



# Viable Commercial Mixture for Making a Marketable Engineered Soil

## ERDC Dredging Operations Technical Support Program (DOTS)

U.S. ARMY CORPS OF ENGINEERS

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### Response Summary:

Rock Island and Chicago District Corps of Engineers have stockpiles of clean dredged material available for use, but each have problems finding users. The Ottawa DMMP is in a remote location and Chicago has background contaminants. A plan to market manufactured soil evolved to a beach nourishment project when the Illinois Department of Natural Resources, Coastal Resources Branch asked for help to combat excessive beach erosion at Illinois Beach State Park. A rapid assessment of methods to move material, costs, and risks was required so ERDC, LRC, and Illinois DNR staff worked together to quickly compile a plan to transport 200,000 cy of dredged sand from Mackinaw to Illinois Beach State Park.

Transportation is possible using river barges that are able to move 80 miles into Lake Michigan. The transport is complicated by a requirement to change from river licensed to lake licensed fleeting companies at Calumet Harbor. Loading at Ottawa DMMP Can be achieved with a front end loader using an existing access ramp. Transport by barge requires several hundred hopper barges which can be transported in fleets of 6 – 12 depending on location in the waterway for a cost of \$6 - \$10/cy to Calumet Harbor and a similar cost moving to Illinois Beach. Offloading can be accomplished using hydraulic transport that pumps a slurry of water to a crane or backhoe mounted 6” – 8” cutterhead siphoning material out of the hopper barge and pumping to the beach for a cost of \$10 - \$15/cy. The estimated costs were less than quarry sand costs and water transport can keep several thousand trucks off the highway and park roads. A Regional Sediment Management program proposal was written to refine the cost estimate.



The acceptability of river sand for beach nourishment was investigated by the Illinois State Geological Survey who sampled the Ottawa DMMP site. They found the river sand to be superior to quarry sand because the size and variable gradation of the river sand matched the beach sand better than the larger, more uniform quarry sand. A discussion of stability of larger grains concluded that mixing large quarry sand could result in uneven scour that drives erosion elsewhere. The Ottawa DMMP has been tested for contaminants and has been determined to meet Illinois TACO standards. Furthermore, the State of Illinois has cleared sand sized and larger sediment for unrestricted use. A concern over invasive aquatic species transport identified a scud, *A. lacustre*, which might diapause in the sand.

### Period of Performance:

January FY20 – June FY20

### Benefits of the Response to the USACE Dredging/Navigation Program:

Identified Great Lakes beach nourishment as a new beneficial use alternative for river sand; Response to rising lake levels and erosion in LRC and LRD; Transferable to other locations.

### Deliverable:

A Regional Sediment Management Proposal was submitted June 2020 but not selected for funding; ISGS produced a draft report on their sand characteristics analysis.



Providing environmental and engineering technical support to the U.S. Army Corps of Engineers Operations and Maintenance navigation and dredging missions

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