

PEQUONNOCK RIVER / TWIN BROOKS PARK
FLOODING EVALUATION

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MMI #3247-01

Prepared for:

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1.0 INTRODUCTION

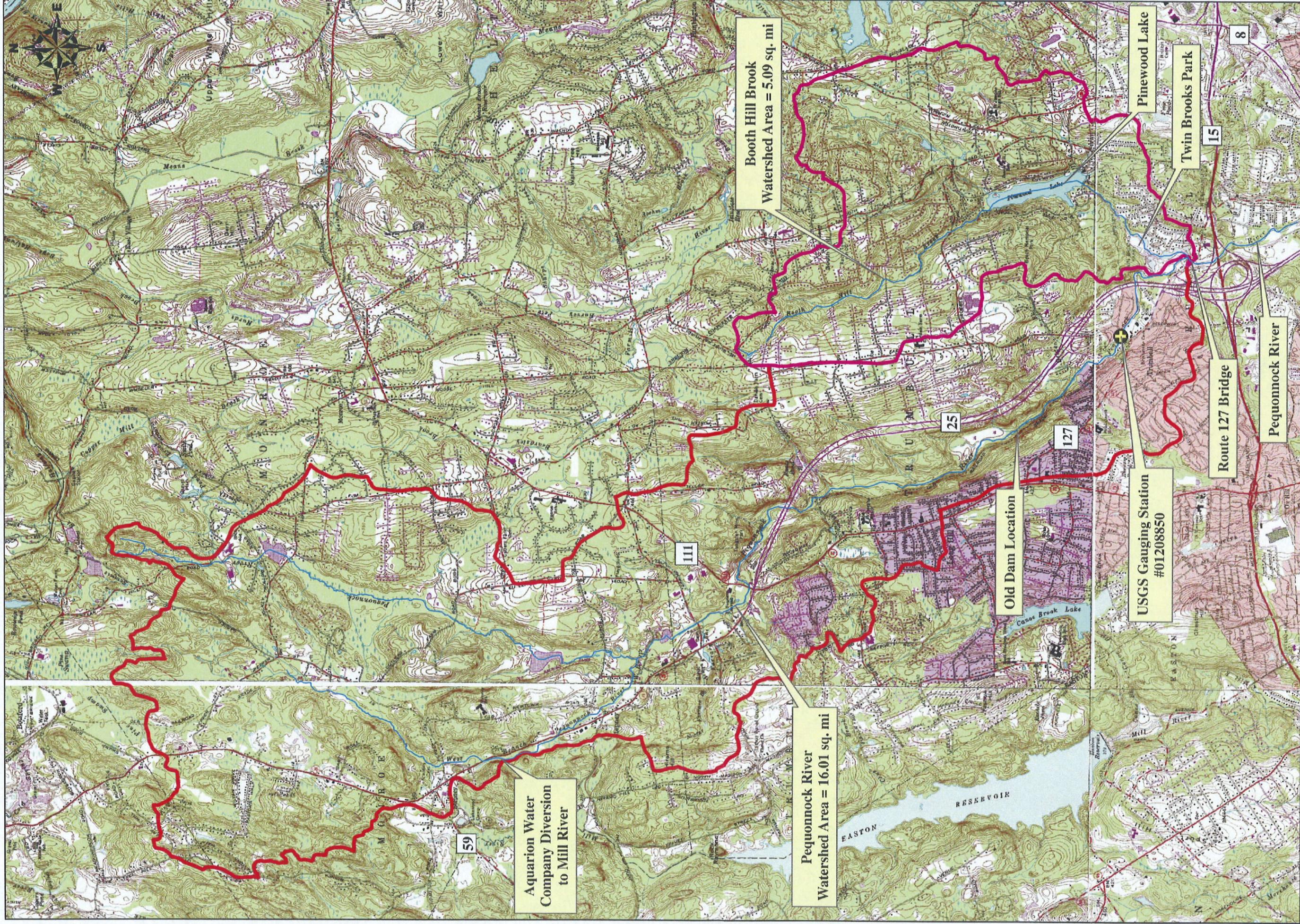
1.1 General Background

The Town of Trumbull (Town) contracted Milone & MacBroom, Inc. (MMI) to analyze flooding along the Pequonnock River at Twin Brooks Park. This watershed was chosen for analysis because of chronic flooding problems in residential and recreational areas near the confluence of the river with Old Sawmill Brook (a.k.a. Booth Hill Brook) in addition to the Trumbull town center. The confluence of these two watercourses is approximately 200 feet upstream of the Route 127 bridge, and the total watershed area to this location is 21 square miles. Critical flood levels in the Twin Brooks Park area are shown in Table 1. These elevations define the elevations at which flooding of critical structures and locations are flooded and, therefore, define target water surface elevations for the proposed improvements. Figure 1 is a project location map.

TABLE 1
Critical Elevations in Pequonnock River

Elevation (feet, NGVD29) from Trumbull Town Topography	Flood Level Implications
86	Overtopping of ponds
90	Brock Road overtops
90	Majority of park flooded
92	Nearby yards flooded
94	Homes flooded
98	Equivalent to the 100-year flood in FEMA FIS study, major flooding of area

Notes: NGVD29 = National Geodetic Vertical Datum of 1929



Aquarion Water Company Diversion to Mill River

Pequot River Watershed Area = 16.01 sq. mi

Booth Hill Brook Watershed Area = 5.09 sq. mi

Old Dam Location

USGS Gauging Station #01208850

Pinewood Lake

Twin Brooks Park

Route 127 Bridge

Pequot River

MILONE & MACBROOM[®] Engineering, Landscape Architecture and Environmental Science 99 Realty Drive Cheshire, Connecticut 06410 (203) 271-1773 Fax: (203) 272-9733 www.miloneandmacbroom.com	USGS Location Map		LOCATION: Trumbull & Monroe, CT
	MMI#: 3247-01-1 MXD: H:\fig1-Overview.mxd SOURCE: CT DEP	DATE: Oct. 2007 SCALE: 1" = 3,500'	SHEET: Figure 1

A dam was historically located on the Pequonnock River upstream of Twin Brooks Park, and it has been assumed that this dam provided some flood control benefit. This structure breached in the 1930s (based on a review of historic aerial photographs), and public perception has held that flooding has worsened since that time. The purpose of this analysis is to evaluate the benefit of replacing this structure to provide flood storage.

1.2 Preliminary Data Collection

The initial phase of work completed by MMI consisted of collection and review of available data. Field investigation was completed to evaluate the channel and existing storage areas to develop the watershed model. The following tasks were performed to define existing watershed conditions:

- Copies of Flood Insurance Study (FIS) for the town of Trumbull and the town of Monroe, as developed by the Federal Emergency Management Agency (FEMA), were obtained and reviewed.
- The Town, as well as the town of Monroe, provided copies of topographic information which MMI geo-referenced with other Geographic Information System (GIS) data to provide base mapping for use in the subsequent analyses.
- GIS information was obtained from the public geographic information system database, including soil types and land use for use in the hydrologic modeling.
- The watershed was explored to evaluate potential storage areas available as an alternative to the former dam site.

1.3 Rainfall Patterns

In recent years, a noticeable change has occurred in both weather and precipitation patterns in New England. Scientific models suggest that the rate of evaporation will increase as the climate warms due to the effects of global warming, which will in turn increase global precipitation. Precipitation is projected to show little change in spring, increase by 10% in summer and fall, and increase by 30% in winter. The amount of precipitation on extremely wet or snowy days in winter is likely to also increase. Since the precipitation increases are not projected to be linear over the course of the year, it is expected that when storm events occur larger rainfall amounts will be recorded and at higher intensities than in the past. As Figure 2 shows, the annual precipitation measured in Connecticut increased by 10 to 11 inches between 1890 and 2004. The additional rainfall translates to increased flooding for many Connecticut communities.

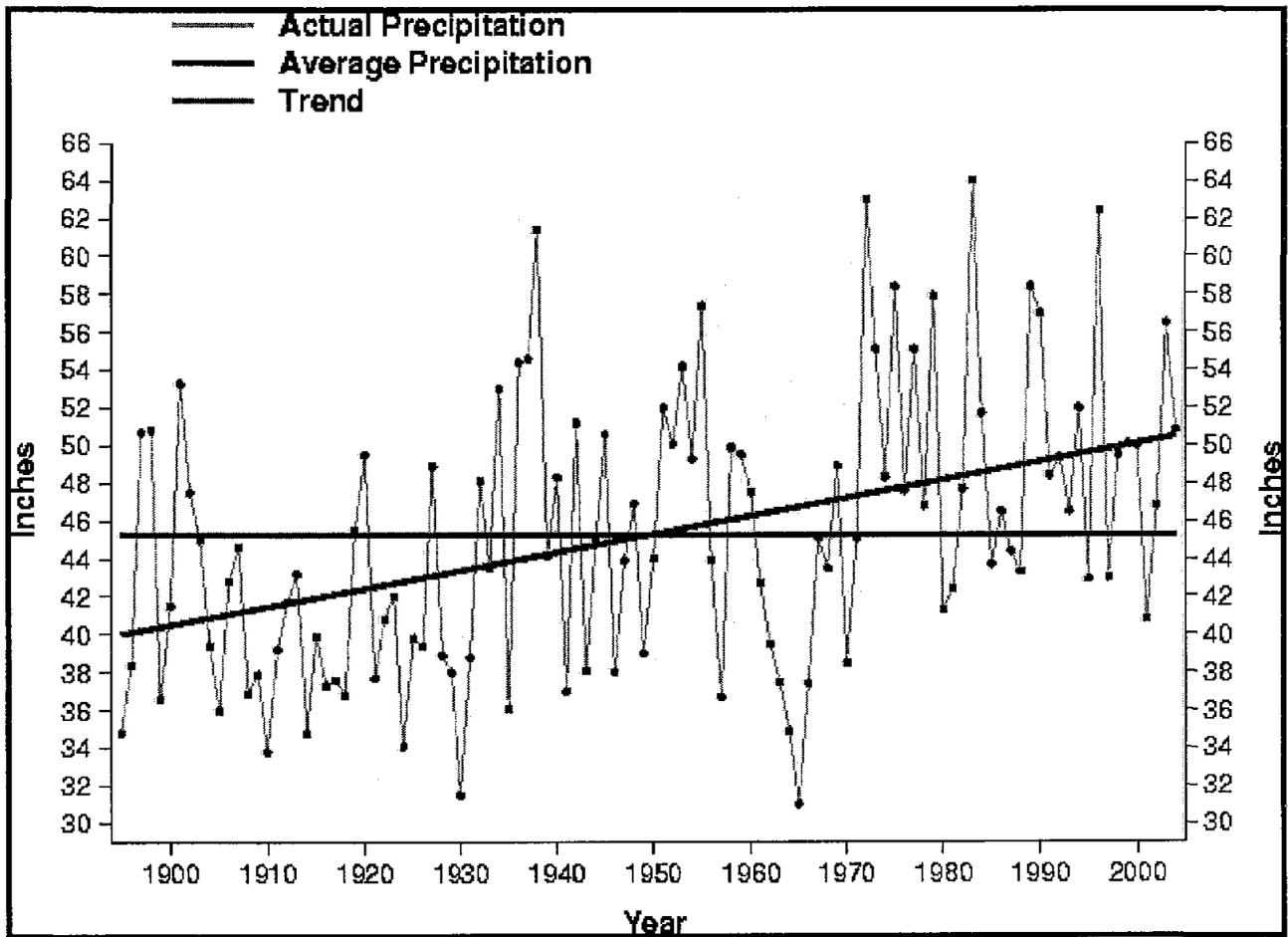


Figure 2: Connecticut Rainfall Trends - 1890 to 2004

1.4 FEMA Study

The FIS for the Town of Trumbull is dated December 1997. This was an update of the original FEMA study completed in 1979. Flow rates for the 1979 study were determined using discharge frequency curves developed by the U. S. Army Corps of Engineers. It appears that these flow rates were used again for the 1997 update, with no modifications to account for increased development that may have occurred in the watershed. In addition, we note that the 1997 update does not reflect channel modifications as well as the addition of nine bridges that occurred between 1979 and 1997. Based on these two factors (outdated hydrology and lack of detailed hydraulics), the regulatory floodplain developed for the Pequonnock River may not reflect actual flooding limits.

It should be noted that there is a discontinuity in the FEMA analysis of the Pequonnock River with no detailed analysis performed between an area east of Valley View Road and Whitney Avenue. Through this reach, the floodplain limit is approximated.

The profile of the Pequonnock River contained in the FEMA study indicates that the Route 127 bridge passes the 10-year flood event but is overtopped in larger, less frequent floods. During a 25-year flood event, an estimated three feet of head loss is predicted in the river due to this undersized bridge, meaning that the water surface elevations upstream (in the park) are three feet higher than on the downstream side of the bridge. This backwater effect would increase flooding at Twin Brooks Park.

It should be noted that flood control improvements are often referenced against the elevation of the 100-year return frequency storm event or, in other words, a storm with a one percent chance of occurrence in any given year. This is the standard of flood control that has been established by the FEMA. However, in some instances, protection of structures and existing facilities to the 100-year storm is not possible. In these instances, when the facilities in question are not critical resources such as schools and hospitals, providing a lower standard of flood protection such as for the 10-year return frequency event (10 percent chance of occurring in any given year) may be sufficient. For the purposes of this analysis, the 2-, 10-, 25-, 50-, and 100-year events were evaluated.