

Panel Decision & Report

SRP MAPC051914 - Plymouth County, MA

July 10, 2015



National Institute of
BUILDING SCIENCES

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Summary

Based on the submitted scientific and technical information, and within the limitations of the SRP, the Panel has determined that the Community's (Scituate, MA and Marshfield, MA) data and methodology does not satisfy NFIP standards, therefore FEMA's data is not corrected, contradicted, or negated.

Introduction

This report serves as the recommendation to the Federal Emergency Management Agency (FEMA) administrator from the National Institute of Building Sciences (NIBS) Scientific Resolution Panel (SRP). SRP's are independent panels of experts organized, administered and managed by NIBS for the purpose of reviewing and resolving conflicting scientific and technical data submitted by a community challenging FEMA's proposed flood elevations. The SRP is charged with helping to efficiently resolve appeal and protest issues between FEMA and communities by acting as an independent third party in an effort to obtain the best data possible for the community's Flood Insurance Rate Maps (FIRM's).

Panel

Panel ID: MAPC051914
Panel Name: Plymouth County, MA
FEMA Region: I
Panel members:

- **Mr. Martin Brungard, P.E., D.WRE**, Senior Project Manager, DLZ Corporation, Indianapolis, IN.

Mr. Brungard has over 29 years of experience in engineering consulting. He holds advanced degrees in civil and environmental engineering from the University of Florida with specialization in water resources engineering. He was formerly chief coastal structure reviewer for Letter of Map Revision (LOMR) applications for FEMA where he reviewed and assessed dozens of coastal systems for wave and runup conditions. He also provided post-hurricane damage and flood assessments along the Florida Gulf coast in 2002 and 2005. He is experienced with ACES, WHAFIS, RUNUP, STWAVE, RCPWAVE, and GENESIS coastal modeling software.

- **Mr. Douglas Hamilton, P.E., D.WRE**, Foothill Ranch, CA.

Mr. Douglas Hamilton is a Civil Engineer with extensive experience analyzing and solving complex problems related to water. His areas of expertise include hydrology, hydraulics, water resources, and natural hazards. Over the course of 30 years of professional experience, he has developed and applied a wide range of analytical techniques in order to explain the hydrologic impacts of natural hazards including the effects of wildfires, landslides, and seismic activity. He is an expert in the application of sediment transport, geomorphic, and hydrologic principles to the understanding of natural systems and for the design of constructed facilities and methods to

mitigate hazards. For the past 10 years, Mr. Hamilton has been working on water projects in Iraq including Iraq's National Water Plan for 2015 through 2035.

While in the Research Branch of the Hydrologic Engineering Center (HEC) of the US Army Corps of Engineers, Mr. Hamilton was in charge of the computer program HEC-6, Sediment Transport in Rivers and Reservoirs. He has taught a number of professional courses for hydraulic and sediment transport analysis techniques. He is a cooperating partner with the Chinese Academy of Sciences, Institute of Mountain Disasters and Environment (Sichuan, China), and has served as a committee member for the National Research Council's Water Science and Technology Board and the California Governor's Alluvial Fan Flooding Task Force.

- **Mr. John Lally, P.E.**, Lally Consulting, LLC, Seattle, WA.

Mr. Lally has over 24 years of experience in coastal engineering and construction throughout the United States and Canada, South America, Asia, Africa, and the Caribbean. He has worked as a consulting engineer for approximately half of his career, and as a marine contractor for the other half. In 2007, John founded Lally Consulting LLC, an engineering and environmental consulting firm that specializes in the design and implementation of coastal engineering, waterway restoration, and dredging projects. John has performed site physical and processes analyses, oceanographic data collection, hydrographic surveys, dive surveys, planning, numerical modeling, engineering design, evaluation of alternative construction methods, production and cost estimating, contract plans and specifications preparation, procurement support, environmental compliance monitoring, project management and construction oversight for a broad range of coastal and waterway engineering projects. John is a working group member of the World Association for Waterborne Transport Infrastructure (PIANC), a member of the American Society of Civil Engineers (ASCE) Coasts, Oceans, Ports and Rivers Institute (COPRI) Dredging Operations and Navigation Engineering Subcommittees, a past president of the Western Dredging Association (WEDA) – Pacific Chapter, and a member of the Coastal, Education & Research Foundation (CERF).

- **Mr. Spencer Rogers**, Extension Specialist in Hurricane-Resistant Construction and Shoreline Erosion, North Carolina Sea Grant, Wilmington, NC.

Spencer Rogers joined North Carolina Sea Grant in 1978 as a coastal engineering extension specialist in hurricane-resistant construction techniques, shoreline erosion, coastal management and marine construction. His faculty affiliations are with the University of North Carolina at Wilmington's Center for Marine Science and an adjunct with the North Carolina State University's Department of Civil Engineering. He was previously employed by Florida Bureau of Beaches and Shores. His education includes a BS in Engineering from the University of Virginia in 1973 and a MS in Coastal and Oceanographic Engineering from the University of Florida in 1975. Recent work includes participation in FEMA's Hurricane Katrina Mitigation Assessment Team

(MAT), damage assessments for ASCE following Hurricanes Katrina and Ike, as well as damage assessment projects for the Corps of Engineers following Sandy.

- **Mr. George Sills, P.E.**, Manager, George Sills Geotechnical Engineering Consultant, L.L.C., Vicksburg, MS.

Mr. Sills is retired from the U.S. Army Corps of Engineers (Corps) where he worked for over 36 years. He has extensive experience in the evaluation, design, and construction of dams, levees, and pumping plants. George has lead several investigations into the causes and mechanisms of seepage distress along levees and has helped the Corps develop a comprehensive understanding of these issues. He has lectured and published numerous technical papers on levee seepage distress and levee design. In 2005, George was selected to serve on the Corps' Interagency Performance Evaluation Task Force (IPET) following Hurricane Katrina as a member of the Perishable Data Team and also as a member of the Performance Analysis Team. He made major contributions to these efforts and to the IPET document that summarized the team's findings. In 1999, Mr. Sills was selected as the U.S. Army Corps of Engineers "Federal Engineer of the Year" and was then selected by NSPE as one of the top ten "Federal Engineers of the Year." He has a BSCE from Mississippi State University, a MSCE from Texas A & M, and has advanced graduate work in Civil Engineering at Louisiana State University, toward Ph.D.

Basis for Appeal

By letters dated October 2, 2013 and October 15, 2013, the Towns of Scituate, MA and Marshfield, MA, respectively, submitted appeals of the preliminary revised Flood Insurance Rate Map (FIRM) issued for Plymouth County, MA by FEMA on May 1, 2013. The appeals are focused on narrow geographic locations and technical issues. In Scituate, the appeal involves areas in the vicinity of coastal transects PL-40 and PL-49 from the Flood Insurance Study (FIS). In Marshfield, the appeal involves areas in the vicinity of coastal transects PL-64 and PL-66 from the FIS.

The technical issues disputed in both appeals are the incident wave height and wave period used to compute the wave setup along those transects. Altering the wave setup alters the wave height and wave runup computed in the final Base Flood Elevations and flood zones. The appellants, through their consultant, Ransom Consulting, Inc., contend that FEMA should not use deep-water wave characteristics for these computations. The appellants contend in the Marshfield FEMA Appeal (top of page 2 from that appeal) that nearshore wave height and period should be selected "where the density of wave contours increased (suggesting breaking) and was approximately equal to one wave length out from the shore".

Data Submitted by the Community and FEMA

The following data used to generate the challenged flood elevations and the contesting data submitted by Marshfield and Scituate, MA has been provided to the Panel:

Marshfield

- Scientific Resolution Panel Request Letter, dated January 10, 2014
- Scientific Resolution Panel Request Form, dated January 10, 2014
- Appeal Data with Attachments 1 through 11, dated October 15, 2013
- Appeal Data with Attachments 12 through 19, dated October 15, 2013
- Shore profile and wave calculations, Excel file, undated

Scituate

- Scientific Resolution Panel Request Letter, dated January 9, 2014
- Scientific Resolution Panel Request Form, dated January 9, 2014
- Appeal Data with Attachments 1 through 20, dated October 2, 2013
- Shore profile and wave calculations, Excel file, undated

FEMA

- Marshfield Acknowledgement Letter, dated October 31, 2013
- Scituate Acknowledgement Letter, dated October 31, 2013
- Marshfield Resolution Letter, dated December 13, 2013
- Scituate Resolution Letter, dated December 13, 2013
- Preliminary FIRM Panels: 25023C0231K, 25023C0232K, 25023C0233K, 25023C0234K, 25023C0128K, 25023C0136K, dated May 1, 2013
- Preliminary Flood Insurance Study Volumes: 25023CV001B, 25023CV002B, 25023CV003B, 25023CV004B, (Volumes: 1 through 4), dated May 1, 2013

Summary of Panel Procedures

The SRP was selected in January 2015 and a kickoff meeting was held on February 12, 2015 via web-based teleconference. Ms. Dominique Fernandez, Director for National Institute of Building Sciences (Institute), presented the procedures to be used by the Panel, panel members were introduced, and a panel chair was selected. The responsibilities of the Chair were presented. The proposed schedule for the challenge presentation, review, and resolution was reviewed. A discussion of communication protocol between the Panel, Communities, FEMA, and the Institute was also conducted. The Panel Chair's responsibility for leading the review of Communities and FEMA submissions was discussed.

The Panel was tasked to review only the technical information and appeal data provided to the Panel. Those data were conveyed to Panel members via the Institute's web-based portal. Deliberations were to be focused on the scientific and technical issues presented and the correctness of the appeal data. The Panel's objective was to determine which of the two provided analyses was more scientifically and or technically correct. Panel members were instructed that they cannot request additional information,

introduce new data, suggest alternative methods, or conduct alternative analyses, nor could the Panel offer any alternative determination as a resolution.

After reviewing all Community and FEMA data, the Panel was to arrive at a majority decision regarding the data. A written report of the analysis and findings was to be prepared. All internal Panel deliberations were to be considered confidential until the final Panel decision was made public by the Institute or FEMA Administrator. All subsequent Panel meetings and presentations were conducted via web-based teleconference calls.

The second Panel meeting was held on March 6, 2015 to review the appeal items and discuss questions generated by Panel members. A review of FEMA's modeling methodology and their comments on the Community's methodology were discussed. Ransom's analysis methods and results were discussed. The applicability of other potential wave models and methods was discussed. However that discussion was not allowed to guide the deliberations.

Presentations to the Panel by FEMA and the Communities were conducted on April 2, 2015. Panel members posed questions to the presenters to clarify the information presented and to evaluate the issues. Prior to the presentations, the following questions from the Panel were directed to the presenters for response during their presentations.

1. Was the use of H_b (breaking wave height) for wave setup in Maine in the original mapping contract or was it used for an appeal?
2. Did FEMA explicitly acknowledge the switch from H_o (deepwater wave height) or was it a detail buried in the volume of the larger report?
3. What is the source of the Still Water Elevation (SWEL)?
4. Is it appropriate to use STWAVE less than one wavelength from the coast?
5. Ransom Consulting referenced a "compromise" solution that FEMA had adopted for Coastal Flooding in Maine. Could Ransom provide addition data information, etc. that documents this? Or could they show us in the existing information where such data are located?

A third Panel meeting was held on April 22, 2015 to discuss the information from the Community and FEMA presentations and to assess the correctness of the data and analyses presented via a vote. The presentations, technical procedures, and preliminary Panel decision were discussed. A vote in accordance with SRP procedures was held and a unanimous vote of the five panel members resulted.

A draft Report was prepared by the Panel Chair containing the conclusions of the Panel. The draft Report was distributed and the Panel members convened for a fourth time on July 09, 2015 via email exchange to complete the Report and conclusions.

Recommendation

Based on a unanimous Panel vote, the Panel recommends denial of the Communities (Marshfield and Scituate, MA) appeal. The Community's data does not satisfy NFIP mapping standards defined in FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners (NFIP standards, (FEMA 2003 & 2007)).

Rationale for Findings

The Panel reviewed the methodology proposed by Ransom and could not find evidence that the methodology had technical basis or support for use in the Communities' coastal setting. The offshore and nearshore settings for the Communities are similar to those assumed in the FEMA Coastal Flooding Analyses and Mapping Guidance (relatively smooth and consistent offshore bottom profile). Ransom presented an alternative methodology to FEMA's Direct Integration Method (DIM). The DIM method has been reputed to occasionally overestimate wave setup using deep water wave height and period. However, no technical support was provided to indicate that the nearshore wave conditions used in the appeal were more accurate or appropriate than produced by DIM.

The appeal referred to the use of nearshore wave conditions for setup calculations in Maine flood mapping studies. FEMA indicated that similar methods had been submitted in Maine, but had not been accepted, in part, pending this review. Plymouth County representatives provided no evidence that the proposed setup methods had been accepted in Maine or elsewhere.

The breaking wave height methodology proposed by Ransom was not found to be more correct than the FEMA analyses used to produce the preliminary mapping products.

References

FEMA, April 2003. *Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix D. Guidance for Coastal Flooding Analyses and Mapping.*

FEMA, April 2007. *Atlantic Coast and Gulf of Mexico Guidelines Update.*