

Memorandum

To George Meservey, Director of Planning & Community Development
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Subject **Town of Orleans, MA**
Water Quality and Wastewater Planning
Preliminary Landfill Assessment of Septage Lagoon Response Actions

Project Number 60476644

From Thomas Parece, P.E., AECOM Project Manager

Date March 29, 2017

1. General

Operations at the Town of Orleans Landfill included septage disposal to open pit lagoons from the 1950s until 1989. Six unlined lagoons were located immediately north of the solid waste landfill in a rectangular area approximately 200 feet by 300 feet. The solid waste landfill was capped with an impermeable cover in 2005, reducing the infiltration of water through solid waste material. However, drainage structures constructed to manage runoff from the cap include an unlined riprap swale that passes directly over part of the former septage lagoon area. A large volume of drainage water from the landfill cap and stormwater runoff from the Transfer Station is infiltrating to groundwater through the bottom of the swale and through nitrogen rich subsurface soil in the former septage lagoons area. This infiltrating water is mobilizing nitrogen compounds from soil and transporting nitrogen to groundwater.

A soil boring completed adjacent to the swale identified the old lagoon bottom at a depth of 12 feet below land surface. At least 2 feet of contaminated soil is present in the old lagoon bottom. High concentrations of nitrate have been found in groundwater at this location.

2. Potential Response Actions

Potential response actions to reduce or eliminate infiltration of nitrogen from the former septage lagoons include:

- Capping the lagoon area under an impermeable surface;
- Lining the rip rap swale with an impermeable surface; and
- Excavation of contaminated soil.

A. Capping the Lagoon Area Under an Impermeable Surface; and Lining the Rip Rap Swale with an Impermeable Surface

Capping of the riprap swale and the remainder of the surface of the former septage lagoon area could be incorporated into site improvements for construction of the new DPW facility at the landfill. A portion of the area underlain by the septage lagoons is already slated for placement of impermeable pavement.

B. Excavation of Contaminated Soil

The feasibility of excavation and rough excavations costs are outlined here. The contaminated soil is located below approximately 12 feet for clean sand that would have to be excavated prior to excavating contaminated soil. The layer of contaminated soil has been identified as approximately 2 feet thick below the clean sand. Safely excavating to 14 feet below ground surface in sandy soil would require a larger footprint of excavation for stable side slopes resulting in an excavation area approximately 300 feet by 500 feet. This area would extend into the area of capped solid waste reducing the feasibility of excavation of the contaminated soils due to high associated cost, lengthy and complicated permitting, and long implementation schedule. The excavation would also disrupt Transfer Station Operations and require demolition/relocation of the "Gift Shop" building.

Roughly the excavation would require relocating 106,000 tons of clean material (equivalent to 5,300 truckloads) followed by excavation, transport and disposal of 7,000 tons of contaminated material (equivalent to 350 truckloads).

Engineering, excavation, backfill, trucking and disposal costs have been estimated for the project at roughly \$3,000,000. The addition of permitting, engineering and construction costs associated with excavation into the footprint of the capped solid waste landfill increases the cost of this alternative to roughly \$5,000,000.