

FACTS ABOUT

The Braintree-Weymouth Relief Facilities Project

A MASSACHUSETTS WATER RESOURCES AUTHORITY PUBLICATION

The MWRA Braintree-Weymouth Relief Facilities Project will expand and improve the Braintree-Weymouth System, MWRA's network of sewer pump stations, interceptors and siphons that serves Braintree, Hingham, Holbrook, Randolph, Weymouth and parts of Quincy. The project will transform the way that wastewater generated by six South Shore communities is conveyed to sewer treatment and processing facilities.

THE BRAINTREE-WEYMOUTH SYSTEM TODAY

The existing Braintree-Weymouth System consists of the Braintree-Weymouth Interceptor, three siphons and the Braintree-Weymouth Pump Station. Wastewater (as much as 54 million gallons during peak flow conditions such as times of heavy rains or snowmelt) is sent through the Braintree-Weymouth System for transport to the Nut Island Headworks. The headworks screens and removes grit from the wastewater and then sends it through the Inter-Island Tunnel to MWRA's Deer Island Treatment Plant. The treatment plant is able to treat over one billion gallons of wastewater per day, in compliance

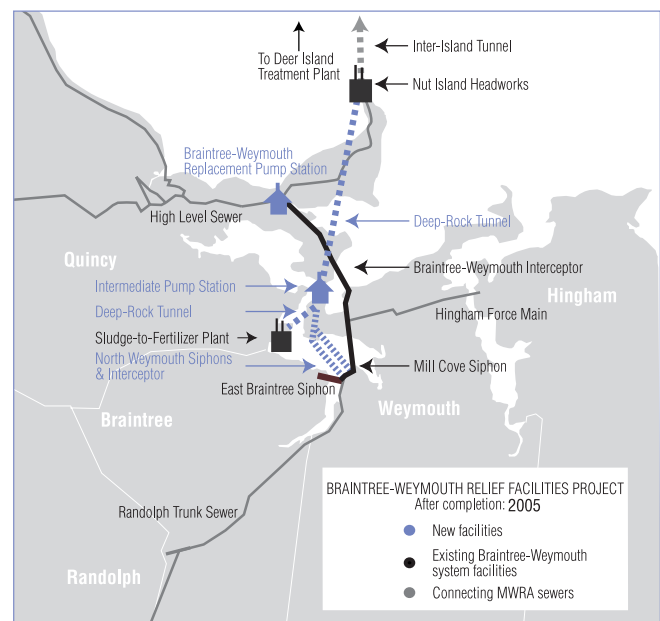
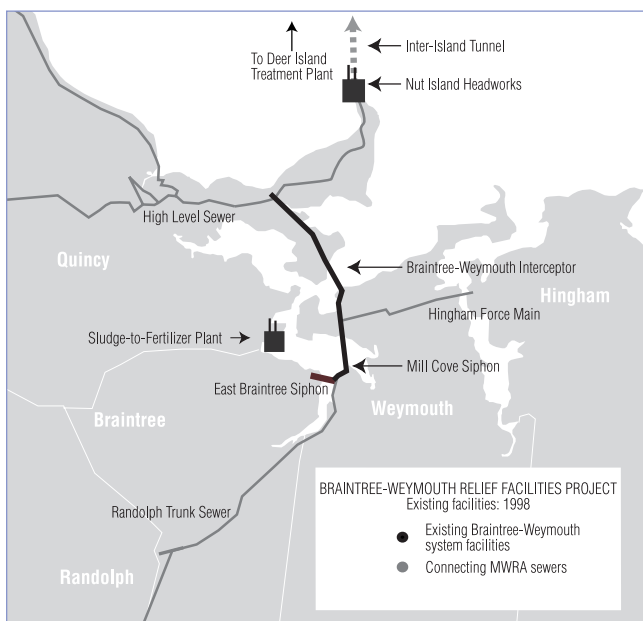
with state and federal standards. Finally, digested sludge from Deer Island is barged to the Sludge-to-Fertilizer Plant at the Fore River Staging Area in Quincy.

MWRA's wastewater treatment and sludge processing facilities have the capacity to manage all of the sewage they receive. However, parts of the Braintree-Weymouth System are not able to convey all flows to these facilities during peak periods.

HOW THIS PROJECT WILL IMPROVE SERVICE TO SOUTH SHORE COMMUNITIES

The project will increase the Braintree-Weymouth System's peak flow capacity by approximately 19 million gallons per day and streamline the route that wastewater takes from South Shore communities to the Nut Island Headworks and the Deer Island Treatment Plant.

New Braintree-Weymouth System facilities will significantly reduce the risk of sewage surcharges and backups, which can be associated with sewer facilities that can't accommodate all of their flow due to the growth of communities, or the age or insufficient size of the sewers, or the entry of non-sewage flows into sewers.



Existing (left) and future (right) Braintree-Weymouth Sewer System.

The new MWRA facilities will increase the system's capacity by approximately 19 million gallons per day.

WHY THE BRAINTREE-WEYMOUTH RELIEF FACILITIES PROJECT IS IMPORTANT

Since MWRA was established in 1985, it has been working to improve and maintain its regional sewer facilities – the pipes and pump stations that carry wastewater from communities to treatment and processing plants.

MWRA's regional sewer improvement projects, including the Braintree-Weymouth Relief Facilities Project, enable the whole sewer system to work as effectively as possible.

This project will protect the environment – not only Boston Harbor, but the waters and land of the project's host communities. Just as importantly, the new facilities will benefit everyone who relies on the Braintree-Weymouth System for clean, safe, reliable sewer service.

PROJECT DETAILS

The Braintree-Weymouth Relief Facilities Project is a series of construction and rehabilitation projects needed to avoid overflows and comply with state and federal environmental laws.

The project's schedule is subject to an Administrative Consent Order issued by the Massachusetts Department of Environmental Protection. Construction is expected to be complete by 2005.

The project's total cost is estimated at \$150 million. Work will take place in Quincy and Weymouth.

INTERMEDIATE PUMP STATION

Today all wastewater generated by six communities – Braintree, Hingham, Holbrook, Randolph, Weymouth and parts of Quincy – must pass through the Braintree-Weymouth Pump Station. Its 54-million gallon per day capacity is not sufficient to handle all peak flows.

To make the Braintree-Weymouth System more effective in all conditions, MWRA will construct a second pump station, the Intermediate Pump Station, near King's Cove in Weymouth.

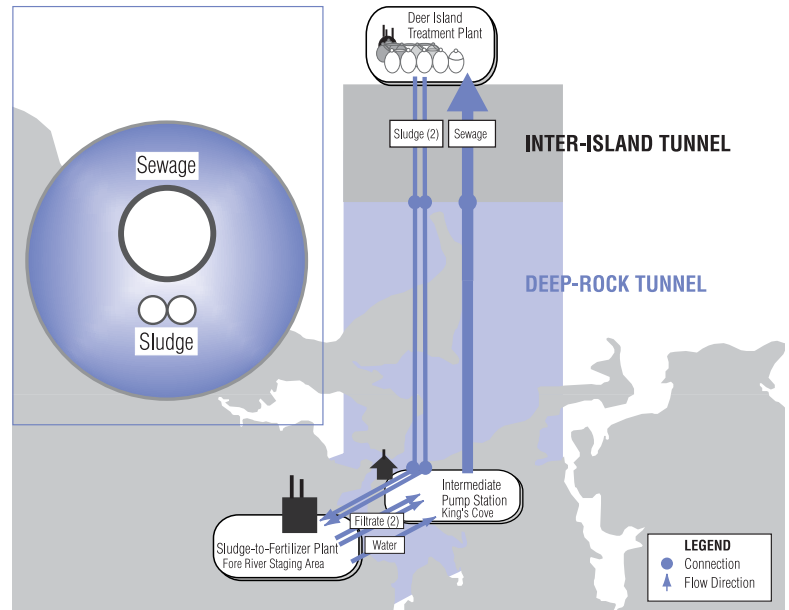
When complete, it will "take over" flows from Braintree, Holbrook, Randolph and parts of Weymouth.

SCHEDULE: INTERMEDIATE PUMP STATION

Complete design:	August 1999
Start construction:	March 2000
Complete construction:	May 2003



The Sithe Property and King's Cove in Weymouth, where MWRA will construct the Intermediate Pump Station and part of the Deep-Rock Tunnel. The Sludge-to-Fertilizer Plant is visible in the background.



Mains within the Deep-Rock Tunnel will convey materials between system facilities. The tunnel will increase sewer system performance and minimize impacts to project host communities and the environment.

MULTI-USE DEEP-ROCK TUNNEL

The Deep-Rock Tunnel, measuring 12 feet in diameter and 2.7 miles in length, will be constructed 250 feet beneath the surface. It will contain force mains to convey materials between facilities. Each main (or group of mains) will perform a different task:

1. A 42-inch diameter force main will convey sewage from the Intermediate Pump Station directly to the Inter-Island Tunnel:
After screening and removing grit, the Intermediate Pump Station will pump wastewater through this force main toward Nut Island. At Nut Island, the main will connect to the Inter-Island Tunnel, which will continue the transfer to the Deer Island Treatment Plant.
2. Two 14-inch diameter force mains, joining lines in the Inter-Island Tunnel, will return sludge from Deer Island to the Sludge-to-Fertilizer Plant:
The linked pipes will eliminate the need to transport sludge from Deer Island to the fertilizer plant by barge.
3. Two 12-inch diameter force mains will carry wastewater from the fertilizer manufacturing process (filtrate) at the Sludge-to-Fertilizer Plant to the Intermediate Pump Station:
After travelling to the Intermediate Pump Station, the filtrate will be pumped to the Deer Island Treatment Plant.
4. A 12-inch diameter main will carry potable water from the Sludge-to-Fertilizer Plant to the Intermediate Pump Station:
The water will be used to cool and seal the station's pump bearings, to operate grit collectors and for the station's day-to-day operation and maintenance.

SCHEDULE: DEEP-ROCK TUNNEL

Start construction:	June 1999
Complete construction:	December 2003

REPLACEMENT BRAINTREE-WEYMOUTH PUMP STATION

The existing Braintree-Weymouth Pump Station, built in 1933, currently serves six communities: Braintree, Hingham, Holbrook, Randolph, Weymouth and parts of Quincy. It has a shortfall of about 19 million gallons of peak flow capacity.

The 28-million gallon per day Replacement Braintree-Weymouth Pump Station will be built on the existing station's site on Kilby Street, Quincy. It will pump wastewater through the High Level Sewer to the Nut Island Headworks.

The replacement station will be smaller in capacity than the original because MWRA's new Intermediate Pump Station will reduce the Braintree-Weymouth station's flows by 26 million gallons per day.

When complete, the Replacement Braintree-Weymouth Pump Station will only handle flows from Hingham, Weymouth and the Germantown and Adam's Shore sections of Quincy.

SCHEDULE: REPLACEMENT PUMP STATION

Complete design:	August 2002
Start construction:	March 2003
Complete construction:	August 2005

NEW NORTH WEYMOUTH SIPHONS AND RELIEF INTERCEPTOR

The Braintree-Weymouth Interceptor conveys wastewater from six communities to the Braintree-Weymouth Pump Station. It does not have the capacity for all peak flows. To transport more sewage out of the area, MWRA will "split up" the existing interceptor's flow by constructing two new siphons and a relief interceptor.

The North Weymouth Siphons, 36 inches in diameter, will be built under the Fore River, between Idlewell in Weymouth and the Sithe property in North Weymouth.

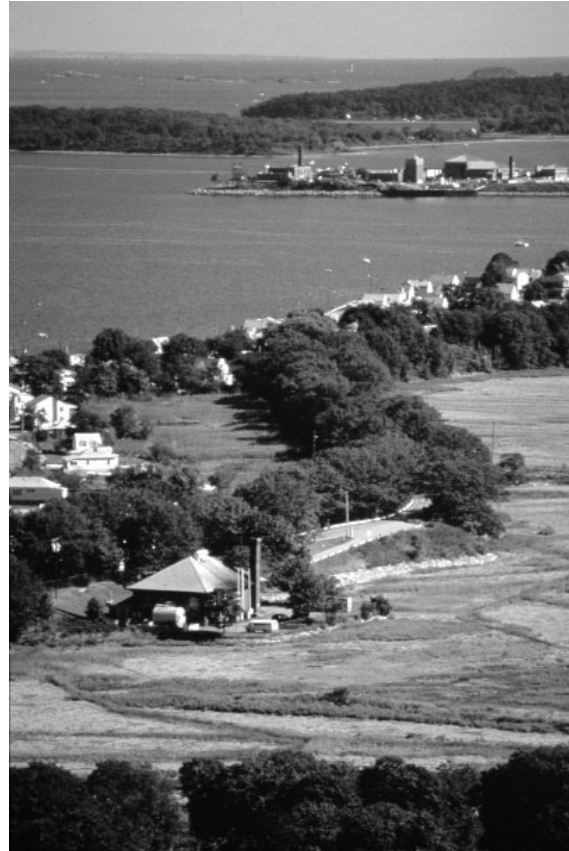
The 60-inch diameter North Weymouth Relief Interceptor will connect to the siphons and discharge to the new Intermediate Pump Station.

The new pipes and pump station will create a new flow pattern, generally corresponding to geography. Up to 45 million gallons of wastewater from Western Weymouth, Braintree, Randolph and Holbrook will be rerouted to flow through the new siphons and interceptor to the Intermediate Pump Station.

Hingham, the rest of Weymouth and the Germantown and Adam's Shore sections of Quincy will continue to be served by the Braintree-Weymouth Interceptor, its existing siphons and the Replacement Pump Station. These facilities will convey and pump flows through the Nut Island Headworks for processing before transport to Deer Island.

SCHEDULE: NEW NORTH WEYMOUTH SIPHONS AND NORTH WEYMOUTH RELIEF INTERCEPTOR

Complete design:	September 2000
Start construction:	March 2001
Complete construction:	December 2003



The existing Braintree-Weymouth Pump Station, Kilby Street, Quincy

EXISTING BRAINTREE-WEYMOUTH INTERCEPTOR AND SIPHONS REHABILITATION

The 70-year old Braintree-Weymouth Interceptor is corroded in one area. MWRA will repair the corrosion, but the interceptor's size and capacity will not change. New Braintree-Weymouth System facilities will reduce the interceptor's peak flows by 45 million gallons per day, so its current size will be sufficient for all of its remaining flow.

The interceptor's reduced flows will make it necessary for MWRA to resize one of its two 54-inch diameter siphons, which cross the Fore River between Quincy and North Weymouth. If left unchanged, the siphons' combined capacity would be too great, especially under low-flow conditions; this would increase the risk of odors and sedimentation in the pipes. Reducing the diameter of one siphon by 26 inches will ensure that wastewater will move through the system efficiently at all times, whether conditions are wet or dry.

SCHEDULE: EXISTING INTERCEPTOR AND SIPHONS REHABILITATION

Complete design:	July 2003
Start construction:	January 2004
Complete construction:	December 2004

REDUCING IMPACTS TO OUR NEIGHBORS AND OUR ENVIRONMENT

MWRA relies on careful planning, citizen input and the use of innovative technology to minimize the effects that construction can have on project neighbors and the environment. The construction of the Braintree-Weymouth Relief Facilities Project has been specially planned to reduce impacts to Quincy and Weymouth streets and to protect wetlands in Germantown's salt marsh.

An example of how technology can make a positive difference to project neighbors: MWRA is using a tunnel construction procedure called *Horizontal Directional Drilling* to build the North Weymouth Siphons. Its use eliminates the need for construction in East Braintree and reduces impacts to salt marsh areas in Idlewell. Horizontal Directional Drilling is known for its safety and cost-effectiveness, and has been used with success to construct other major MWRA projects, including the Mill Cove Siphons.

PUBLIC PARTICIPATION

Lawmakers and project neighbors have worked closely with MWRA during the project's design process. The Braintree-Weymouth Working Group, made up of area residents and representatives of the business community, Boards of Selectmen, City Councils, watershed associations and other interested people, meets regularly to re-view and comment on various aspects of the project. The meetings are announced by mail and in local newspapers.

If you have any questions or would like to be added to the Braintree-Weymouth Relief Facilities Project mailing list, please call MWRA Public Affairs at (617) 788-1170.

Municipal Pipes Need Attention, Too

Many of the sewer systems owned and operated by Greater Boston communities need to be rehabilitated because pipes with leaks, cracks or unauthorized connections are often susceptible to **INFILTRATION AND INFLOW (I/I)**.

INFILTRATION occurs when leaky sewer pipes allow groundwater to enter. Once this extra water enters a pipe, it becomes mixed with sanitary waste from homes and businesses.

INFLOW occurs when unauthorized stormwater connections, such as sump pumps, discharge water directly into MWRA's sewer system.

I/I causes problems for the local sewer system and MWRA customers because the extra water must be transported and treated. I/I raises costs and reduces the amount of sewage a system can carry. It may also impact local watersheds (such as aquifers, rivers and streams) by allowing groundwater and stormwater to be transported by sewer pipes rather than follow a natural path.

Levels of I/I are usually highest during heavy rains or periods of snowmelt. In fact, during very wet weather, some communities' total sewer volume can contain as much as 70% I/I. Until I/I is reduced, residents will continue to pay for the transportation and treatment of this extra water.

MWRA's new regional relief sewers, which connect to local sewers, will increase the system's reliability and decrease the risk of surcharges and backups. But, some problems may persist if the conditions that allow excessive amounts of I/I to enter local sewers are not corrected.

An **I/I TASK FORCE** has been formed to develop strategies for reducing I/I and improving local and regional sewer service. The Task Force is made up of representatives of MWRA, local Departments of Public Works, municipal offices and chambers of commerce. This cooperative effort will be integral in finding solutions for Infiltration and Inflow.



The Horizontal Directional Drilling procedure, shown here at Mill Cove in 1997, begins with the horizontal drilling of an 8-inch diameter pilot hole. The hole is then enlarged until it reaches its ultimate diameter. Finally, the pipeline is pulled through the reamed hole.

GLOSSARY

FORCE MAINS: Sewer pipes where flow moves under pressure created by mechanical force from a pump station.

HEADWORKS: Sewer facilities for the preliminary treatment of wastewater. They remove grit and screenings before flows enter a treatment plant.

GRIT AND SCREENINGS: The solid material (including pebbles, sand, coffee grounds and coins) that is removed from wastewater prior to the treatment process. It is usually deposited in landfills.

INTERCEPTORS: Large regional sewers that collect and transport wastewater from municipal systems to MWRA sewer systems.

PEAK DESIGN FLOW: The highest volume of wastewater that can be accommodated by a sewer facility as designed. It is calculated to include the amount that would be generated if the following factors were reached simultaneously: the greatest amount of sanitary waste expected to be sent to a facility, the amount of stormwater that would be produced by a "1-year, 6-hour storm" and the highest groundwater level.

SEWAGE (OR WASTEWATER): The used water, sanitary "toilet" waste and added waste of a community that is carried away by sewers. Wastewater can also include extra water called infiltration and inflow.

SIPHON: A closed conduit that uses gravity to conduct the flow of wastewater, typically built to cross beneath rivers and streams.

SLUDGE: The solid material that settles out in the wastewater treatment process. Sludge is separated from wastewater at the Deer Island Treatment Plant.

SURCHARGES: The stalling of wastewater flows that can occur when infiltration and inflow fill sewer pipes beyond their design capacity. Surcharges are not backups; the wastewater does not overflow above ground level.



MWRA offers a wide variety of informational materials on the region's water and sewer systems and the natural environment. To find out what's available,

- **CALL US:** MWRA Public Affairs Department 617-788-1170
- **VISIT OUR WEB SITE:** www.mwra.com
- **WRITE TO US:** PUBLIC INFORMATION UNIT
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