Fox Point Hurricane Barrier Facts

Background

The Fox Point Hurricane Barrier was authorized by the Flood Control Act of 1958.

The Hurricane Barrier can protect against storms that produce water 20 feet above sea level.

The Hurricane Barrier protects several hundred million dollars of Downtown property in a 280 acre area.

The central business district is located in a shallow natural basin with an elevation of 8 to 12 feet above mean sea level and is bordered by the Providence River.

Construction began in 1960 and was completed in 1966.

The total cost of the project was $16 million (1960 dollars). $4.8 million of the project cost, or thirty percent of the cost, was financed by the City of Providence and the State of Rhode Island.

Function

Two central functions:

(1) to retard high tides from potential storm surges in Narragansett Bay.
(2) to maintain river flow such that water levels do not get too high behind the barrier.

Size

3,000-foot long, 25 foot high barrier spanning from Allens Avenue to India Point Park.

Operation

The operations of the Hurricane Barrier are in accordance with the regulations prescribed by the Secretary of the Army. Today, when a hurricane reaches the 38 Longitude, a hurricane watch is effective.

The crew from the Department of Public Work gathers and the vehicular gates are closed.

Once a storm enters the Narragansett Bay, the Barrier's systems are put to use in two ways;

(1) The tainter gates are closed, providing a half mile long, 25 foot high barrier spanning from Allens Avenue to India Point Park so that high waters in the Bay do not enter the city.

(2) As the river water behind the Barrier rises, the pumps are put into action.

River Gates

The barrier's three openings

Mean sea level will rise to a maximum elevation of +35 feet,

The tainter gates are 40 feet square, weigh 53 tons, and curve outward toward the Bay to break the impact of the waves.

The gates descend at a rate of 1½ feet per minute, taking roughly half an hour to lower. It takes approximately 30 minutes to lower the gates which are essentially lowered by gravity. It takes about two hours to raise the gates.

The maximum vertical clearance when the gates are elevated is 25 feet above mean sea level.

Each gate weighs approximately 112,000 pounds and require three horsepower to lift.

They are lowered and raised by electrical motor driven hoists or manually, if necessary.

Pumping Station

The pumps each require 11,000 volts of electricity to start the motors.

The pumping station, located between the west bank and the center of the river, is 68 feet above mean sea level. The station is a reinforced concrete substructure with brick superstructure. It is 213 feet long and 91 feet wide.

Two independent electrical lines, A and B, run into the opposing east-west ends of the control room. The A line operates the canal gates and the first and second pump, and is located on the west side of the building. The east side line, the B line, controls the river gates and the remaining pumps. Only one line is necessary, while the other is a back-up.

The operating floor, occupying most of the interior, houses five vertically mounted axial flow 119-inch pumps which keep the river water from backing up when the river gates are down.

The five pumps are each 20 feet in diameter and 54.7 feet high and have a combined capacity of 7000 cubic feet squared. The pumps are General Electric pumps, powered by a 4,500 horsepower motor that turns a 137 ton impeller pump 150 times a minute.

Each pump is capable of lifting 630,000 gallons of water per minute. Together they have a capacity of 3,150,000 gallons per minute. Each pump is also equipped with hydraulically operated backwater closures, designed to prevent reverse flow of river water.

Dikes

Two long rock and earth dikes each span the east and west banks of the Providence River, parallel to the Narragansett Bay shoreline. Composed of armor steel, rolled earth

fill faced with a rock shell, the dikes extend to where the land is 25 feet above sea level - high enough to contain a storm surge.

They range between 10 and 15 feet high to provide protection from tidal waves.

Penetration in the dike exists only at the points of the vehicular gates (see below) and at Benefit Street which may be closed with sandbags in the case of an emergency.

From the east abutment, an earth-cored rip rapped 800 foot dike extends in a northeast direction toward the toe of a hill rising to a maximum elevation of 200 feet above mean sea level. At the abutment, on lot #16, plot #18, the dike is 17 feet above ground level and has a base width of about 80 feet. The dike severs South Main Street and continues along lot #40, tapering to a height of 11 feet and a base of 60 feet. A concrete land wall continues to the intersection of Tockwotton and Traverse Streets, crossing lot #94 and damaging lots #135, #152, #236, and #238.

The 1200-foot west dike begins on the property of the electric company (lots #145, #96, and #185) with an 80-foot base and 15 to 17-foot height. The dike continues in a westerly direction for 400 feet and then curves south toward Allens Avenue, severing Commercial Street and rounding a 136,000 Bbl fuel oil storage tank. The dike cuts the southeast corners of lots #267 and #11, runs parallel for 160 feet along Allens Avenue, and then turns west 90 degrees to span the right-of-way flood gates. This cuts 35 feet off of the northwest corner of lot #243. As the west side of Allens Avenue, the dike severs the southern portion of lot #191.

Vehicular Gates

Located where Allens Avenue and South Main Street intersect with the dikes, two vehicular gates provide a passageway.

During a flood these steel swing gates may be closed and sand bags are used to seal them completely. The structural steel gates are supported by reinforced concrete abutments.

The gates at Allens Avenue are 13 feet high and 76 feet wide, but has a clear opening of 67 feet.

The top elevation is 25 feet above mean sea level while the sill elevation is 12.25 feet above mean sea level.

The South Main Street vehicular gate has a clear opening of 41.5 feet, a tope elevation of 25 feet above mean sea level, and a sill elevation of 14 feet above mean sea level. The structure is similar to the gate at Allens Avenue.