



## Client

US Army Corps of Engineers

## Contract Number

Task Order 0009

Basic Agreement W912BU-10-H-0017

## Project Name

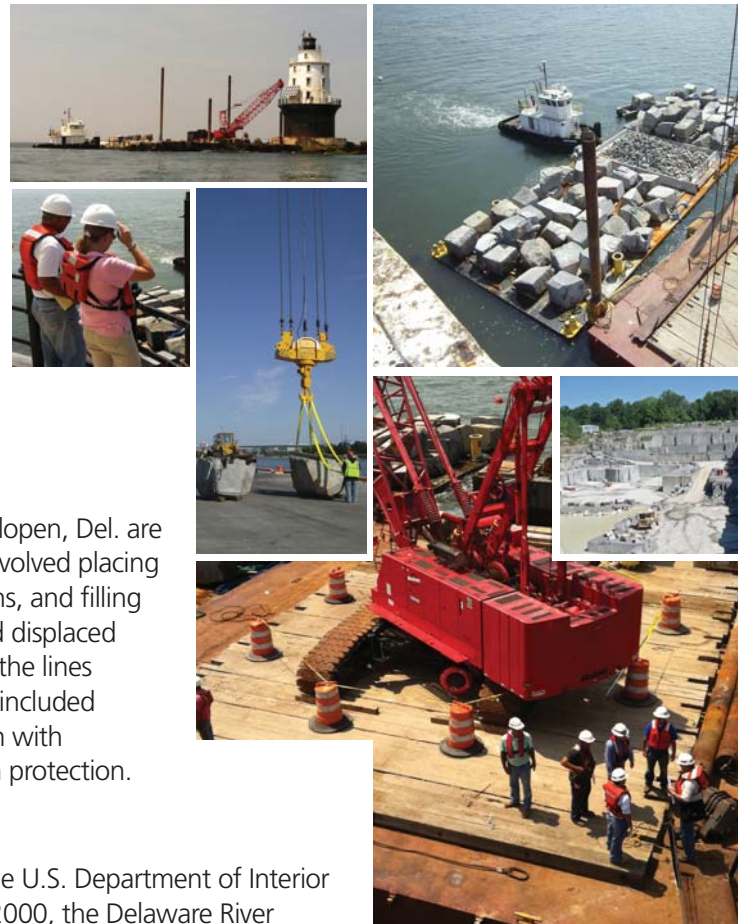
Repairs to Harbor of Refuge Breakwater  
Lewis, Delaware

## Total Project Value

\$2,341,459.66

## Project Summary

The Harbor of Refuge and its historic lighthouse off Cape Henlopen, Del. are listed in the National Register of Historic Places. The project involved placing approx. ninety capstone, each weighing approximately ten tons, and filling voids along the breakwater using a combination of re-handled displaced capstone cast-in-place concrete and stone void filler to match the lines and grades of the typical breakwater section. The project also included the stabilization of the existing concrete lighthouse foundation with cast-in-place concrete void filler and new capstone foundation protection.



## Challenges

- Complying with the historic preservation requirements of the U.S. Department of Interior under the National Historic Lighthouse Preservation Act of 2000, the Delaware River and Bay Lighthouse Foundation and the U.S. Army Corps of Engineers (USACE). The Harbor of Refuge breakwater was constructed by USACE between 1897 and 1901 and repaired numerous times throughout its history. The historic, cast-iron lighthouse was constructed in 1926, replacing a previous lighthouse.
- Mobilizing numerous pieces of heavy earth moving equipment via barge, tug and crew boat(s)
- Quarrying nearly one hundred correct shape and size stones, approx. 10-12 ton each, in upstate Pennsylvania and then shipping them to the Port of Wilmington via fifty separate tractor trailers where they were unloaded and barged over 24hrs to our construction site located at the mouth of the Delaware Bay & Atlantic Ocean.
- Placing each stone by barge crane at various locations
- Coordinating time sensitive batching, mixing and transporting of concrete
- Underwater form work and concrete work preparations
- Differing subsurface conditions
- Weather, tides and then tropical storms Irene and Lee

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