

## **NEHRP Responses to 2021 ACEHR Report Recommendations ON THE STATE OF THE PROGRAM**

NEHRP responses are provided below in terms of “Response and Planned Action” representing a consensus of the Program agencies, along with additional specific agency inputs from agencies to further inform ACEHR.

### **Recommendation 1**

Once the FY22-29 NEHRP Strategic Plan is approved and adopted, the focus will change to ensuring the Plan is implemented. Depending on available resources, ACEHR calls upon the Interagency Coordinating Committee to provide the resources required for full implementation of the Plan, including appropriations and budgetary mechanisms that are closely aligned with the Plan at agency and sub-agency levels.

**Response and Planned Action:** The Program agencies are in the process of finalizing the NEHRP Strategic Plan for FY22-29 and will submit it this spring to the Interagency Coordinating Committee for concurrence. The Plan builds on previous efforts (e.g., *National Earthquake Resilience: Research, Implementation, and Outreach* (NRC 2011<sup>1</sup>) and the 2008 NEHRP Strategic Plan) to provide a strategy to support national needs in research, knowledge transfer, implementation, and outreach necessary to provide the tools to make the United States more earthquake resilient. Afterwards, the Program agencies will strive to implement activities that support the Plan, dependent upon available agency resources, agency mission within the Program, and other congressional priorities for NEHRP. The 2011 NRC report noted that 2009 NEHRP total funding to the four agencies was \$127.9 million but estimated the cost to implement the roadmap was \$306.5 million per year. With that said, a supplemental *Management Plan* to accompany the Strategic Plan will be developed by the Program Coordination Working Group (PCWG) to give the Interagency Coordinating Committee a roadmap for prioritizing work and resources necessary to implement the Plan, at the agency and sub-agency level.

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<sup>1</sup> National Research Council. 2011. *National Earthquake Resilience: Research, Implementation, and Outreach*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/13092> (last accessed 02/22/22).

## Recommendation 2

ACEHR has two recommendations related to the structure and focus of its meetings:

- a. ACEHR calls upon the NEHRP agencies to add progress updates on previous ACEHR recommendations as a regular agenda item for ACEHR meetings.

**Response and Planned Action:** The Program agencies agree that tracking progress on previous recommendations is useful for assessing the Program over time. The Program agencies agree to implement progress updates on applicable recommendations. The Program update for ACEHR meetings has recently moved to focus on implementation of the updated Strategic Plan at a programmatic level. Moving forward, the agencies will incorporate progress on programmatic recommendations. Similar to current meeting logistics, ACEHR can seek further information about an activity if needed during the Q&A session with agency representatives.

Additional Agency Inputs: NSF, USGS, and NIST provided concurrence; FEMA agrees to include progress reports on previous ACEHR recommendations that are still applicable.

- b. ACEHR calls upon the NEHRP agencies to continue identifying synergetic programs to present during ACEHR meetings in an effort to promote inter-programmatic coordination. This recommendation is closely related to Recommendation 5 below.

**Response and Planned Action:** The Program agencies agree that inter-programmatic coordination between federal programs or agencies supports efficiencies and synergies through coordinated government efforts. In developing the updated NEHRP Strategic Plan, the agencies integrated inter-programmatic coordination with relevant federal programs or agencies as a guiding principle to support development of programmatic activities. Consequently, the agencies will continue to explore possibilities for appropriate opportunities to support presentations by such programs at future ACEHR meetings. Also see Recommendation 5 response.

Additional Agency Inputs: NSF, USGS, and NIST provided concurrence; FEMA has inherently been doing this all along as they are a participating agency in many relevant federal programs, and they agree to continue this practice.

### Recommendation 3

Given the importance of functional recovery and community resilience to the nation's safety, ACEHR makes the following two recommendations related to this key initiative:

- a. ACEHR calls upon the NEHRP agencies to implement the seven recommendations in the joint FEMA-NIST report on *Recommended Options for Improving the Built Environment for Post-Earthquake Reoccupancy and Functional Recovery Time* and move the nation forward with respect to recovery-based objectives and community resilience.

**Response and Planned Action:** The 2018 reauthorization of NEHRP included a focus on enhancing community resilience and a new requirement for NIST and FEMA to jointly report on recommended options for improving the built environment to reflect seismic performance goals stated in terms of post-earthquake re-occupancy and reduced functional recovery time. The reauthorization legislation and report (FEMA P-2090/NIST SP-1254<sup>2</sup>) was the basis for including programmatic efforts in functional recovery as a focus area in the updated NEHRP Strategic Plan. Consequently, the agencies will strive to implement focused activities that support this area, dependent upon available agency resources, agency mission within the Program, and other congressional priorities for NEHRP.

Additional FEMA Input: With no new levels of support or congressional direction, it is not possible for FEMA to implement the seven recommendations from FEMA P-2090/NIST SP-1254 without adversely impacting our other congressionally mandated program activities. However, FEMA was able to modify two existing task orders within their current Seismic Technical Guidance and Development Support task order contract with the Applied Technology Council (ATC) to begin work on two of the reported recommendations. These two task orders are the Performance-Based Seismic Design Support (ATC-138), which is developing a FEMA P-58 based tool for calculating functional recovery time as described in Recommendation 1, and Development of Lifelines Infrastructure Guidance (ATC-150), which is beginning to address lifelines issues from Recommendation 4.

Additional NIST Input: NIST will support this recommendation as resources permit. NIST has two ongoing task orders focused on functional recovery aspects with select lifelines. NIST will continue to coordinate planning or work related to this topic area with the other agencies.

Additional NSF Input: NSF will participate appropriately in NEHRP planning and

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<sup>2</sup> [https://www.fema.gov/sites/default/files/documents/fema\\_p-2090\\_nist\\_sp-1254\\_functional-recovery\\_01-01-2021.pdf](https://www.fema.gov/sites/default/files/documents/fema_p-2090_nist_sp-1254_functional-recovery_01-01-2021.pdf)

other activities to promote implementation of the recommendations. There are budget issues to be considered, of course. And some of the recommendations do not fit well with NSF's mission. However, we can envision research and outreach activities relevant of the recommendations that we may be able to support.

- b. ACEHR calls upon the NEHRP agencies to sponsor a multi-agency and multi-hazard workshop bringing together individuals, divisions, etc. working on functional recovery, community resilience, and related topics.

**Response and Planned Action:** Also see Program Response to 3a above. The Program agencies agree that advancing both functional recovery and community resilience is a significant move toward enhancing earthquake resilience. Further emphasis is also needed to understand the impacts of compounding consequences from coincidental and/or sequential hazards, and the societal responses to them. Consequently, the agencies will strive to implement focused activities that support these concepts, individually or where synergies are identified, dependent upon available agency resources, agency mission within the Program, and other congressional priorities for NEHRP. Whether a workshop is a Program-wide or a specific agency-motivated workshop will be dependent upon programmatic needs.

Additional FEMA Input: FEMA agrees with this need and last fall contracted with ATC to plan and hold such a workshop. Our current plan is to conduct the workshop in late summer 2022. ATC and FEMA have already formed a planning committee, which is chaired by Ryan Kersting (ACEHR member). We intend to invite NIST and other federal agencies as well as private organizations such as the Earthquake Engineering Research Institute (EERI), the International Code Council, the National Council of Structural Engineering Associations, the Structural Engineers Association of California, and other organizations already doing work in the functional recovery area. Our goal is to be able to coordinate these different activities to multiply our individual efforts and to avoid duplication.

Additional NIST Input: NIST will support this recommendation as resources permit. NIST will coordinate any efforts with the Community Resilience group as well as the other statutory programs at NIST (e.g., National Windstorm Impact Reduction Program).

Additional NSF Input: NSF will participate in and will identify appropriate academic participants for such a workshop.

Additional USGS Input: Special sessions at major national conferences, such

as those of EERI and the Seismological Society of America, will provide the most cost-effective approach to gaining broad input to NEHRP initiatives. USGS is happy to participate in any workshop organized under this theme.

## Recommendation 4

ACEHR calls upon the NEHRP agencies to support research in earth science, engineering, and social science to further develop earthquake early warning (EEW) capabilities and better understand how EEW can best inform protective actions. ACEHR also calls upon the NEHRP agencies to support investments in education and outreach campaigns to increase awareness and understanding of EEW.

**Response and Planned Action:** The Program agencies agree that EEW can provide critical advance warning to allow people and systems to take protective actions to protect life and property from destructive ground shaking. As such, advancing EEW is a Program identified focus area included in the updated NEHRP Strategic Plan. Consequently, the agencies will strive to implement focused activities that support this area, dependent upon available agency resources, agency mission within the Program, and other congressional priorities for NEHRP.

Additional USGS Input: A significant fraction of annual appropriations for ShakeAlert are used to support research and development of EEW systems and algorithms, and social science within broader Communication, Education, Outreach, and Technical Engagement (CEO&TE) activities. CEO&TE activities involve significant engagement with state and university partners. USGS is committed to continuing these development efforts in parallel with completing buildout, and operations and maintenance of the ShakeAlert system. Funding to support such efforts is also available through an EEW panel as part of the annual program announcement for competitive proposals under the USGS External Grants Program. Sara McBride (a USGS social scientist) and colleagues have published a new paper on protective actions and EEW: <https://library.seg.org/doi/10.1190/geo2021-0222.1>

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## Recommendation 5

ACEHR calls upon the NEHRP agencies to further undertake additional jointly funded activities depending on available resources and where synergy is applicable.

**Response and Planned Action:** Also see Program Response to 2b above. In developing the updated NEHRP Strategic Plan, the agencies aimed to enhance coordinated interagency collaborations to support development of programmatic activities. Consequently, the agencies will continue to explore appropriate opportunities to achieve efficiencies and synergies through coordinated investments and activities to support this plan, dependent upon available agency resources, agency mission within the Program, and other congressional priorities for NEHRP.

Additional FEMA Input: The Economy Act significantly restricts how federal agencies can “jointly fund” activities. However, FEMA does continue to coordinate activities with our fellow NEHRP agencies and will continue to fund separate portions of those activities. We are open to continuing such work where circumstances and resources allow.

Additional NIST Input: NIST will support this recommendation as resources permit. NIST will continue to explore joint opportunities with the other agencies where resources allow synergetic activities (e.g., NSF-NIST Disaster Resilience Research Grants opportunity).

Additional NSF Input: NSF will continue to engage in joint activities with other NEHRP agencies, such as the joint NSF-NIST Disaster Resilience Research Grants competition. We will seek additional opportunities to achieve efficiencies and synergies through coordinated investments and activities. As FEMA mentioned, “jointly funded” can be different from jointly undertaken and coordinated, given legislated budget restrictions. However, the spirit of “jointly funded” is something we all strive to achieve when it can yield benefits.

USGS provided concurrence.

## Recommendation 6

ACEHR calls upon the NEHRP agencies to help organize workshop(s) for the earthquake science and engineering community to explore how applying lessons learned from the COVID-19 pandemic, multi-hazard approaches, climate change, and data-driven models and new sensing technologies can enhance earthquake risk-reduction efforts.

**Response and Planned Action:** Also see Program Response to 3a above. The Program agencies agree that advancing our understanding of the impacts of compounding consequences from coincidental and/or sequential hazards, and the societal responses to them, is a significant step to develop and enhance earthquake risk mitigation tools and policies. This concept resonated during the development of the updated NEHRP Strategic Plan and became a core objective to support development of programmatic efforts. Consequently, the agencies will strive to implement focused activities that support this concept, dependent upon available agency resources, agency mission within the Program, and other congressional priorities for NEHRP. Whether a workshop is a Program-wide or a specific agency-motivated workshop will be dependent upon programmatic needs.

Additional FEMA Input: Since this would be a cross agency activity, FEMA would defer to the NEHRP lead agency (NIST) on organizing such a workshop. FEMA would of course be willing to participate in a meaningful way.

Additional NIST Input: NIST will support this recommendation as resources permit. NIST will coordinate any efforts with the Community Resilience group as well as the other statutory programs at NIST (e.g., National Windstorm Impact Reduction Program).

Additional NSF Input: NSF will accept and review unsolicited proposals from the earthquake science and engineering communities on the topics listed above. We will also collaborate with other NEHRP agencies on any workshops they seek to develop.

Additional USGS Input: USGS defers to NIST and the PCWG. USGS is happy to participate in any workshop organized under this theme.