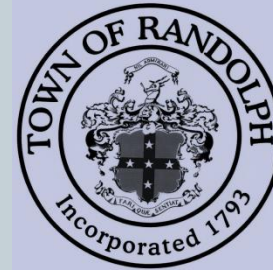
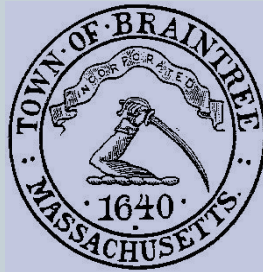


# Tri-Town Water Treatment Plant



## PROJECT INTRODUCTION



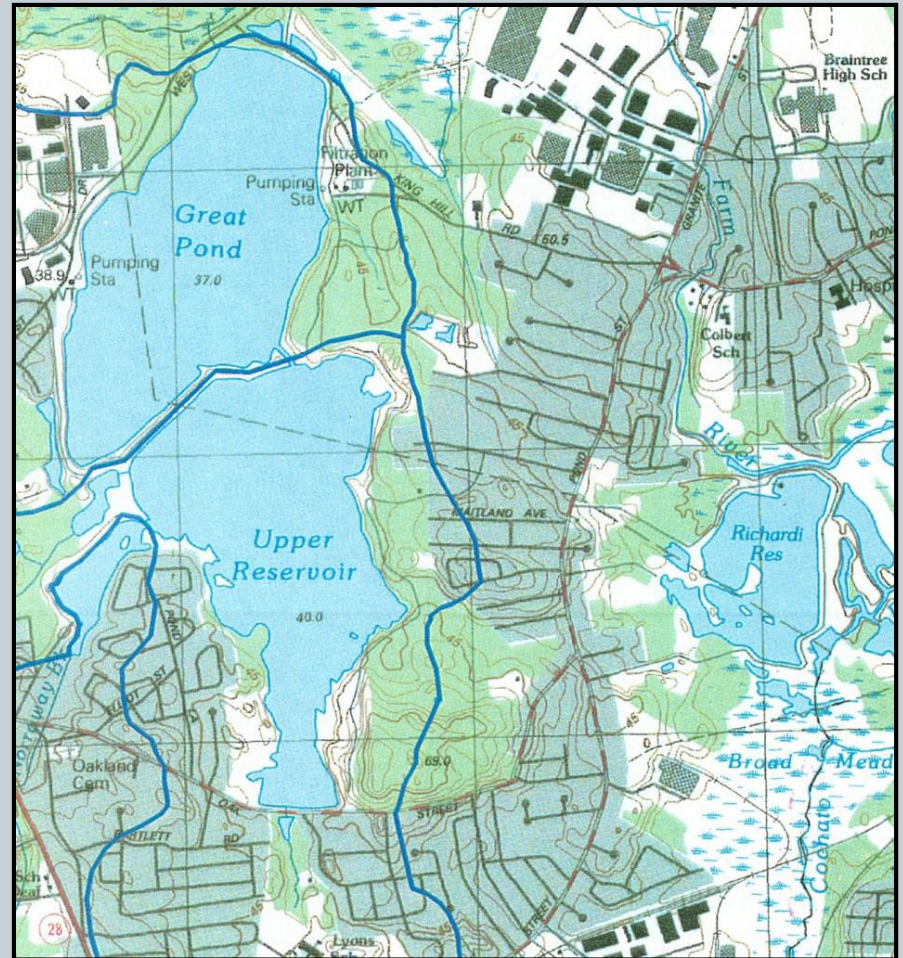
# Background:



- **Braintree:** The Great Pond Water Treatment Plant
  - Constructed in 1935 (Expanded several times)
  - Maximum capacity: 6.2 mgd
  - King Hill Road Braintree
- **Holbrook/Randolph:** Shared Water Treatment Plant which also draws its water from the Great Pond
  - Constructed in 1888
  - Converted to water treatment plant in 1936
  - Maximum capacity: 6.0 mgd
  - Pond Street Randolph

# Water Source: Great Pond

- Capacity: 1.77B gallons
  - Increased by 150 mg due to Bathymetric Survey conducted in 2011. Approved by the DEP
- Water supplied from:
  - Upper Reservoir
    - ✦ Narroway Brook
  - Lower Reservoir
  - Richardi Reservoir
    - ✦ 350 million gallons
    - ✦ Farm River



# Regional Plant Cost Estimate:

## Capital Cost (as of 9/16)

**Total Cost Design/Build**  
**\$50,000,000**

### Cost per Town:

- Braintree (50%): \$25,000,000
  - Holbrook (16%): \$8,000,000
  - Randolph (34%): \$17,000,000
- Total: \$50,000,000

*Note: Additional water line costs for  
Holbrook/Randolph: \$2-3 million*

## Operating Costs (Est/FY18)

**Annual Operating Costs:**  
**\$2,208,161**

### Cost per Town Based on Usage\*:

- Braintree (50%): \$1,104,080
  - Holbrook (11%): \$242,897
  - Randolph (39%): \$861,183
- Total: \$2,208,161

*\*Cost per Town to be based on  
Metered Usage*

# Estimated Schedule:

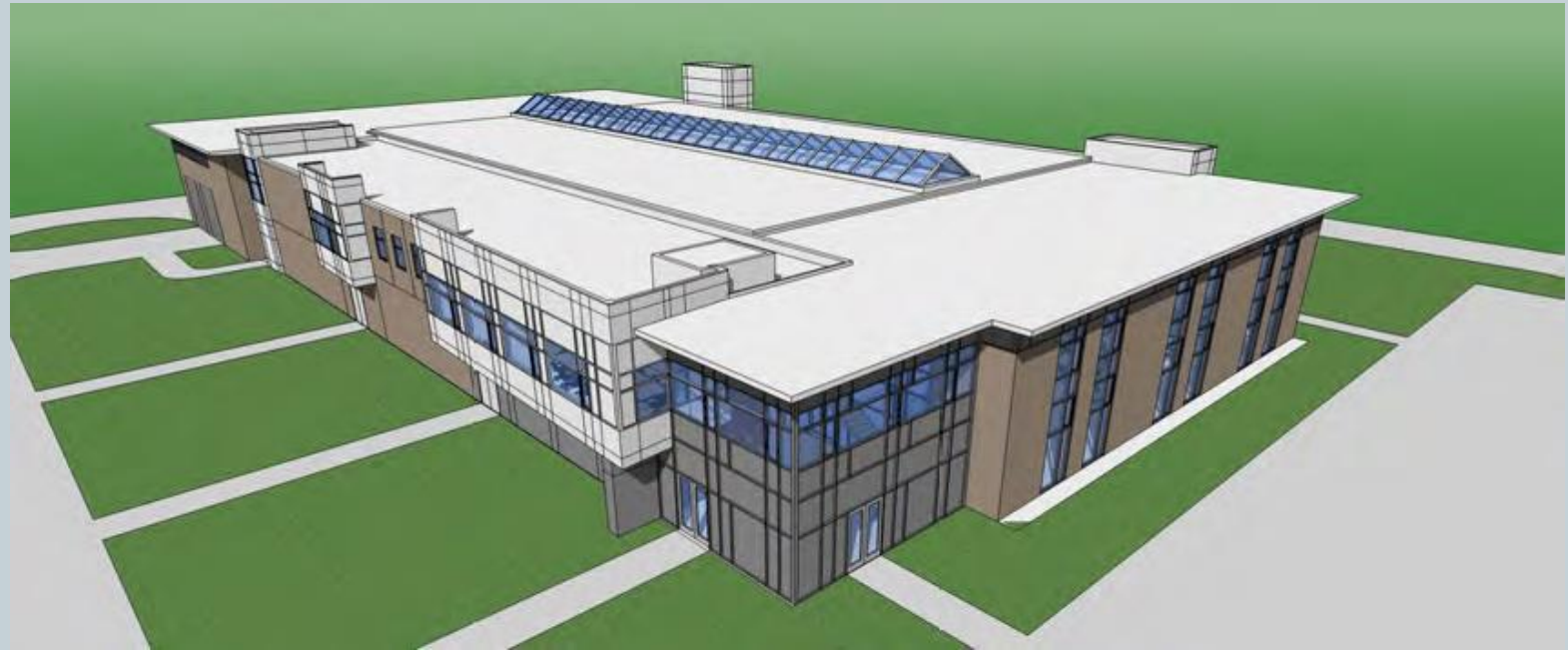


- OPM advertisement November, 2017
- Select Owners Project Manager (OPM) January, 2018
- Designer advertisement February, 2018
- Select Design firm May, 2018
- Finalize design & Specifications December, 2018
- Advertise the bidding of construction February, 2019
- Low bidder selection May, 2019
- Start Construction July, 2019
- Complete Construction September, 2021
- New Water Treatment Plant in service November, 2021

# Site Plan:



# Profile of building:



# Layout of Building:





# Design characteristics:



The preliminary design of the plant was based on the Great Pond Reservoir Pilot Study Report which was Submitted to the DEP on April 23, 2004. The original recommended design criteria was as follows:

- In-Line Mixing: Static Mixer – 1 to 2 seconds (for pre-oxidant)
- Pre-Oxidation: Contact Tank – 5 minute detention time
- Rapid Mixing: 30 seconds (for coagulant)
- Flocculation: 20 minutes (dual stage, variable speed)
- Dissolved Air Flotation: Loading Rate 8 gpm/sf; Recycle Flow 12%
- Granular Activated Carbon Filters: Loading Rate: 5 gpm/sf 4 ft of 8x30 mesh carbon and 6 in. or filter sand
- Filter Clearwell/CT Basin: Detention Time – 42 mg/L . min (CT required)

The chemicals and recommended design dosages are summarized below:

- Primary Coagulant Al<sup>+3</sup>] Polyaluminum Chloride 65-75 mg/L (as product) [2.7 mg/L to 3.7 mg/L as
- Coagulant Aid Cationic Polymer 0.2 mg/L (winter only)
- pH Adjustment (Raw Water) Potassium Hydroxide 9.0 mg/L (winter only)
- pH Adjustment (Finished Water) Potassium Hydroxide 10.0 mg/L (year round)
- Pre-oxidation Potassium Permanganate 1.5 mg/L
- Disinfection Chlorine Gas 3.5 mg/L
- Corrosion Inhibitor Orthophosphate 4.0 mg/L

# Distribution System:

## Infrastructure Specs

### Water Line Mileage

- Braintree: 160
- Holbrook: 50
- Randolph: 100

### Holding Tanks

- Braintree: 4
- Holbrook: 2
- Randolph: 2

## Water Treatment

### Disinfectant

- Both plants use chlorine

### Corrosion Control (regulate pH)

- Braintree: Sodium Hydroxide
- Holbrook/Randolph: Lime

# Distribution System:



- Currently separate distribution systems
- Tri-Board communities have completed a hydraulic modeling review.
  - Region-wide efficiencies being explored
  - Integration in some areas under review
- Emergency Conditions: Water can be obtained from Quincy, the MWRA through formal agreements, and other Municipal interconnects.

# Summary:



- Better quality drinking water
- A single state of the art facility replacing two antiquated and costly facilities
  - Consolidation Efficiencies
- Fully Automated allowing for remote troubleshooting