layer

- Composite Geonet

- 40 mil LLDPE Liner

6" Sub-grade Layer

The topsoil, barrier layer and sub-grade layers will all be constructed utilizing the dried dredged material.

The test pads will initially be prepared by clearing and grubbing the designated areas. An anchor trench will be excavated to hold the liner in place on the landfill slopes. Subsequently, the dredged material will be transported to the area utilizing off-road dump trucks. The 6" sub-grade layer will be spread with a bulldozer and all sharp rocks and debris will be removed prior to the placement of the liner.

The liner will be deployed from a loader equipped with a spreader bar. The liner seams will be welded and tested in accordance with the manufacturers' standard procedures. The geonet will be placed on top of the liner and the subsequent layers of soil/dredge material will be spread with a low ground pressure bulldozer. The bulldozer will always work from a position on top of the soil/dredge material in order to avoid damaging the liner.

A toe drain approximately six feet wide will be constructed at the bottom of the slope consisting of crushed stone and filter fabric. Seeding and erosion control fabric will be placed in accordance with the specifications. Monitoring equipment will

be installed as directed by DEP. Erosion control material will be applied to one side of each test pad, leaving the other side open to erosion as a test control.

The contractor will install erosion-control fencing upstream of the toe-drains to collect the soil as it is eroded, as a quantitative measure of erosion.

3.5 Install Monitoring Equipment

The monitoring equipment shall consist, at a minimum, of a meteorological station near the first test pad. The contractor will install the station and we will attempt to deliver a wireless link to connect the Consultant and the station.

In addition, a soil chemistry sensor (type to be determined) will be placed in the soil at various locations and depths to monitor conductivity, pH, moisture content, and soil nutrients. Based on availability, these may also be connected to the Consultant.

3.6 Monitoring Program

The monitoring program for the completed test pads will be comprised of two components: 1) the geotechnical issues; 2) the

agricultural testing issues. The pads constructed on PAL will be monitored by the Consultant for only geotechnical issues for 3 months after construction, under this proposal. One pad would be left in place for an extended period for DEP continued evaluation or dismantled by the final closure contractor at the DEP's discretion and further specification.

The material selected will have been evaluated through a series of laboratory tests (see Task 1) for interface friction and shear strength to prove acceptability. In the laboratory environment, however, all factors are controlled. However, in the field, such factors are uncontrollable (rain fall, wind, etc.) and may have adverse effects on the acceptability of the material.

The geotechnical issues are related to the stability of this material on 3:1 slopes and the infiltration/run-off factors that affect long-term stability. This monitoring will be conducted only on the PAL test pads and will consist of surveyed slope stability points, monitoring of the tension in the liner, and surficial sloughing of portions of the final cover.

The agricultural parameters will be developed jointly with OEPA and soil scientists. The monitoring of the vegetative growth

will be conducted only by DEP, and may extend beyond the Consultant's geotechnical monitoring as described above. At the end of the monitoring program, all study components, including the dredged material and the geomembrane liner will be placed under a new geomembrane liner as part of the final closure of the landfill.

Deliverable: Includes drying and admixture of dredged material, if necessary, construction of (3) $\frac{1}{2}$ acre cells, test of structural and agricultural properties of dredged material.

Task 4. Present Results and Public Outreach

4.1 Present Results

It is anticipated that the test pads will be completed in time for planting of cool and warm season grasses in late summer/early fall of this year. A report will be prepared in late-fall 2000, which will summarize the monitoring results (agricultural and/or geotechnical) as of that time. This report will also include summaries of all dredge sampling analyses done as part of Task 1, as well as the results of bench-scale admixture, drying, and/or desalinization tests. This report will summarize all construction methodologies used and will present cost analyses of the dredging, dredge processing, and construction operations.

While the agency staff has the training and expertise to review complex data table and analytical results, the public typically does not. The Consultant will prepare and present this information in layman terms with supporting graphs, charts and photos to support its conclusions.

4.2 Public Outreach

In addition, there will be a public outreach program conducted by EDC and DEP. The Consultant will support this effort by the following tasks:

- Attend 4 public meetings;
- Prepare practical presentation materials for these meetings;
- Maintain a contact list of interested parties;
- Prepare at least four (4) fact sheets newsletters and other document for public distribution.

Deliverable: Technical and logistical support to the public outreach effort, coordination with other technical tasks, preparation of literature related to the Project.

E. SCHEDULE

The Consultant shall complete the services as set forth in the following schedule:

<u>Task</u>	<u>Completion Date</u>
1. Sample and Analyze Sediments	2 month from Commencement
2. Dredge Preferred Materials	3 months from Commencement
3. Construct Test Pads/Conduct Test of Materials	3 months from Commencement Date to construct test pads at the project site; 13 months from Commencement Date to complete testing of dredged materials.
4. Public Outreach	Concurrent with all other Tasks
Submit Draft Interim Report	6 months from commencement
Submit Final Interim Report	7 months from commencement
Submit Draft Final Report	x months from commencement
Submit Final Report	x months from commencement

*Penn Landfill Technical/Environmental
Advisory Committee Kick-off Meeting*

NJ Maritime Resources Current Initiatives

Presented by: Lisa Baron, Maritime Specialist

August 2, 2000

New York City

NJMR's Sediment Management Strategy

☐ **Beneficial Use Applications**

Brownfield Reclamation

Landfill Operations

PA Mines

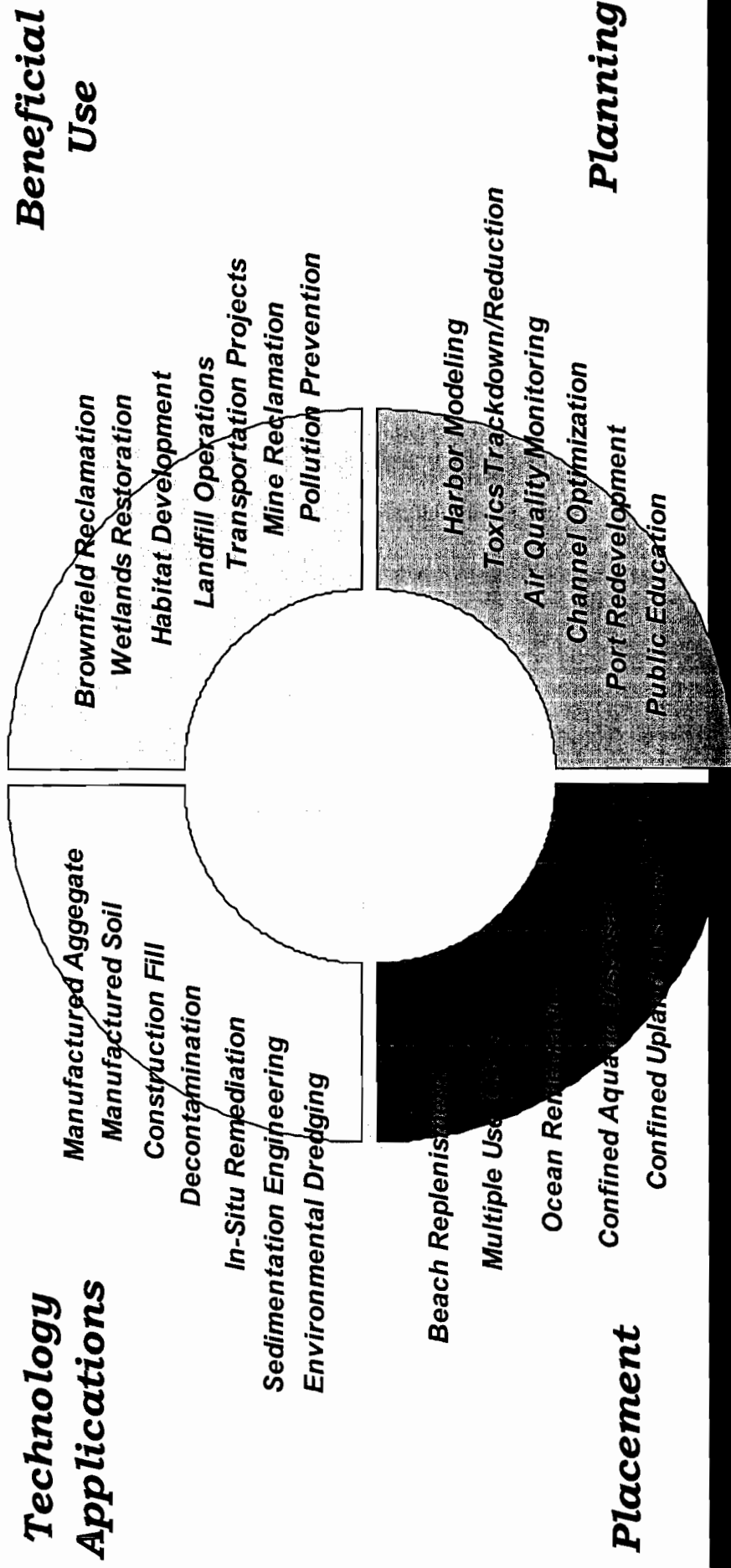
Transportation Projects

Wetland Restoration

☐ **Decontamination Technologies**

☐ **Planning: Toxics Trackdown, Air monitoring**

New Jersey's Comprehensive Sediment Management Strategy



Upland Beneficial Use of Dredged Material

- ☐ Treat dredged material as a *RESOURCE*
- ☐ Environmental Improvement (Reclaim brownfields and close landfills)
- ☐ Economic development and revitalization
Tax revenue, Recreational Facilities (malls, golf courses, parks, etc.)

NJDEP Acceptable Use Determination

- ☐ Extensive permitting process
- ☐ Material must meet environmental requirements for end use (e.g., brownfield, habitat creation, decon end-product)

Bulk chemistry

Leachability

Physical properties

Beneficial Upland Alternatives
New Jersey Examples

Jersey Gardens Mall

- ☐ Former municipal landfill
- ☐ Under-utilized property and contaminant source
- ☐ Utilized 850,000 CY as base of a parking lot in 1997
- ☐ DOT Berm Project: Current demonstration to evaluate feasibility of dredged material as embankment in DOT projects. Evaluation to be completed in 2001.

OENJ Cherokee Corp in Bayonne

- ☐ Inactive municipal landfill and brownfield
- ☐ Permitted in October 1998
- ☐ 4.5 MCY dredged material capacity
- ☐ Projected receipt of material- October 2000
- ☐ Future public golf course
- ☐ Air Quality Monitoring (NJMSC, Rutgers, Stevens Institute)

Mine Reclamation

- ☐ Serious environmental problems (acid mine drainage, health & safety, etc.)
- ☐ Bark Camp Demonstration Project

Permitted in June 1997 for 500,000 cyd

Consolidated Technologies Inc (CTI): amend and stabilize dredged material and transport by rail to PA.

After successful completion of demo, PADEP may issue Statewide permit to accept dredged material

Hackensack Meadowlands Landfills

- ☐ HMDC identified 11 unclosed industrial and municipal landfills
- ☐ 400,000 gallons of leachate per acre per year
- ☐ Capacity of 9 MCY fill
- ☐ Cap using clay from Kill Van Kull and Newark Bay

Additional Beneficial Uses

- ☐ Landfill Daily Cover

Ocean and Burlington County Landfill

- ☐ Landfill Liner (clay)

- ☐ Civil Engineering Applications for DOT projects

Embankments, roads, rail stations, etc.

Construction material: Aggregates (sand and gravel), blended cement, top soils

Summary

- Dredged material has been used in upland beneficial use applications in NJ and other States in an environmentally protective manner.
- Win-Win Scenario: Home for dredged material while reclaiming and closing contaminated upland sites.

From: Nigel N. Crawford
To: Mary Ellen Kris
Date: 8/2/00 1:15PM
Subject: Re: Penn & Fountain Dredge Material Pilot

Mary Ellen: I will be attending the meeting along with my staff. I will be meeting with Tom before the public meeting. Thank you, Nigel

>>> Mary Ellen Kris 07/31/00 07:44PM >>>
7/31

I understand that the CAC for Penn & Fountain Landfills is hosting a meeting with DEP on Wed. eve. Aug 2 at 7:00 at the Starrett City Recreation Center (Brooklyn Sports Center), 1540 Van Siclen Avenue (side entrance). I believe that DEP will be making a technical presentation on use of dredge materials. I think it is important that DEC send representatives from dredging, remediation and natural resources, since this topic cuts across dredging, closure and end use.

The community seems to have real reservations as to this pilot project. They want to know where the material is coming from; how will it be tested; how will it be treated; where has this been done before? The Brooklyn Boro President has gone on record in a letter that says something like this material should not be placed in Penn & Fountain unless and until it goes to Fresh Kills. I told the Brooklyn BP's Engineer that dredge material would be used only if it met the chemical and physical specs for grading and cover material at these landfills. His response was, "yeah, but we're concerned about what you'd have to do to the material to get it to meet those specs".

I'm not sure, but I think the 8/2 meeting is an "Open Mike night". I have heard that there will be a follow up technical meeting as well. (I don't know when, where or who is going to participate in the latter). I hope that the National Park Service will attend on 8/2 as well as any follow up technical meeting so that they can get comfortable with how the spec was put together and why we think it is protective of the environmental and public health.

CC: John Ferguson; Richard Gardineer; Shaun Bollers; Thomas Lang; Zhuang Miao

Dredge Pilot Study Pennsylvania Avenue Landfill Proposed Schedule

	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N
Initial TEAC Meeting	◆ 8/2/00															
Selection of Sampling Sites																
Assess Existing Data	—															
TEAC Meeting to Select Sites	◆															
Sampling			—													
Selection of Dredge Sites																
Receive and Assess Analytical Results			—													
TEAC Meeting to Select Sites and Discuss Dredging Logistics				◆												
Dredge/Deliver to PAL					—											
Desalinization/Drying						—										
Construction of Test Pads																
TEAC Meeting								◆								
Construction of Pads									—							
Monitor/Evaluate Pads											—					
Permitting												—				

**SUMMARY OF THE PROPOSED PILOT PROJECT
FOR THE
BENEFICIAL USE OF DREDGED MATERIAL
AT THE
PENNSYLVANIA AVENUE LANDFILL
BROOKLYN, NEW YORK**

August 2, 2000

2/1/2000 11:06

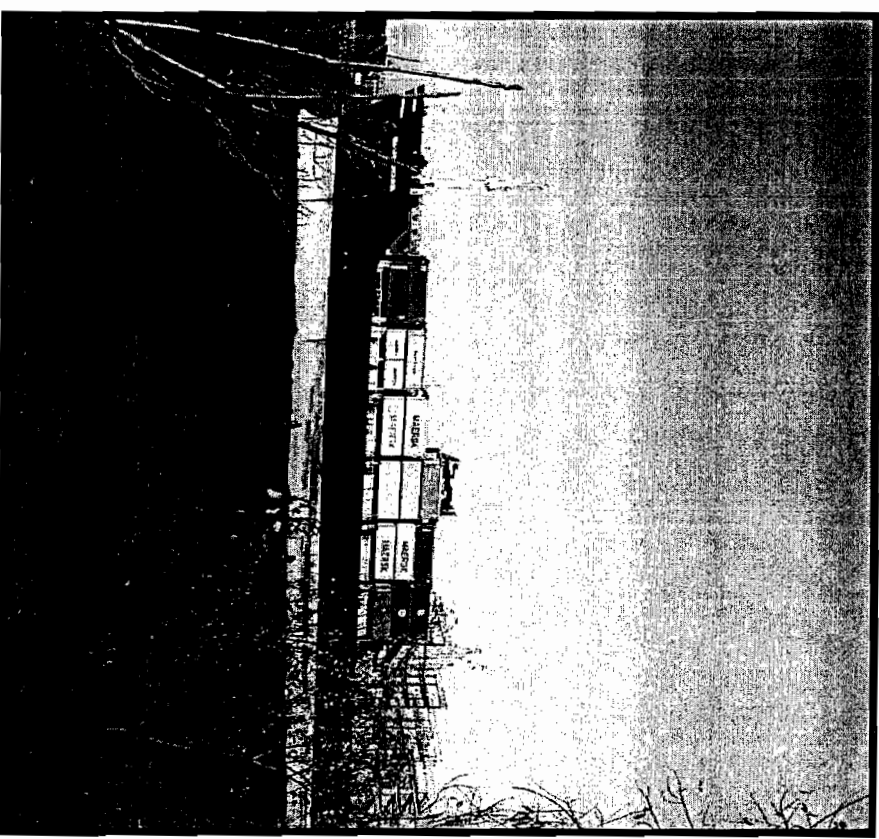


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Background Harbor Navigation Needs



- New York Harbor is naturally shallow; average depth is 19 feet.
- Regular maintenance dredging required to keep shipping channels safe for navigation.
- Deepening projects required to handle the next generation of super-large containerships.
- Forecast demand of 6 MCY (the equivalent of three World Trade Center Towers) of dredged material from New York waters available through 2005.
- The region is investigating beneficially using this material on upland sites.





Why A Pilot Project for Dredged Material? Penn and Fountain Need A Lot of Soil

•Material to be used in three ways:

- Grading material under an impermeable liner
- Barrier protection layer
- Topsoil to support plant growth on top of an impermeable liner

❖ *Quantity of Material Needed Under the Pilot Study (cubic yards)*

	Above Liner	Below Liner
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Pennsylvania Avenue	4,000	4,000
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Potential Material Needed for Closure of Pennsylvania and Fountain Avenue Landfills

	Above Liner	Below Liner
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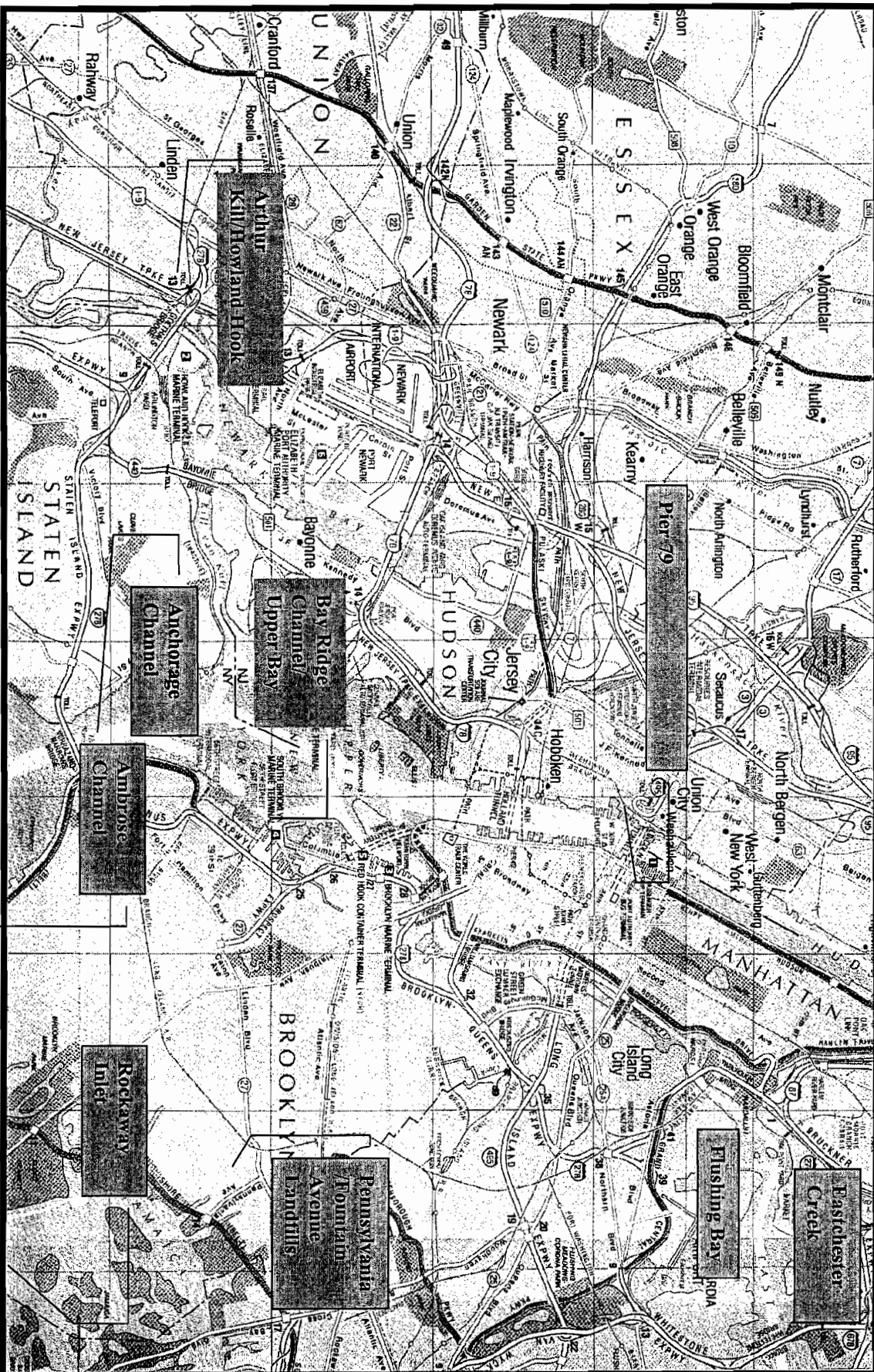
Pennsylvania Avenue	800,000	250,000
Fountain Avenue	1,400,000	750,000

Total	2,200,000	1,000,000
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Candidate Sampling Locations





Why A Pilot Project for Dredged Material?

- There is a need to dredge the port to maintain New York City's shipping channels and marinas.
 - Brooklyn and Queens facilities will need to dredge approximately 3 million cubic yards by 2005
- Other areas have demonstrated that dredged material can be used to close landfills.
 - We can benefit from technologies applied elsewhere to close PAL/FAL
- Some harbor sediments contain contaminants; the extent of which will be identified in the pilot.
 - Dredged material must meet strict Consent Order soil criteria.
- If the City were not to use dredged material, the soil would be taken from upland sources, thus disturbing another natural resource.



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Why the Pennsylvania Avenue Landfill?

- Timing is right:
 - Pelham Bay: Already closed
 - Brookfield: Closure Plan not finalized
 - Fresh Kills: Still accepting solid waste
- There are few upland sites in New York City other than landfills and they have large material needs for closure.
- Sandy dredged material has positive characteristics that support the Penn and Fountain natural area restoration
- All material will be barged to the pilot test site



Pilot Study Tasks

- **Task 1: Identify sources of dredged material for pilot study.**
- **Task 2: Sample, then analyze materials based on landfill closure soil specifications**
- **Task 3: Place acceptable dredged materials on-site and address pre-treatment needs (reduce salinity, structural stability).**
- **Task 4: Conduct field demonstration for above- and below-liner materials (3, 1/2 acre test plots).**
- **Task 5: Conduct Public Outreach Process**



Public Outreach

Community Participation is Crucial to Study Success

- **The Community will be consulted throughout the pilot study.**
- **Meetings, workshops, and field visits will continue throughout the study period.**
- **Frequent Technical/Environmental Advisory Committee of CAC Members, Community Boards, and Dredged Material Experts.**

Proposed Pilot Project Schedule

- Commence Public Outreach -- Spring 2000
- Obtain Federal/State Permits -- Summer 2000
- Begin Sampling -- Early Fall 2000
- Lab Results -- Late Fall 2000
- Dredging -- Winter 2000
- Complete Pilot Project -- Summer 2001

Pilot Project Summary

- Federal and state permits required for sampling and dredging
- Sample dredged materials at various locations in New York Harbor where dredging could take place within 5 years
- Lab evaluation of materials to determine if materials meet PAL/FAL Soil Specifications

IF MATERIAL IS UNACCEPTABLE, IT WILL NOT BE USED

- Dredge 8,000 cubic yards of material
- Apply at three, half-acre test sites at PAL (dry/desalinate material)
- Test material for structural stability and suitability for growing native plant species
- Determine whether full-scale application of dredged material is desirable.

