

**MINUTES  
TOWN OF DARIEN  
BOARD OF SELECTMEN  
REGULAR MEETING**

**August 4, 2014**

A regular meeting of the Board of Selectmen was held on Monday, August 4, 2014. In attendance were First Selectman Stevenson, Selectmen Marks and Tierney. Also in attendance was Town Administrator Karl Kilduff. Selectmen Hall and Nielsen were absent.

**CALL TO ORDER**

First Selectman Stevenson called the meeting to order at 7:01 p.m.

**FIRST SELECTMAN'S REPORT**

First Selectman Stevenson thanked Selectmen Nielsen and Marks for their recent role as Acting First Selectmen.

The opening of the Mather Center on July 21 was reported with an emphasis on new memberships, increased participation in program offerings and positive feedback from users of the space. A public grand opening is still planned for the end of September.

First Selectman Stevenson noted and distributed a memorandum (attachment) from Milone & McBroom which responded to the additional level of review requested associated with the FEMA Letter of Map Revision. Milone & McBroom was authorized to release the memo to the professional engineer hired by a resident. The First Selectman read the opening paragraph of the memo in the record.

**TOWN ADMINISTRATOR'S REPORT**

The Town Administrator reported that he would have the pay plan for department heads for the Boards approval at the next meeting. He also reported that work is on-going with the new Public Works Director to identify a path forward for handling facility maintenance. Finally, he responded to Selectman Tierney's prior request for transfer information that it would be available in September when the fiscal year is closed and transfers are complete in August.

**PUBLIC COMMENT**

Flora Smith, 42 Hamilton Lane, spoke in regard to the process behind the FEMA Letter of Map Revision. She felt that the tributary near her property was not taken into consideration and there was very little time left to respond to FEMA. She stated that she had two engineers look at the data and cannot understand how two engineers could be wrong in light of the memo from Milone & McBroom. She concluded by stating that the way the public was dealt with was unfortunate.

Draft to be Approved by BOS

Board of Selectmen Minutes

August 4, 2014

First Selectman Stevenson stated that the Town stood behind the professionalism of the firm hired by the Town and the firm used by Ms. Smith. The Town responded to taxpayer requests by performing an additional analysis. She added that Darien has not had a 100-year storm since the 1950s, however, FEMA requires mapping to the 100-year event. The Town would not ask FEMA to revise the map beyond what has been proposed as the level of work has been substantiated multiple times

**NEW BUSINESS**

a) Transfer

**Administrative Officer – Support Services**

RESOLVED:

That the following transfer of appropriations is approved for referral to the Board of Finance:

From: [redacted]

To: [redacted]

Acct. No.	Account	Amount		Acct. No.	Account	Amount
10102021-82016	Mailing	\$8,721		10102021-82024	Copy Equipment	\$8,721
	TOTAL	\$8,721			TOTAL	\$8,721

Mr. Kilduff explained to the Board that the transfer was needed to cover increased costs for copiers. The line item pays for the lease payment which is fixed and the cost for prints which is variable. The number of copies made in a given year can be unpredictable. It was a matter that the new copier lease should resolve as it will include an allowance of copies and a lower lease payment.

Mr. Tierney moved the motion, seconded by Ms. Marks. The motion passed on a 3-0 vote.

**AGENDA REVIEW**

First Selectman Stevenson noted that the Board will receive a report from the Board of Education Central Office/Mather Center Building Committee on September 8, 2014.

**APPROVAL OF MINUTES OF PREVIOUS MEETINGS**

The Board tabled action on the minutes for the regular meeting of July 21, 2014 as there were insufficient members in attendance to approve the minutes.

**ADJOURNMENT**

Mr. Tierney moved, seconded by Ms. Marks, to adjourn the meeting at 7:14 p.m. The motion passed unanimously.

Respectfully submitted  
Karl F. Kilduff  
Town Administrator

## MEMORANDUM

TO: Jayme Stevenson, First Selectwoman, Town of Darien  
Jeremy Ginsburg, Planning and Zoning Director, Town of Darien

FROM: Nicolle E. Burnham, P.E., CFM, Principal  
Jessica Louisos, P.E., Lead Project Engineer  
Milone & MacBroom, Inc.

DATE: August 4, 2014

RE: Goodwives River Floodplain Modeling and Mapping  
Hamilton Lane Area  
Darien, Connecticut  
MMI #1581-05-7

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At the request of the Board of Selectmen, Milone & MacBroom, Inc. (MMI) has reviewed the modeling of Goodwives River near Hamilton Lane. We have also reviewed comments and additional information provided by Redniss & Mead (R&M) on behalf of a property owner in this area. This memorandum documents how MMI's model was developed, provides the results of our review of the information provided by R&M, and ultimately supports the results of our original modeling as technically sound and consistent with Federal Emergency Management Agency (FEMA) practices and methodologies.

### *We Walked the Channel from Bottom to Top.*

MMI was contracted in 2008 by the Town of Darien to perform a series of flood studies for the town. Goodwives River was selected as the second study watershed (after Stony Brook) due to a history of chronic flood complaints from residents along the river.

As part of the study, field observation of the river and watershed was completed by MMI, specifically by the person who went on to complete the hydraulic model that is the subject of current discussions. During the field observations, in-channel conditions were assessed and photographed by walking in or along the river from Rings End Road upstream to Salisbury Road. The purpose of this detailed field investigation was to develop firsthand knowledge of the river and its floodplain. The data collected was used as the basis for the hydraulic and hydrologic modeling. Additional investigations of the floodplain areas outside of the immediate river channel were collected by car. The site investigations are fully documented in the report entitled "Watershed Evaluation of Goodwives River" dated September 17, 2010.

### *We Used Detailed and Current Information to Develop our Models.*

In its most basic terms, hydrology tells us how much water is generated from a specific rain event. This is based on watershed size, land use, soil types, and topography, among other things. Hydraulics tells us how deep and how fast the water will be during those specific rain events. Hydraulic modeling is based on the shape and slope of the river channel area that is below the normal water elevation, as well as the overbank (aka floodplain).

For Goodwives River, MMI first obtained the hydraulic model that was used by FEMA to define the Goodwives River floodplain as shown on previous floodplain maps. The FEMA model data was reviewed and compared to current field conditions. This included considering the channel shape, as well as the size and shape of roadway culverts and bridges. In some areas, FEMA cross sections were observed to be consistent with current field conditions. In other cases, when MMI observed field conditions that were different from the model, the differences were noted. In still other locations along the river, MMI felt that additional cross sections needed to be added to accurately represent field conditions.

Once MMI had determined where updated or new cross section information was needed, our survey crews performed fieldwork under the guidance of a licensed land surveyor to determine the elevation of the areas in the riverbed that are normally below water. This work is done by walking the channel and using standard survey equipment.

The overbank, or floodplain, elevations were determined using topographic data provided by the Town of Darien. The town's topographic data was prepared by James W. Sewall Company of Old Town, Maine and depicts elevations at 1-foot contour intervals, roadways, buildings, tree lines, and other features. The topographic data prepared by Sewall meets the National Map Accuracy Standards (NMAS) for 1" = 40' with 1-foot contours. In simple terms, the topographic mapping is highly accurate and exceeds FEMA's minimum standards for floodplain mapping.

Cross-section data used by MMI was a combination of our own in-house survey data and the topographic data provided to the town by Sewall.

#### ***Past FEMA Studies and Mapping are Outdated.***

The original FEMA study for the Town of Darien was published in July 1980. The Goodwives River floodplain in the 1980 study was based on hydrology and hydraulic analysis completed in 1978. The next mapping update on the Goodwives River was in June 2010 when the Fairfield County Flood Insurance Study was issued. **The 2010 and 2013 FEMA studies provided updated mapping of the floodplain, but the new mapping was based on the engineering analysis from 1978.** In June 2013, the Fairfield County Study was reissued with new coastal engineering analyses. In other words, the only changes between 2010 and 2013 were along the coastal areas of the town.

#### ***Flood Risk is Increasing throughout the Northeast.***

Floodplain modeling, by definition, assesses the risk associated with catastrophic events. While Connecticut has experienced some significant rain events in recent years, in Darien none of these has been a so-called 100-year or 1 percent annual chance event. The largest event in recent memory occurred on April 16, 2007, where 5.9 inches of rainfall was recorded in the Darien area. A 100-year event, which is the basis of floodplain modeling and mapping, would deposit in excess of 8.0 inches of rain. Historic records suggest that a storm of this magnitude has not occurred in Darien since the 1950s.

Rainfall and river flows have increased regionally with trends toward larger and more frequent storms (Collins 2009)<sup>1</sup>, specifically with steep increases in flood magnitudes after 1970. Changes in land use, increases in rainfall intensity, and more detailed information all suggest that the hydrology developed in 1978 and used for the 2013 FEMA floodplain mapping is outdated and underestimates flood risks. As part of our study work, MMI developed updated hydrology that reflects the current rainfall and land use trends for this watershed.

*FEMA Reviewed and Approved our Modeling.*

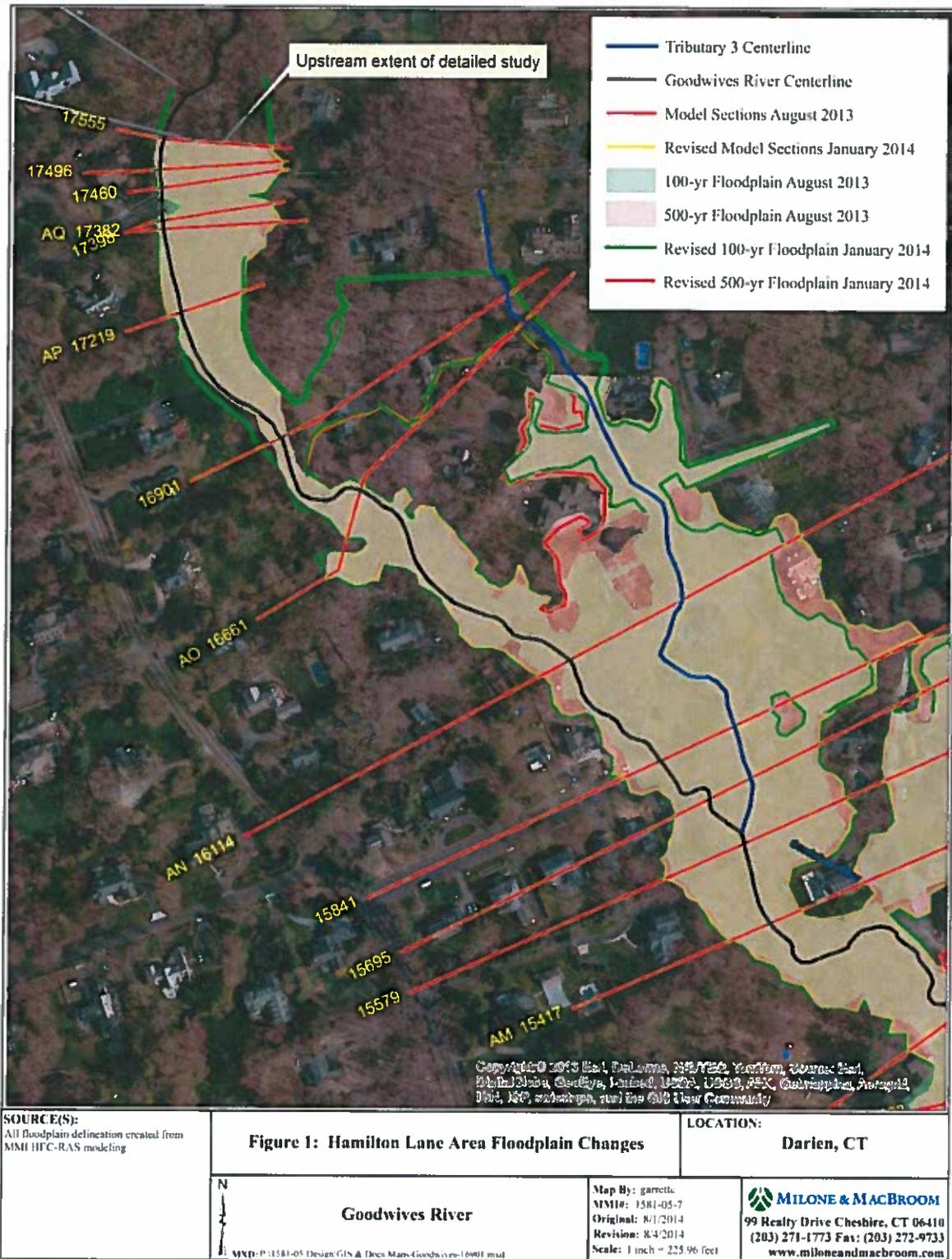
The Town of Darien via MMI first submitted the updated study information to FEMA for review in August 2013. FEMA reviewed the application materials and on September 12, 2013 returned comments and asked for some revisions. Among its comments, FEMA specifically asked: "Please add more cross sections in areas where there is a change in channel geometry, such as between cross sections 17219 and 16661." FEMA provided specific guidance, stating that cross sections must be drawn perpendicular to the contours and flow line and must not contain multiple bends. MMI added cross section 16901 (immediately upstream of Hamilton Lane) to the model at that time. This cross section was developed using available channel data and topographic data from the Sewall mapping.

Through its comments, FEMA dictated the way cross section 16901 is drawn across the floodplain and prompted the left overbank (when facing downstream) portion of the cross section at river station 16661 to also be adjusted in the Hamilton Lane area.

Cross section 16901 provided critical additional detail at a location where the river channel is narrow. The additional detail dramatically changed the extent of the floodplain in this area. Figure 1 shows the Hamilton Lane area floodplain boundaries as submitted to FEMA in August 2013 and the revised floodplain following the addition of cross section 16901 in January 2014. FEMA reviewed the modifications to the model and mapping and ultimately approved the submission.

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<sup>1</sup> Collins, M. J. (2009). "Evidence for Changing Flood Risk in New England Since the Late 20th Century." Journal of the American Water Resources Association 45(2): 279-290.



***Modeling in the Hamilton Lane Area Appropriately Represents Flood Risk.***

Residents have raised questions regarding the proposed floodplain in the Hamilton Lane vicinity, and the Town of Darien subsequently asked MMI to reexamine that area. After extensive review of the modeling, it is MMI's opinion that the proposed floodplain boundaries accurately show the flood risks in the Hamilton Lane area. This is based on the following, each of which is supported below:

1. The area in question appears to have historically been wetland and floodplain.
2. The modeling methods used for the main stem and, by extension, the tributary, in this location are based on sound engineering practice.
3. The R&M questions and comments are not consistent with the modeling methodology used throughout the watershed.

**Historic Mapping**

The Connecticut State Library website provides aerial photographs of the state starting in 1934 to the present day. Figure 2 depicts the 1934 photograph of the Hamilton Lane area. Goodwives River can be seen as the darker line running from upper left to lower right in the photo. The road to the north is Buttonwood Lane. West (left in the photo) of Goodwives River is a series of structures and farmland. An open field is shown in the center of the photo to the right (or east) of Goodwives River. Within the triangular-shaped wooded area between Goodwives River, Buttonwood Lane, and the farm field, we can see the watercourse that runs through the present-day Hamilton Lane area. Aside from the visible watercourse, the fact that the area was undeveloped suggests that it likely was wetland and not suitable for farming.



Figure 2. 1934 Aerial Photograph of Hamilton Lane area

### Modeling Methods

MMI reviewed the geometry and roughness values of the cross section added at 16901 for consistency with other model cross sections and correctness. This cross section and the methodology with which it was developed followed accepted FEMA techniques.

The tributary (denoted as Tributary 3 on our reporting and mapping) in the Hamilton Lane area was examined during the field walk prior to modeling and determined to not be a significant flooding source that would necessitate a separate FEMA study. If Tributary 3 had been determined to be a separate flooding source, MMI would have recommended to the Town of Darien that a detailed study be completed.

Goodwives River at station 16901 is not large enough to carry the entire 100-year or 500-year flow. This is common in river systems and is why floodplains exist. FEMA modeling protocols require that cross sections extend across the floodplain to the point where the entire flow is contained within the floodplain. In the case of cross section 16901, the cross section must extend across the floodplain at Hamilton Lane to include Tributary 3. This extends the 100-year and 500-year floodplains to include that area of the overbank near Hamilton Lane as shown on Figure 1 included in the floodplains labeled January 2014.

### R&M Modeling Comments

The left (when facing downstream) overbank in the vicinity of Hamilton Lane at cross section 16901 is modeled as an ineffective flow area. In its simplest terms, ineffective flow is low velocity, ponded area that is out of the main flow path; however, water would still reach that area and cause flooding at a lower velocity. MMI chose to model that area as ineffective because we understand that the full flow and velocity of the water from Goodwives River would not be in the left floodplain area. We expect that flow in this overbank would consist of some overflow from the tributary and some overflow from the Goodwives River main channel.

We have received comments from R&M questioning the use of ineffective flow at cross section 16901. The R&M report suggests that modeling this area as "effective" flow, meaning the floodwater will have velocity and direction, would reduce the water surface elevation. While it is true that this modeling change would reduce the water surface elevation, we do not agree that this is an effective flow area and believe modeling it as such would underestimate flood risk. It is not appropriate to assume that the overbank area has the full effective flow at the same velocity as the main channel.