



Need a solution?
Think Jersey DOT

Tech Brief

Beneficial Use of Dredged Clay from Newark Bay and Environs

FHWA-NJ-2005-015

June 2005

HERE'S THE PROBLEM

Dredging operations are underway in the New York/New Jersey navigational channels in order to accommodate a new generation of container ships. The channels must be dredged to a depth of 50 feet, thus generating millions of cubic yards of pristine red clay. While this material can be used to cap the historic ocean disposal site off Sandy Hook, NJ, determining alternative beneficial uses for this material frees up capacity for other less useful materials and mitigates the environmental impacts associated with mining of clay.

AND, HERE IS THE SOLUTION...

To determine if dredged red clay can be used beneficially at upland sites such as landfills or brownfields that require a low hydraulic conductivity cap.

BUT, HOW CAN IT BE DONE?

By conducting a pilot study to investigate the feasibility of beneficially using the red clay at upland sites, using 4,000 cubic yards of red clay dredged from ongoing channel construction in Newark Bay.

THESE ARE OBJECTIVES OF THE STUDY...

- To provide NJDOT with useful information in order to pursue the beneficial use of dredged red clay.
- To evaluate the geotechnical properties of dredged red clay and evaluate its potential application at waste containment facilities or brownfields for low permeability cap construction.

AND, HERE'S WHAT WE DID...

4,000 cubic yards of red clay were dredged from Newark Bay and transported to the Bayshore Recycling Corporation facility in Keasbey, New Jersey by a US Army Corps of Engineers contracted dredger. The material was offloaded at Bayshore, transported to the test pad, and placed in varying thicknesses and compacted to evaluate the behavior and workability of the material.

To evaluate the success, the red clay cap was monitored using in-situ and laboratory geotechnical tests. The testing objective was to determine the engineering properties of the material at different moisture contents and compaction conditions.

Following this initial success, 2,000 cubic yards of the red clay were removed and transported to the ILR landfill in Edison, New Jersey, to be used in an actual capping project. Field and laboratory testing indicated that the hydraulic conductivity could be achieved once the red clay was compacted at an appropriate moisture content.

CONCLUSION...

The investigations conducted as part of this study indicate that dredged red clay from Newark Bay and surrounding waterbodies can be used beneficially as a low conductivity cap with similar performance to mined clay. The material can be placed and compacted using conventional construction equipment. Additionally, conventional road trucks could be used for on-land transportation of the red clay within construction sites or on public roads with no modification to the trucks.

Cost comparisons demonstrate that the costs associated with the use of red clay material for all upland applications are comparable to those of competing products. In addition, using dredged red clay in containment barrier applications may also bring substantial advantage over costs of competing products. The technical success of this, however, was not tested in this study.

There are sufficient and viable markets for the upland use of red clay. The estimated potential market use of red clay for the next decade is approximately 22 million cubic yards. Of this, the potential market for use as containment barriers for landfill capping is more than nine million cubic yards; and for in site remediation projects, more than ten million cubic yards.

Additional markets exist for use of clay in civil engineering applications such as pond liners and wetland restoration, as well as for the ceramic manufacturing industry if the red clay material is amended prior to ceramic manufacturing.

WHAT IS THE NEXT STEP?

Further exploration of market use of red clay in upland sites may be conducted to determine the most cost efficient procedures for reuse and the most beneficial method of reuse. Fortunately, use of the red clay will reduce the burden on remediation sites currently accepting less beneficial materials, such as silt. Similarly, using the dredged red clay in place of mined clay would eliminate the environmental impacts associated with mining of clay.

FOR MORE INFORMATION CONTACT:	
NJDOT PROJECT MANAGER:	Mr. Scott Douglas
PHONE NO.	(609) 530-
e-mail	Scott.douglas@dot.state.nj.us
UNIVERSITY PRINCIPAL INVESTIGATORS	Dr. Ali Maher
UNIVERSITY:	Rutgers University
PHONE NO.	(732) 445-2232
e-mail	mmaher@rci.rutgers.edu

A final report is available online at <http://www.state.nj.us/transportation/research/research.html>

If you would like a copy of the full report, please FAX the NJDOT, Bureau of Research, Technology Transfer Group at (609) 530-3722 or send an e-mail to Research.Bureau@dot.state.nj.us and ask for Beneficial Use of Dredged Clay from Newark Bay and Environs.

NJDOT Research Report No: FHWA-NJ-2005-015