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Governor



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**State of Nevada
Resilience Advisory Committee
Annual Report 2019**

Effective May 29, 2019, Senate Bill 35 of the 2019 Nevada Legislature was approved by Governor Sisolak creating the Nevada Resilience Advisory Committee (Committee). As described in Chapter 239C of the Nevada Revised Statutes (NRS 239C), the Committee is tasked with several responsibilities directed toward making recommendations to the Governor, the Legislature, local governments, private business, and citizens about the emergency management, emergency response and homeland security efforts for the State, as well as statewide resilience efforts.

The duties of the Committee include:

- Annually develop state resilience goals and related objectives for the Committee;
- Formulate advisory recommendations and policies regarding the emergency management, emergency response and homeland security efforts for the State, as well as statewide mitigation, preparedness, response and recovery efforts;
- Review grants proposed by state agencies, political subdivisions or tribal governments that are responsible for homeland security and make recommendations and provide related advice concerning such grants to the Nevada Commission on Homeland Security's Committee on Finance appointed pursuant to NRS 239C.170;
- Review grants proposed by state agencies, political subdivisions or tribal governments that are responsible for emergency management or emergency response and make recommendations and provide related advice concerning such grants to the Chief of the Division of Emergency Management (Division) within the Department of Public Safety;

- Review statewide mitigation, preparedness, response and recovery efforts in consultation with political subdivisions and tribal governments and make recommendations to such political subdivisions and tribal governments concerning these coordination efforts; and
- Develop an annual report setting forth:
 - The activities of the Committee which occurred during the preceding calendar year;
 - Any assessments of the programs and processes conducted by the Committee to achieve the state resilience goals and related objectives developed pursuant to NRS 239C.440 and the capacity of such programs and processes;
 - Any recommendations created by the Committee that are based on the activities and assessments conducted during the preceding calendar year; and
 - A description of any matters with respect to which the Committee held a closed meeting or a closed portion of a meeting, as applicable, accompanied by an explanation of the reasons why the Committee determined that the meeting or portion thereof needed to be closed.

To summarize, the centerpiece for the Statewide Resilience Strategy is the Nevada Resilience Advisory Committee. This body serves as the central advisory body for all policy and grant funding decisions administered by the Division. The Committee not only advises on grants and policy, but also develops an annual State Resilience Goal and related Objectives in order to align their work and decisions. The Committee has been meeting since October of 2018 and has been working towards these goals.

Pursuant to NRS 239C.480, a copy of the Committee's annual report is being submitted to: The Nevada Commission on Homeland Security; The Governor; and The Director of the Legislative Counsel Bureau for transmittal to the Legislature.

The Division maintains a website with current and past meeting dates, agendas, and meeting minutes for all the public bodies that are administered by the Division, including the Resilience Advisory Committee. The website can be accessed at: https://dem.nv.gov/DEM/DEM_Public_Meeting_Information/

One significant piece of activity from the Committee's work this past year resulted in a set of seismic risk recommendations for the state. During a series of meetings, Dr. Craig dePolo, Research Geologist within the University of Nevada, Reno, Nevada Bureau of Mines and Geology, guided the members through discussions about Nevada's earthquake risk, history, and mitigation efforts. A compilation of recommendations from the discussions were approved at the January 2020 Committee meeting. The final seismic risk recommendations report is included as an addendum to this report for reference and consideration.

Membership for the Committee is outlined in NRS 239C.400. With the approval of the Director of the Department of Public Safety, the Chief of the Division shall appoint to the Committee not more than 34 voting members that the Chief determines to be appropriate and who have expertise in: Emergency management; Homeland security; Public safety; Cybersecurity; School safety; or Public health. Also, with the approval of the Director of the Department of Public Safety, the Chief or his or her designee shall serve as the Chair and a voting member of the Committee; and appoint one voting member of the Committee to serve as Vice Chair. The term of office of each voting member of the Committee is 2 years and members may be reappointed.

The current voting membership of the Committee consists of the following:

Nevada Resilience Advisory Committee Voting Members			
LastName	FirstName	Company	JobTitle
Anderson	Roy	Washoe County School District	Emergency Manager
Barton	Solome	City of North Las Vegas	Assistant Emergency Manager
Breeden	Elizabeth	NV Energy	Emergency Management Administrator
Chrisley	James	Clark County Department of Aviation	Deputy Director of Aviation, Operations
Conti	Christina	Washoe County Heath District	EMS Oversight Program Manager
Darrough	Cassandra	Pyramid Lake Paiute Tribe	Councilwoman, Pyramid Lake Fire Rescue EMS
dePolo	Craig	University of Nevada Reno	Research Geologist
Dehnhardt	Bob	Nevada Department of Administration	State Chief Information Security Officer
Echeverria	Kelly	Washoe County Emergency Management and Homeland Security	Program Coordinator
Fogerson	Dave	East Fork Fire and Paramedic District	Deputy Fire Chief
Freeman	Jeanne	Carson City Health and Human Services	Public Health Preparedness Manager
Heidemann	Mike	Churchill County Office of Emergency Management	Emergency Manager
Hemenway	Jill	American Red Cross of Northern Nevada	Disaster Program Manager
Holt	Eric	Lincoln County Office of Emergency Management	Emergency Manager
Hunkup	David	Reno-Sparks Indian Colony	Emergency Services Manager
Hynds	Jeremy	City of Henderson	Emergency Manager
Kent	Graham	University of Nevada Reno	State Seismologist
Laffoon	Mary Ann	Northeast Nevada Citizen Corps	CERT Program Coordinator
Lake	Dr. Chris	Nevada Hospital Association	Executive Director, Community Resilience
Leighton	Bob	City of Reno	Emergency Manager
Levering	Carolyn	City of Las Vegas	Emergency Manager
Luna	Justin	Nevada Division of Emergency Management/Homeland Security	Chief
Miller	Ryan	Nevada Department of Public Safety, Investigation Division	Deputy Chief
Moss	Todd	Tahoe Douglas Fire Protection District	Battalion Chief
Pereira	Tennille	Legal Aid Center of Southern Nevada/ Vegas Strong Resiliency Center	Consumer Litigation Attorney
Rahmeyer	Shaun	Nevada Office of Cyber Defense Coordination	Administrator
Robinson	Misty	Southern Nevada Health District	Senior Public Health Preparedness Planner
Skidmore	Rachel	Las Vegas Metropolitan Police Department	Emergency Manager
Solferino	Corey	Washoe County Sheriff's Office	Lieutenant
Southard	Malinda	Nevada Division of Public and Behavioral Health	Health Program Manager II
Steinbeck	John	Clark County Fire Department, Office of Emergency Management	Fire Chief, Emergency Manager
Tomaino	Christopher	Southern Nevada Counter Terrorism Center	Captain
Wilson	Mike	Clark County School District	Director, Office of Emergency Management
Woodard	Dr. Stephanie	Nevada Division of Public and Behavioral Health	Project Director

Additional non-voting members are assigned to the Committee as subject matter experts, and consist of the following:

Nevada Resilience Advisory Committee Non-Voting Members			
LastName	FirstName	Company	JobTitle
Bishop	Bunny	Nevada Division of Water Resources	State Floodplain Manager
Castagnola	Felix	Nevada National Guard	Colonel (Ret)
Friend	Melissa	Nevada Division of Emergency Management/Homeland Security	Statewide Interoperability Coordinator
KC	Kacey	Nevada Division of Forestry	State Forester/Firewarden
Bodnar	Rebecca	Nevada Division of Environmental Protection	Environmental Scientist
Nielsen	Catherine	Nevada Governor's Council on Developmental Disabilities	Projects Manager
Kenneston	Aaron	Washoe County Emergency Management and Homeland Security	Emergency Manager

OVERVIEW

The Statewide Resilience Strategy is an effort to transform and refine Nevada's emergency management and homeland security efforts. This strategy is intended to improve all of Nevada's grant, budgetary, and policy systems by removing silos and overlap and ensuring maximal transparency, predictability, and accountability for the Division and its statewide partner. Reviewed and approved by the Nevada Commission on Homeland Security (NCHS), the Division has been pursuing this strategy through the restructuring outlined below.

BACKGROUND

Calendar year 2017 was an unprecedented year for emergencies and disasters in Nevada, from back-to-back floods resulting in Presidential Major Disaster Declarations in January and February, to the mass shooting incident in October in Las Vegas. The Co-Chairs of the Homeland Security Working Group (HSWG) presented lessons learned from this unprecedented year to the NCHS in December of 2017 and recommended a paradigm shift in emergency management and homeland security policies, operations, and systems in the state. The NCHS agreed, and by February of 2018, approved four significant policy items: 1) a policy directive requiring the Division to pursue a transition to a resilience paradigm; 2) an executive order requiring the development of a Statewide Resilience Strategy, and other requirements; 3) initial legislative recommendations; and 4) budget requests for the Division. The executive order required that the strategy be developed by June 30, 2018.

The executive order required that the Statewide Resilience Strategy cover a number of requirements, including refining the Division's public body structure and its grant structure. It also required the development of finalized legislative recommendations, which would be considered by the NCHS during the summer of 2018. The Co-Chairs of the HSWG developed a four-part strategy for state resilience, which is intended to achieve the transition to resilience required by the objective and the executive order.

STATEWIDE RESILIENCE STRATEGY

Established through Executive Order (EO) 2018-4, “Implementation of Nevada’s Statewide Resilience Strategy,” and the subsequent support from the Nevada Commission on Homeland Security, the former Homeland Security Working Group was transformed into what was originally called the Nevada Resilience Commission. This group was originally created in 2018, and then codified in statute in 2019 as the Nevada Resilience Advisory Committee. The Committee serves as the central advisory body for all policy and grant funding decisions administered by the Division. The Committee not only advises on grants and policy, but also develops an annual State Resilience Goal and related Objectives in order to align statewide resilience work and decisions.

The Committee conducted three meetings in 2018 and ten meetings in 2019.

The following is a summary of the meetings from calendar year 2019.

The Division maintains a website with current and past meeting dates, agendas, and meeting minutes for all the public bodies that are administered by the Division, including the Resilience Advisory Committee. The website can be accessed at: https://dem.nv.gov/DEM/DEM_Public_Meeting_Information/

January 24, 2019 - Nevada Resilience Commission

The scheduled meeting for January was cancelled on the day of the meeting due to an inadvertent error noticed on the posted agenda. There was no opportunity to reschedule the meeting within the month due to the timing of Open Meeting Law posting requirements.

February 19, 2019 - Nevada Resilience Commission

The meeting began with the quarterly review of the body’s bylaws, and then also included an overview of the legislative efforts pertaining to the Statewide Resilience Strategy. The meeting included informational presentations on the former Nevada Earthquake Safety Council; the State Emergency Response Commission; the drug threat assessment regarding statewide opioid initiatives; and the Division’s planning, training, and exercise goals.

The meeting also included information on the status of various grant programs administered by the Division, including obligations for the Homeland Security Grant Program and an update on the Hazard Mitigation Grant Program Post Fire projects and an overview of the Pre-Disaster Mitigation grant projects.

The meeting included discussions on the Statewide Resilience Strategy, a definition of resilience for the state, and resilience goal and objectives. The discussions resulted in the following being approved by the members:

- Resilience Defined: Proactive, flexible, and unified leadership throughout all four phases of emergency management that allows for Nevada communities to adapt to and grow back stronger from disasters.
- State Resilience Goal: Nevada will increase resilience across the whole community by focusing on collaboration in policy development, building operational capacity, and maximizing financial resources throughout all four phases of the emergency management cycle.
- Objective 1: Develop comprehensive policies for all levels of government in order to improve resilience across disciplines and hazards.
- Objective 2: Improve preparedness for response and recovery operations through a unified, statewide planning, training, and exercise effort, in order to improve resilience before, during, and after actual events.
- Objective 3: Distribute limited financial resources from various sources with maximum efficiency, predictability, and accountability, in order to best focus on improving statewide resilience.

March 12, 2019 - Nevada Resilience Commission

The meeting included informational presentations on the statewide Citizen Corps program initiatives and activities; the Incident Management Team developed in southern Nevada; the Stakeholder Preparedness Review (SPR) consequence and gap analysis; the status of the implementation of the Nevada Disaster Recovery Framework; an update on the strategic planning efforts for the statewide resilience goal and objectives; and an update of the status of legislative efforts pertaining to the Statewide Resilience Strategy.

The meeting also included information on the status of various grant programs administered by the Division, including the Emergency Management Performance Grant and the Homeland Security Grant Program. Discussions were provided on compliance priorities for communications and cybersecurity projects as well as recommendations for capacities that should be prioritized to be maintained for future funding.

April 9, 2019 - Nevada Resilience Commission

The meeting began with the quarterly review of the body's bylaws, and then also included an overview of the legislative efforts pertaining to the Statewide Resilience Strategy. The meeting included an informational presentation on the Division's planning, training, and exercise initiatives.

The meeting also included information on the status of various grant programs administered by the Division, including a discussion on the Emergency Management Performance Grant allocations and obligations for the Homeland Security Grant Program. As part of the Homeland Security Grant program review process, initial presentations were heard from project submitters with discussion from the members. Specific projects were identified for additional communications and cybersecurity review.

The meeting included discussions on the Statewide Resilience Strategy, and a review of the proposed Strategic Plan with the goal to broaden the scope of the plan to a statewide emergency management program plan based on the new definition of resilience for the state, and resilience goal and objectives. The discussions resulted in the Strategic Plan being approved by the members. The 2017-2022 Strategic Plan for the Statewide Emergency Management Program can be found at the following link:

<https://dem.nv.gov/uploadedFiles/demnv.gov/content/About/2017-2022%20Strategic%20Plan%20for%20the%20SEMP%20V3.pdf>

May 14, 2019 - Nevada Resilience Commission

The meeting began with an overview of the legislative efforts pertaining to the Statewide Resilience Strategy. The meeting included informational presentations on expectations for the upcoming fire season by the Nevada State Forester/Firewarden; an overview of the status of open disaster grants and a status of the Nevada Disaster Recovery Framework and Recovery Support Functions; and a discussion on the Emergency Management Performance Grant allocations.

The meeting also included a continuation of the Homeland Security Grant program review process, including the approval of projects rankings to submit as recommendations to the Nevada Commission on Homeland Security's Committee on Finance.

June 11, 2019 - Nevada Resilience Commission

The meeting began with an overview of the legislative efforts pertaining to the Statewide Resilience Strategy. The meeting included informational presentations on the statewide Citizen Corps program initiatives and activities; an overview of the Nevada Tribal Emergency Coordinating Council established during the 2019 Nevada Legislature; activities of the Nevada Intrastate Mutual Aid Committee; and the Division's planning, training, and exercise initiatives.

The meeting also included information on the status of various grant programs administered by the Division, including an overview of the Nevada Hazard Mitigation Assistance Program grants and Nevada's Enhanced Hazard Mitigation Plan; a discussion on the Emergency Management Performance Grant allocations; and obligations for the Homeland Security Grant Program.

The meeting also included the first of a series of presentations and discussions on the seismic risk in Nevada with a goal to develop earthquake-specific recommendations. Dr. Craig dePolo, Research Geologist, Nevada Bureau of Mines and Geology at the University of Nevada, Reno, provide an overview of Nevada's seismic history, the behavior of earthquakes, vulnerabilities and consequences of earthquakes, and the specific challenges of unreinforced masonry buildings in Nevada.

July 9, 2019 - Nevada Resilience Advisory Committee

The meeting began with the quarterly review of the body's bylaws, including the transition to reflect the change in the body's name based on Senate Bill 35 of the 2019 Nevada Legislature which officially codified the Committee in statute.

The meeting also included a discussion on 2017-2022 Strategic Plan for the Statewide Emergency Management Program and an update of the bills sponsored during the 2019 Nevada Legislature pertaining to the Statewide Resilience Strategy. The meeting also included discussion on the Emergency Management Performance Grant allocations.

The meeting included informational presentations on an overview of the new requirement for the Nevada Department of Health and Human Services to maintain a Behavioral Health Disaster Plan for the state and also an overview of the five bomb squads in Nevada, including training and equipment requirements, capabilities, recent activities, availability for mutual aid requests, and models from other states.

The meeting included a discussion on the applications from seven jurisdictions that were interested in receiving a Major Incident Response Vehicle resource as a property transfer from the state. The members ranked the resource requestors and voted to approve a recommended ranking list to the SAA for consideration.

The meeting also continued the series of presentations and discussions on the seismic risk in Nevada with a goal to develop earthquake-specific recommendations. Dr. Craig dePolo, Research Geologist, Nevada Bureau of Mines and Geology at the University of Nevada, Reno, led the discussion.

August 13, 2019 - Nevada Resilience Advisory Committee

The meeting included informational presentations on the Metropolitan Statistical Analysis (MSA) process as part of the Homeland Security Grant Program; an overview of statewide flood hazards and the function of the State Floodplain Manager in mitigation, preparedness, response, and recovery activities; and an update on activities of the statewide interoperability program, including planning, training, and exercise updates, the FirstNet buildout, emergency notifications and alerts, and status of statewide interoperability efforts.

The meeting included information on the status of various grant programs administered by the Division, including a discussion on the Emergency Management Performance Grant allocations and an overview of the status of the recovery efforts on open disaster grants.

The meeting also continued the series of presentations and discussions on the seismic risk in Nevada with a goal to develop earthquake-specific recommendations. Dr. Craig dePolo, Research Geologist, Nevada Bureau of Mines and Geology at the University of Nevada, Reno, led the discussion.

September 10, 2019 - Nevada Resilience Advisory Committee

The meeting continued the series of presentations and discussions on the seismic risk in Nevada with a goal to develop earthquake-specific recommendations. Dr. Craig dePolo, Research Geologist, Nevada Bureau of Mines and Geology at the University of Nevada, Reno, led the discussion.

The meeting included informational presentations on the statewide Citizen Corps program initiatives and activities; an overview of the history, functions, and organizations of the Vegas Strong Resiliency Center; an overview of statewide school safety activities; and an overview of the exercise objectives

and planning efforts for the full scale Complex Coordinated Terrorist Attack exercise, “Silver Crucible,” scheduled for November 2019.

October 8, 2019 - Nevada Resilience Advisory Committee

The meeting began with the quarterly review of the body’s bylaws. The meeting also included informational presentations on statewide cybersecurity initiatives and a discussion on the development of strategic capacities to be maintained in the upcoming Homeland Security Grant Program process. The members voted on strategic capacities to be maintained for recommendation to the Nevada Commission on Homeland Security.

The meeting continued the series of presentations and discussions on the seismic risk in Nevada with a goal to develop earthquake-specific recommendations. Dr. Craig dePolo, Research Geologist, Nevada Bureau of Mines and Geology at the University of Nevada, Reno, led the discussion.

November 19, 2019 - Nevada Resilience Advisory Committee

The meeting began with a review of the amended bylaws approved at the October 2019 meeting. The meeting also included an update on the status of the Nevada Department of Health and Human Services’ Behavioral Health Disaster Plan for the state.

The meeting included information on the status of various grant programs administered by the Division, including a discussion on the Emergency Management Performance Grant allocations and an overview of the Pre-Disaster Mitigation grant program.

The meeting included an informational presentation on NV Energy’s efforts to help protect its customers and the communities of Nevada from wildfires and extreme weather, as well as, other efforts to mitigate wildland fires across Nevada. The discussion will also include Senate Bill 329 from the 2019 Nevada Legislature, which requires an electric utility to submit a natural disaster protection plan.

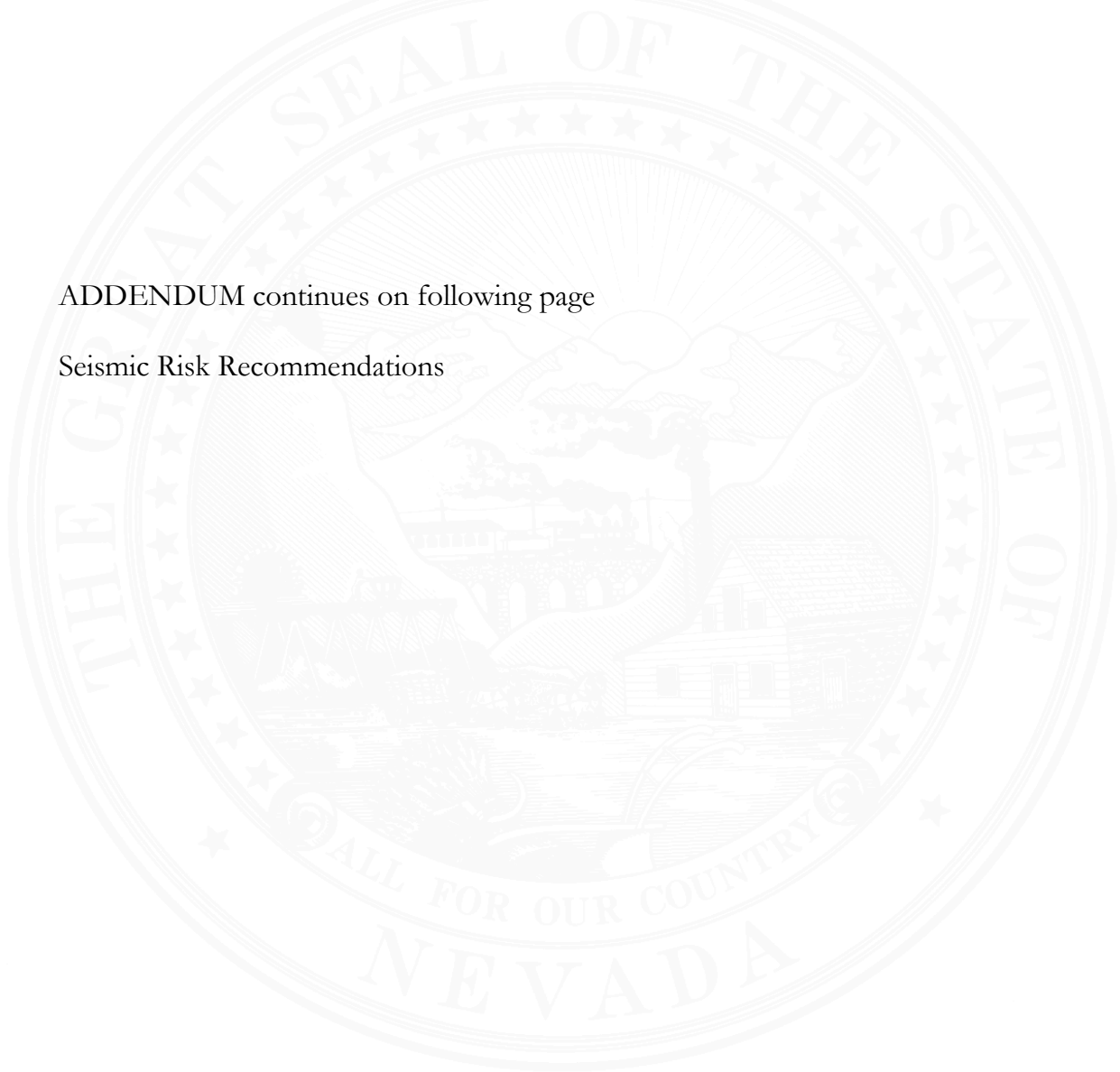
The meeting continued the series of presentations and discussions on the seismic risk in Nevada with a goal to develop earthquake-specific recommendations. Dr. Craig dePolo, Research Geologist, Nevada Bureau of Mines and Geology at the University of Nevada, Reno, led the discussion. A compilation of recommendations from the discussions were approved at the January 2020 Committee meeting. The final seismic risk recommendations report is included as an addendum to this report for reference and consideration.

December 10, 2019 - Nevada Resilience Advisory Committee

The scheduled meeting for December was cancelled prior to the meeting due to other conflicting meetings and the resulting availability of the Chair and Vice Chair. An attempt to reschedule the meeting was unsuccessful primarily due to the difficulty in garnering quorum on such short notice.

ADDENDUM continues on following page

Seismic Risk Recommendations



January 22, 2020

Seismic Risk Recommendations as developed by the Nevada Resilience Advisory Committee

During a series of meetings of the Nevada Resilience Advisory Committee (NRAC), Dr. Craig dePolo, Research Geologist within the University of Nevada, Reno, Nevada Bureau of Mines and Geology, guided the members through discussions about Nevada's earthquake risk, history, and mitigation efforts. These discussions were intended to help develop policy recommendations regarding earthquake risks in Nevada.

Nevada is located within the Basin and Range Province Region and the location of the California Plate Boundary System in the western part of the state increases the threat of earthquakes in Nevada. Nevada has more than 1,500 faults across the state, which is more than any other state in the Union. Dr. dePolo presented information about the overall history of earthquakes in Nevada. There has been a total of 23 earthquakes since 1857 that have been magnitude 6 or greater; the average is one in every 6.9 years. There has been a total of three earthquakes since 1857 that have been a magnitude 7 or greater. Twenty-five Nevada communities have had earthquake damage, at least eight communities have had repetitive damage, and 15 out of 17 counties have experienced some earthquake damage.

The threat of earthquakes in Nevada consists of the following: they occur without warning, the worst damage occurs within the first few minutes, there is often widespread comprehensive damage on many scales, they are compound disasters, and there is typically a short time period to mount large multi-faceted, multi-day responses. The best ways to address earthquake threat include, but are not limited to, raising awareness so people know how to react safely, identifying safe places in buildings to shelter, increasing coordination with response agencies, and supporting earthquake monitoring infrastructure and earthquake hazard investigations. Dr. dePolo advised that Nevada continues to combat this seismic threat but there is always room for improvement and growth in the right direction.

Based on the work of the former Nevada Earthquake Safety Council, which was absorbed into the NRAC, as well as Dr. dePolo's leadership and expertise, the NRAC worked to develop comprehensive recommendations to be included in the Division of Emergency Management's annual report. The following categories were identified to structure the recommendations:

1. Earthquake Public Awareness: The NRAC identified a message to promote earthquake awareness, including but not limited to Community Emergency Response Teams, the Nevada ShakeOut, and other efforts.
2. Unreinforced Masonry Buildings (URMB): The NRAC recognized URMB buildings as potentially dangerous during seismic events and encouraged action to reduce this risk.

3. Earthquake Early Warning Systems: The NRAC endorsed the effectiveness of Earthquake Early Warning Systems and identified ways of increasing related all-hazards systems.

4. Earthquake Hazard Studies: The NRAC emphasized the importance of conducting earthquake hazard studies around Nevada communities as a foundation for building codes.

5. Earthquake Response Training: The NRAC supported the development of earthquake response training including, but not limited to, Urban Search and Rescue and post-earthquake messaging.

Specific recommendations identified by the NRAC for each of the five categories are included below.

1. Earthquake Public Awareness

For Earthquake Public Awareness, the NRAC recommended the following statement to promote public awareness:

“The Nevada Resilience Advisory Committee will identify mechanisms to develop and promote local earthquake awareness, preparedness, and seismic risk mitigation. These efforts could include using the Great Nevada Shakeout, whole communities, and windows of opportunities (such as earthquake events) when people are more receptive to engaging and preparedness.”

This message should be used by all agencies throughout the state to incorporate a culture of earthquake awareness and preparedness for Nevada’s residents and visitors.

2. Unreinforced Masonry Buildings (URMB)

Unreinforced Masonry Buildings (URMB) are buildings made of brick or stone that lack steel rebar or other reinforcement. These buildings commonly have structural deficiencies beyond the construction style. The seismic issues caused by URMBs include, lack of lateral resistance due to smooth-faced bricks, disintegrating old lime-based mortar which causes a loss of bonding, structural instability since materials are not tied together, dangerous crowning concrete beams, rubble wall infill and foundation, and the fact that URMBs are made quickly, cheaply, and sometimes without skill.

The Wells earthquake struck northeastern Nevada on Thursday morning at 6:16 a.m., February 21, 2008. It was a damaging magnitude 6 earthquake that originated about 5 miles north-northeast of Wells. In the 2008 Wells earthquake, there were 10 of 15 commercial URMBs

moderately to severely damaged, 3 of 15 commercial URBMs had partial to total collapse, 1 of 15 commercial URBMs had the potential of death if the occupant had stayed inside, and 15 of 33 commercial URBMs exits had potentially deadly debris.

Dr. dePolo spoke to URBMs being the most seismically vulnerable buildings in Nevada. One third of URBMs are expected to have failures as a result of strong shaking. Regarding URBMs in Nevada identified in 2011-2012, county assessor's data was used, and sorted with numerous filters and placed into this category. The results of this study resulted in a total of 23,597 buildings being classified as potential URBMs in Nevada. Dr. dePolo noted there are field studies being conducted to get more accurate numbers and believes there will be changes to all the estimated numbers. Dr. dePolo stated that Nevada is taking steps to reduce the seismic risk. Building code seismic provisions have been adopted by all Nevada counties, and many state-owned URBMs have been retrofitted.

URMBs are the most difficult contemporary challenge in creating an earthquake-resistant society. These challenges include; social challenges with owners, tenants, neighbors and communities, lack of funding, and the risk is not always compelling. There is a high risk with low probability. Another challenge is the cost of seismic retrofitting which can cost anywhere from \$100,000.00 to \$1,000,000.00. This is a large ticket item, especially to individual owners who might doubt an earthquake will ever occur and damage their building.

Dr. dePolo advised that Nevada has made modest progress in reducing its overall URM seismic risk mostly through tearing down URBMs and not letting them be built anymore. Thousands of URBMs exist throughout the state and many have been damaged by past Nevada earthquakes. Many of these buildings are in fragile and dilapidated states. There does not exist a broad consciousness or effort to reduce the URM seismic risk. To help address this deficiency, the NRAC adopted this statement with respect to URBMs and along with strategies to address mitigation and inclusion:

“The Nevada Resilience Advisory Committee recognizes unreinforced masonry buildings as dangerous earthquake risks and encourages actions within Nevada to reduce this risk, with the result of saving lives, reducing injuries, and reducing property loss from earthquakes.”

- URM Seismic Risk: “Nevadans are largely unaware of the seismic risk and threat of Unreinforced Masonry Buildings (URMBs). A broad and comprehensive education effort is needed to raise this awareness so Nevadans will understand the seismic risk they face from these types of buildings and to motivate actions to reduce this threat. When an earthquake strikes and these buildings fail, people are crushed when upper portions of brick or stone walls fall into the building or onto surrounding sidewalks, streets, and adjacent buildings.”

- URMb Inventory: “It is essential to know how many URMbS exist in Nevada and prioritize these as to which pose the highest risks. Initial assessments based on county assessor data indicated there were over 20,000 URMbS in the state. Field verifications of URMbS underway in Clark County, Carson City, and Reno have lowered these counts to a projected few thousand buildings. Many URMbS have been torn down, damaged during earthquakes, and dozens have been retrofitted. This inventory and prioritization effort need to be completed, especially in rural Nevada, where it is more challenging to allocate staff and funding.”
- URMb Website: “Reducing seismic risk of URMbS in Nevada is a daunting task, but it must be done. If we do nothing, these buildings will eventually be eliminated by attrition and future earthquakes, but this will likely be at a cost of thousands of Nevadan lives and serious injuries, and much property and economic loss to building owners, tenants, passersby, and communities. Information, strategies, incentives, and motivating movements of action are needed for a task this large. A web site should be supported and created that informs Nevadans about URMbS and lays out approaches and techniques to retrofitting URMbS. Nevada can draw many lessons learned from other western states and Canada on how to best manage and reduce the risks of URMbS.”
- Headwinds to Reducing Risk: “There are very difficult challenges associated with reducing the risk of URMbS, including costs, business disruption, tenant disruption, and the challenge of making weak buildings more earthquake-resistant or replacing them. In many cases, retrofit costs are comparable to tearing buildings down and rebuilding modern structures. Replacement is one of the most effective strategies for eliminating these risks. One strategy to reduce the financial burdens to owners is to share costs with those that benefit from reducing risks. Costs can be shared through federal pre-disaster grants, state and local programs that contribute funds, community block grants, community bonds, waving permit fees, private donations, and other ways. Sharing costs can become a strong motivation to act for owners.”
- Addressing the Risk: “Addressing the risk of thousands of Nevada URMbS in a timely manner will take actions to get momentum going, and to measure and make significant progress. One strategy to do this would be to create a decade of URMb reduction in Nevada once information and support mechanisms are in place. The Nevada Resilience Advisory Committee recommends that the state of Nevada allocate appropriate and adequate funds available each year of this decade. This will help support retrofitting and replacing the highest risk buildings in the state. The Committee also strongly encourages political leadership and support at all levels of government and the private sector.”

3. Earthquake Early Warning Systems

Dr. Graham Kent, State Seismologist and Director of the Nevada Seismological Laboratory at the University of Nevada, Reno, provided a presentation on the ShakeAlert and AlertWildfire systems. Dr. Kent explained how these different hazard monitoring systems can help get earthquake early warning systems to Nevada. Ultimately, the goal is to have an early earthquake warning system that is resilient and available to the public.

In an earthquake, a rupturing fault sends out different types of waves. The fast-moving P-Wave is first to arrive, but damage is caused by the slower S- Wave and later-arriving surface waves. Sensors detect the P-wave and immediately transmit data to an earthquake alert center where the location and size of the quake are determined and updated as more data becomes available. A message from the alert center is immediately transmitted to your computer or mobile phone, which calculates the expected intensity and arrival time of shaking at your location. The importance here is to make sure equipment works on the worst days, not just the best days.

Earthquake early warning systems are being added to fire cameras in eastern California. The earthquake early warning system debuted on October 17, 2019, in California. There is a flow over process concerning the Nevada border. The California Governor's Office of Emergency Services (Cal OES) is working with the division to coordinate on this flow over idea. This could benefit the Reno, Carson, Sparks, Tahoe, and Minden geographical areas in regard to the early earthquake warning system.

4. Earthquake Hazard Studies

Dr. dePolo provided information about how many of the earthquake faults in Nevada are understudied and lack enough documentation to properly identify an accurate level of risk. To address Earthquake Hazard Studies, the NRAC recommended the following statement to endorse earthquake hazard studies in and around Nevada communities as a foundation for the seismic provisions in building codes:

"The Nevada Resilience Advisory Committee endorses earthquake hazard studies in and around Nevada communities as a foundation for the seismic provisions in building codes. Building codes are the largest investment society makes in creating earthquake resilient communities. The earthquake input for building codes is based on the National Seismic Hazard Map produced by the U.S. Geological Survey. The earthquake hazard of a fault is considered in this map if it has been explored and characterized through geologic studies. Many communities in Nevada have not had their local faults studied and thus, the earthquake hazard input is underestimated. At the current pace of study, it will take many decades to complete these investigations. Meanwhile, communities are potentially under-designing buildings for earthquake resistance. The study of

faults in and near Nevada communities needs to be greatly accelerated so the proper levels of seismic input can be used in building design.”

Earthquake hazard studies should be used by all agencies throughout the state to identify and strengthen seismic provisions in building codes.

5. Earthquake Response Training

Dr. dePolo introduced the earthquake response training topic and NRAC member, Deputy Chief Dave Fogerson, from East Fork Fire Protection District, voiced his concern about the lack of focus on how to respond to an earthquake incident. Deputy Chief Fogerson acknowledged the strong capacities available in the urban areas of the state but indicated there is a need to develop more advanced search and rescue capacities in the rural areas. The following statement was proposed as a recommendation to promote additional earthquake response training throughout the state, in urban and rural areas:

“Major earthquakes pose unique risk and emergency response settings that require specialized training and resources, such as responding to and managing structural collapses, especially in unreinforced masonry buildings. The Nevada Resilience Advisory Committee recommends training for firefighters, incident commanders, and emergency operations center managers in responding to post-earthquake structural collapses. Further, emergency planning should specifically address obtaining Type 3 level urban search-and-rescue resources to rural and frontier firefighters. The Nevada Resilience Advisory Committee recommends the development of a statewide strategy to identify resources and funding for training opportunities for response and recovery to seismic risk.”

The recommendations identified above are the results of a continuing effort to advance the understanding of seismic risks within Nevada. Through knowledge and collaboration, many of these recommendations can have meaningful impacts to increase resiliency in the state.