

## **Opponents' Exhibit 8: Increase in Flood Velocity**

The Map Change will disturb more than 6 acres, which are surrounded by water on three (3) sides, and will increase the hazard of coastal flooding through significant alteration of shoreline configurations (taller structures; also see proposed designs for new home - larger footprint, use of fill etc.) within a high velocity flood zone.

The attached March 3, 2014 Memorandum from Roberge Associates, Coastal Engineers, LLC, confirms that the resident can expect increased hazard flooding if this Zoning Application is approved. The Memorandum states that:

When a wave hits a vertical, impermeable, rigid surface, essentially all of wave energy will be reflected from the wall (Veri-Tech 2003). Reflected waves can be super imposed on the oncoming wave train, essentially doubling the height of the wave. This can have a significant influence on the resulting BFE and the energy that is reflected onto neighboring properties.

**Before any variance or zoning map district changes are considered the actions that need to be taken in order to mitigate coastal and upland flooding must be identified and understood for the safety of all.**

**Further, increasing the zoning height and adding a half story for coastal properties will (i) increase flood heights and velocities and (ii) divert flood waters and increase flood hazard to other lands. This in all likelihood will be the case if the prior footprint and height and bulk of the new residence at 74 Saddle Rock Road are increased as the Applicant's apparently intends to do.**

Further flood engineering design and decisions are currently too closely linked with FEMA insurance policy decisions. The homeowners in the Coastal A Zone area of the City of Stamford need scientifically based recommendations that focus on the actual risk to such homeowners, not minimum standards. The Coastal Construction Manual (CCM), currently considered the best practice available, provides code-plus design recommendations, but these best practices are not required to be followed in Stamford. Further, the CCM does not account for simultaneous high tides and peak surges which (I believed) accounted for a significant amount of the damages in the Coastal A Area proposed to be rezoned.

The primary goal of the Zoning Board and other boards and commissions for this Coastal A Zone should be to improve the understanding of coastal flooding in the changing environment and to provide guidance to homeowners and others to consider increased mitigation and adaptation for buildings designed in this coastal area, not an arbitrary, unlawful map change proposed by a conflicted resident.

## MEMORANDUM

|                      |  |                        |                     |
|----------------------|--|------------------------|---------------------|
| <b>Project Name:</b> | Kirby Cullman Residence<br>74 Saddle Rock Road | <b>Project Number:</b> | 2013103             |
| <b>Date:</b>         | 3/3/14   | <b>Memo By:</b>        | John C. Roberge, PE |

RACE, at the request of John Kirby, has performed a review of the coastal flooding conditions that characterize the property located at 74 Saddle Rock Road as a part of the design and regulatory processes associated with the development of that site. This memorandum summarizes the opinions that have been developed by RACE regarding the potential impact of two (2) vertical walls that were included as a part of the improvements that were performed on the neighboring property located at 68 Saddle Rock Road (Murphy) in Stamford, CT. It is the understanding of RACE that the home that was located on 74 Saddle Rock Road was destroyed during Storm Sandy on October 29/30, 2012.

The Federal Emergency Management Agency (FEMA), Flood Insurance Study (FIS) No. 09001CV001B, dated July 8, 2013 shows the 100-yr stillwater elevation to be El. +10.8' (NAVD 88) and the 100-yr total water elevation to be El. +12.6' (FEMA 2013) in the Saddle Rock Road area. The 68 – 74 Saddle Rock Road sites are mapped on FEMA's Flood Insurance Rate Map (FIRM) No. 09001C0519G, dated July 8, 2013, to include a Zone VE with a BFE of +15' extending approximately 35' landward of the existing seawall and a Zone AE with a BFE of +14' for the remaining landward portion of the property. The BFE in the vicinity of the subject walls is El. +14' (FEMA 2013). An AE Zone is a flood zone with a wave height less than 3'. A VE Zone is a flood zone with a wave height of over 3'. VE Zones have a greater potential for flood induced damage due to storm-induced velocities and wave action. Damage in the VE Zone is typically greater than that of an AE Zone

The Zoning Regulations for the City of Stamford require that, "All development including, but not limited to, fill, new construction, substantial improvements and manufactured home placement shall be prohibited unless the applicant provides written certification from a professional engineer registered in the State of Connecticut that no significant increase in the base flood will result." (*Underscore by RACE*)

When a wave hits a vertical, impermeable, rigid surface, essentially all of wave energy will be reflected from the wall (Veri-Tech 2003). Reflected waves can be super imposed on the oncoming wave train, essentially doubling the height of the wave. This can have a significant influence on the resulting BFE and the energy that is reflected onto neighboring properties.

The BFE at the 68 Saddle Rock Road residence, as mapped by FEMA, is shown to be in the AE Zone at an El. +14', based on the total water level of El. +12.6'. This indicates that a wave of approximately 2' can be expected in this flood zone and potentially can impact either of the vertical walls that were built on this site. This wave could and would likely be 100% reflected and would result in a the wave height approximately 4' in height at a distance of approximately one (1) wavelength from the face of either wall, providing that there is sufficient water depth. RACE performed no assessment of grade elevations at the Murphy site to verify that the depths at the face of the wall that circles the residence would result in this potentially damaging wave reflection. However, the grades along the western property line, in the

immediate vicinity of the wall that was constructed along that property line with 74 Saddle Rock Road are sufficient to support a fully reflected wave. This wave reflection would increase the base flood elevation to approximately El. +15' (NAVD 88), in direct conflict with the requirements of the City of Stamford. This wave would also effectively increase the flood zone conditions in that area to a VE Zone, indicating potentially higher resulting damage. It is the opinion of RACE, that these walls would not likely be approved by the City under current zoning requirements.

It is our further understanding that the wall that extends along the 68/74 Saddle Rock Road property line was to include a 4" high scupper to manage potential surface water flows. While this scupper has little or no beneficial impact on wave reflection or wave energy translation, it is our understanding that the installed scupper is clogged and not functional.

RACE neither condones the past approval nor advocates removal of either of these wall structures. We look at the current situation from a flood management perspective, and recommend that you be allowed to mitigate the potential effects of these structures on the proposed improvements to the 74 Saddle Rock Road property. This might include, but not necessarily be limited to, placement of sloping fill, vegetation, earth reinforcement, and such measures on the 74 Saddle Rock Road site, or even retention and/or modification of the questionable walls so as to minimize impacts to the local BFE(s).

We look forward to developing and resolving these issues as a part of your design and approval process and remain at your disposal for discussions.



#### References:

Federal Emergency Management Agency (FEMA), *Flood Insurance Rate Map*, No. 09001C0519G. Washington, D.C., July 8, 2013.

Federal Emergency Management Agency (FEMA), *Flood Insurance Study – Fairfield County, Connecticut (All Jurisdictions)*, No. 09009CV001C. Washington, D.C., October 16, 2013.

Veri-Tech, Inc., *Coastal Engineering Manual Professional Edition*. Version 2.0, Summit, Mississippi, 2003



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**ZONING BOARD CERTIFICATE**

I, Thomas Mills, Chairman of the ZONING BOARD of the CITY OF STAMFORD, in compliance with Special Act No. 619 of the 1953 General Assembly, hereby certify that on July 8, 2013, a Public Hearing was held by the ZONING BOARD on the application of:

**APPL. 213-18 – STAMFORD ZONING BOARD**

Requesting approval to amend the Stamford Zoning Regulations, to consider amendments to Article III, Section 7.1, Flood Prone Area Regulations of the Zoning Regulations of the City of Stamford, CT. The proposed amendments will incorporate the recently updated Flood Insurance Study and Flood Insurance Rate Maps which generally show an increase in the extent of flood prone areas and an increase in the depth of flooding for properties already within a flood prone area. Other technical amendments include a definition of the Connecticut Coastal Jurisdiction Line and a change in the definition of “substantial damage” for properties with repetitive flood losses. The Zoning Board is proposing these amendments to comply with the minimum standards of the Federal Emergency Management Agency to maintain the City of Stamford’s participation in good standing in the National Flood Insurance Program.

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and that the following is a statement of its findings: UNANIMOUSLY APPROVED on July 8, 2013, by passage of the following motion:

Article III, Section 7.1, Flood Prone Area Regulations to read as follows:

**SECTION 7.1 - FLOOD PRONE AREA REGULATIONS (213-18)**

**A. PURPOSE**

The purpose of this Section is to implement comprehensive flood prone area regulations that promote the health, safety and welfare of the general public, that limit public and private property losses and diminish expenditures of public money for costly flood protection projects and relief efforts, and that minimize prolonged governmental and business interruptions. This Section is specifically intended to:

1. Regulate those uses that are dangerous to the health, safety and welfare of the public;
2. Regulate those uses that are threatened by the action of flood waters, velocity or erosion hazards or increase the potential for damages caused by increased flood heights, velocities or erosion hazards;
3. Require that uses vulnerable to floods be protected against flood damage at the time of initial construction or when substantially improved;
4. Control the alteration of natural floodplains, stream channels and natural protective barriers that act to accommodate flood waters or moderate their potentially erosive actions;
5. Prevent or regulate the construction of flood barriers that will unnaturally divert flood waters or increase flood hazard to other lands.
6. Minimize dangers to public health by protecting water supplies and natural drainage