how was the Massachusetts Bay site chosen?

After a four-year long process including oceanographic and engineering studies, regulatory review, and extensive public participation, the 9.5-mile site for the outfall discharge was found to be the best location for the health of nearshore and offshore waters.

The outfall siting process began in 1986 with the appointment of the Facilities Planning Citizens Advisory Committee (FPCAC), which included 27 participants representing agencies, environmental groups, community officials, and other interested individuals. The FPCAC developed criteria used in the siting process, and reviewed and commented extensively on the environmental impact reports.

At the outset of the siting process, the United States Environmental Protection Agency (EPA) ruled acceptable only those sites that (1) could provide an initial dilution of 50 parts seawater to one part effluent; (2) were far enough from shore so that particles could not be transported directly to shore on the next incoming tide; and (3) avoided sensitive and unique resources.

The existing Deer Island and Nut Island discharge locations (Figure 9a) at the mouth of Boston Harbor did not meet any of the above criteria—for example, the dilution there is only 14 parts seawater to one part effluent. Therefore, because of insufficient depth and dilution, Boston Harbor was not chosen as a site for the new outfall.

Seven potential sites, from a location in Broad Sound to a site 10 miles offshore, were evaluated in detail by MWRA and EPA independently. Sites more distant than 10 miles were eliminated from consideration because construction would not have been feasible at a reasonable cost. Siting studies were done in 1987 and 1988, including engineering studies by four different leading engineering firms as well as the Massachusetts Institute of Technology and the Georgia Institute of Technology. Oceanographic work was done by Battelle Ocean Sciences, the New England Aquarium, MIT, and the US Geological Survey. Biological, chemical, and physical oceanographic information to support the siting analysis was collected in Broad Sound, Nantasket Bight, and western Massachusetts Bay.

Along with oceanographic measurements, a computer model of pollutant transport in Massachusetts and Cape Cod Bays was used to predict likely effects of prospective outfall discharges: any discharge site had to show the ability to attain compliance with state and federal water quality criteria. Other criteria to evaluate potential sites were based on discussions with citizens and scientific advisory groups, and included protection of commercial on-the-water activities, maintenance and enhancement of aesthetics, and avoidance of areas of important habitat.

The computer model predicted that water depth and current patterns would produce the most effective dilution of effluent at three of the most distant candidate sites. These predictions were confirmed by oceanographic field studies. After an extensive period of regulatory and public review and comment, the Final Supplemental Environmental Impact Statement confirmed that the 9.5-mile site (Figure 9b) was the optimum location for the outfall because it is in an area of strong random off-shore currents, has a sufficient water depth, and would be feasible to construct. In 1988, the EPA published its Record of Decision on the outfall site, which also required MWRA to conduct monitoring of the effects of the ocean discharge on the Massachusetts Bay environment.

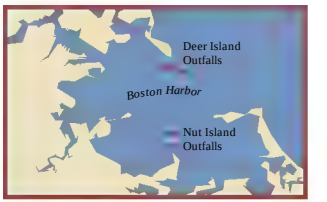

Figure 9a. Present outfall locations in Boston Harbor

Figure 9b. Future outfall location in Massachusetts Bay

Schematic views of outfall and diffusers

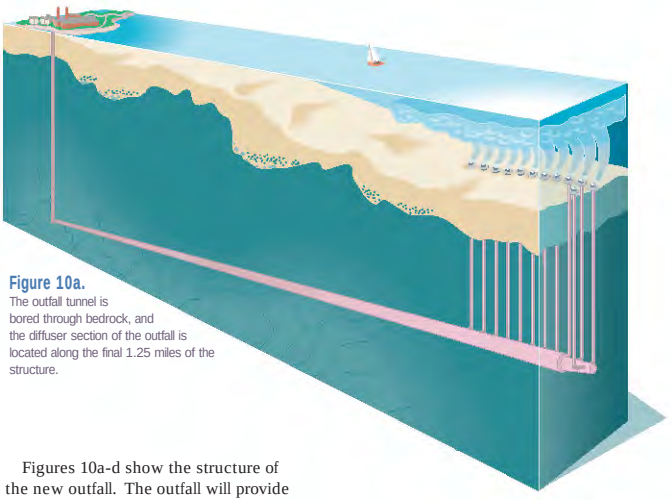

Figure 10a. The outfall tunnel is bored through bedrock, and the diffuser section of the outfall is located along the final 1.25 miles of the structure.

Figures 10a-d show the structure of the new outfall. The outfall will provide a larger measure of environmental protection than the existing outfalls. Currently, wastewater is discharged within Boston Harbor from two short (less than a mile long) outfalls at Deer Island and three short outfalls at Nut Island. Because all wastewater treatment will be consolidated on Deer island, it was necessary to build a larger outfall and to locate the discharge in deeper water. Since the continental shelf off the East Coast has a very gentle slope, the outfall had to be relatively long.

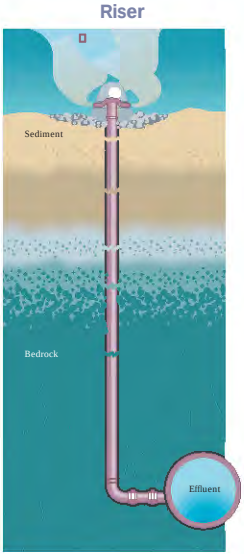

Figure 10b. The 55 risers carry effluent from the deep rock outfall tunnel up to the diffuser heads at the seafloor.

Figure 10c. The diffuser heads each disperse the effluent through eight ports.

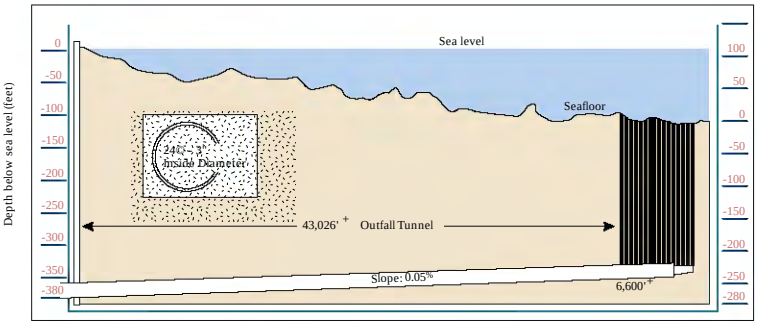

Figure 10d. Cross-section diagram of outfall pipe

NOTE: Diagrams not drawn to scale