



SEISMIC RETROFITS
FOR ARCHITECTURE OF
A LIBERAL ARTS INSTITUTION

The Evergreen State College, Washington

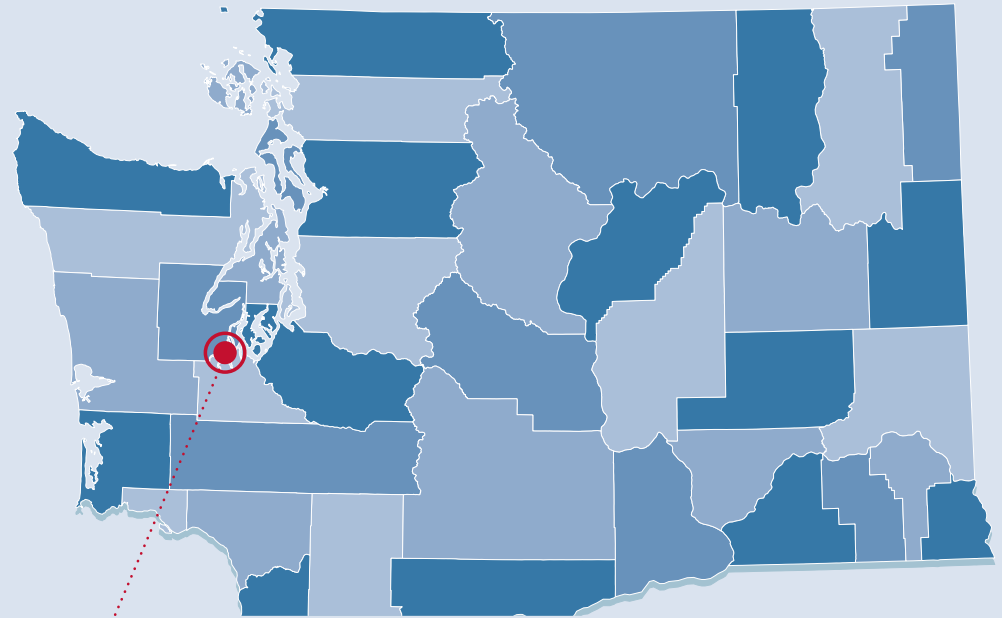


FEMA

RiskMAP
Increasing Resilience Together

“Evergreen demonstrates a long-term, sustained effort to seismically retrofit its entire campus—in which Hazard Mitigation Planning and FEMA HMA grants have played important roles. They leverage past successes to maintain support for their current and future projects. It’s that sustained commitment to seismic mitigation work that is, to me, most compelling and instructive.”

— Tim Cook, State Hazard Mitigation Officer



THE EVERGREEN STATE COLLEGE

On February 28, 2001, a magnitude 6.8 earthquake hit Olympia and The Evergreen State College (Evergreen). This event, later named the Nisqually earthquake, cracked walls in core academic buildings and the library, which required extensive epoxy injections to re-stabilize their structural integrity. The earthquake shook books off their shelves, caused suspended ceiling tiles to fall, and broke a water line in the library. The campus community felt this event as a call

to action for public safety as it increased their awareness of feeling vulnerable to the next event, which that may be worse.

Evergreen campus officials had worked with engineers in the 1990s to study the potential impacts of a seismic event and to evaluate weaknesses in campus infrastructure, and the Nisqually earthquake was the first event to test those findings. Campus officials used this opportunity to ask, “What do we

need to do to become a more resilient campus?” In answering this question, the original engineering studies informed subsequent studies, planning processes, grant applications, and eventual seismic mitigation projects.

The Evergreen State College developed a strategic, methodical process for identifying seismic retrofit projects that

have increased the campus’ resiliency to future seismic events. The success of this project is directly related to the dedication of a specific staff member, Robyn Herring, former Environmental Health and Safety Coordinator.



Following the Nisqually earthquake, the former Evergreen Environmental Health and Safety Coordinator realized the need for a functional emergency response plan and an Emergency Operations Center to ensure coordinated communications during an earthquake response. The Environmental Health and Safety Coordinator began searching for a better understanding of seismic risks and opportunities to reduce those risks. For context, Evergreen functions like a small city by providing a variety of services to students, staff, and faculty while managing critical infrastructure that supports their own business, academic, and residential structures. Effective curriculum delivery demands continuity of services. In order to achieve this, Evergreen needed to understand – and seek to reduce or eliminate – the long-term risk to people and property, by developing plans to mitigate the effects of natural hazards identified as causing the most harm to the community and its infrastructure.

“As a parent I’d want to be told my child will be taken care of and that Evergreen took all measures necessary to mitigate the hazards associated with earthquakes. That reassurance is what we are aiming to provide for the parents of all Evergreen students.”

– Matt Lebens, *Environmental Health and Safety Coordinator*



Project Timeline:

- CAPITAL FUNDS
- LOCAL FUNDS
- FEMA FUNDS

- 2001 Nisqually Earthquake, Washington
- 2003 Thurston County Multi-Jurisdictional Hazard Mitigation Plan: First Version
- 2003 *The Evergreen State College Seismic Studies: Structural & Nonstructural Focus*
- 2009 Thurston County Multi-Jurisdictional Hazard Mitigation Plan: Update 1
- 2012 Clock Tower Seismic Retrofit Completed
- 2013 Student Residence Hall 'A' Seismic Retrofit Completed
- 2015 *The Really Big One*, by Kathryn Schulz
The New Yorker
- 2016 Thurston County Multi-Jurisdictional Hazard Mitigation Plan: Update 2
- 2018 Lab II Office Wing Seismic Retrofit Completed
- 2018 Central Utility Plant Seismic Retrofit (Ongoing)

Concurrently, the college's Environmental Health and Safety Coordinator focused on seismically retrofitting buildings through existing planned building renovations and through grant money for stand-alone projects. In addition, in 2003, Evergreen joined Thurston County in the county's first iteration of a multi-jurisdictional hazard mitigation plan (HMP). Each jurisdiction (city, county, or special district) participating in the HMP planning process becomes eligible for FEMA Hazard Mitigation Assistance (HMA) grant assistance, with FEMA-approval of the plan. Seeing itself as a small city for planning purposes helped to frame how to assess risks, vulnerabilities, and mitigation actions. The county received FEMA grant funding to write most of the plan while Evergreen provided in-kind support through the Environmental Health and Safety Coordinator's engagement in the planning process and Capital Budget funding to a two-phased engineering study. This information was incorporated into the county's HMP. The first phase of this study, The Evergreen State College Seismic Study, written by ABS Consulting, focused on the potential impacts of earthquakes to campus structures. The second phase of the study focused on vulnerabilities to nonstructural infrastructure, such as what would happen to the communications system following an earthquake event. The hazard mitigation planning process provided an opportunity to strategically identify 16 seismic retrofit projects that would have the most benefit to the

campus community. These projects were prioritized by college officials based on Evergreen priorities and needs at the time. As grant funding has become available through FEMA Pre-Disaster Mitigation (PDM) grants and the Hazard Mitigation Grant Program (HMGP), this list of prioritized projects is still the main reference for project ideas.

Thurston County received funding through FEMA's Hazard Mitigation Grant Program to write an HMP. Evergreen provided in-kind support. Capital Budget from Evergreen paid for the engineering studies in the hazard assessment section of the HMP.

Following the College's adoption of the county's HMP, the Evergreen Environmental Health and Safety Coordinator immersed herself in FEMA grant requirements through online and in-person trainings and by reaching out to the State Hazard Mitigation Officer for support. She participated in FEMA Benefit-Cost Analysis (BCA) training, which proved critical for the school's successful application. The training supported her in analyzing the impacts to specific buildings being damaged in an earthquake. For example, if the library was damaged, not only would books be impacted but faculty offices, meeting spaces, and the campus network and telephone, as well as campus business operations. All impacts contributed to a more accurate assessment of vulnerability to earthquakes and a more comprehensive determination of costs to inform a BCA. The

“We had the early 1990's engineering study that highlighted the financial challenges in making the needed seismic retrofits, but we didn't have a clear path to getting the retrofits completed. The HMGP program allowed us to pursue funding sources to correct seismic deficiencies that would have been nearly impossible to correct via traditional state capital budget requests.”

— Robyn Herring, *Former Environmental Health and Safety Coordinator*



Environmental Health and Safety Coordinator dedicated substantial time and focus to steps needed for increasing overall resiliency of the campus to earthquakes. She did this through seeking out training, learning nuances of grant requirements, and developing a relationship with the State Hazard Mitigation Officer. This dedication resulted in many successful and strategic applications, all based on the original prioritized list of 16 projects. Leveraging HMA grant funds, Evergreen is on the path to having completed four retrofit projects: Iconic Clock Tower (2012, HMGP), Student Residence Hall 'A' (2013, HMGP), Lab II Office Wing (2018, PDM), and Central Utility Plant (2018, HMGP).

Through staff dedicated to participating in the HMP process, learning BCA software, and being informed of grant requirements, the college was able to use non-Capital budget funding to strategically retrofit the highest-risk and most critical campus assets.

As the former Environmental Health and Safety Coordinator began developing grant applications, the College's Academic Grants Manager provided advice: "People need to understand the need for the project on an emotional and fiscal level." Having someone on staff who is passionate about increasing campus safety and commits time to exploring the layers of grants requirements is an essential investment. This translates to not a single grant but rather getting a potential series of grants. Robyn Herring, Former Environmental Health and Safety Coordinator.

Interest in natural hazard mitigation can wane after an event as life returns to pre-event state. While this happened among campus officials after the Nisqually earthquake, processes like participating in a hazard mitigation planning team helped maintain momentum and awareness. In addition, a renewed sense of urgency developed in the summer of 2015 as parents of students called the college inquiring about their children's safety following the publishing of *The Really Big One* article in *The New Yorker*. This concern reignited momentum to explore creative ways of reaching the student body and ensuring public safety and continuity of school operations during and after an earthquake. As a result, the college began integrating preparedness drills and earthquake information into student orientations.

Evergreen learned the importance of outreach and awareness by trial and error with their retrofit projects. In the first phase of the first major campus retrofit project, part of the scope included reinforcing a roof overhang by constructing additional exterior shear walls. Prominent sycamore trees needed to be moved to accommodate the new shear walls. The public had not been involved in the process which resulted in pushback. From this pushback, campus officials capitalized on public interest to conduct additional outreach and engagement around the project and to educate on earthquake risk and preparedness. By the second phase, a professor informed on the project status asked to paint a mural on the outside of the new shear wall and lights were installed to illuminate the artwork.

These projects were largely successful because of the dedication of one employee who devoted time to learning FEMA BCA software and Federal grant management requirements, and to developing relationships with State grant partners who could provide technical assistance and support to her project applications. The prioritized retrofit projects stemmed from Evergreen's participation in the Thurston County HMP and were informed by the engineering study from the early 1990s. Ideas for future projects will build on this previous work, using the HMP, prioritization methodology, and fostered relationships with State experts as a template for successful risk reduction. Each project contributes to increasing the College's earthquake awareness and resilience; necessary assets for current students and for attracting future students.





Goal of Showcase:

This booklet highlights The Evergreen State College's success in prioritizing and completing a number of seismic retrofit projects for school infrastructure through multiple FEMA HMA grants, with one single dedicated staff person. This booklet, highlighting Evergreen's story, is part of a collection the FEMA Region X Mitigation Showcases to illustrate the different methods local communities have used to leverage partnerships and collaborate with State and Federal partners to complete mitigation projects that address vulnerabilities to earthquakes and/or tsunamis. These narratives describe how project partners worked together to effectively navigate FEMA HMA requirements, build political and public support, and describe what lessons were learned throughout the project process. Information provided in each booklet intends to inspire and support other communities that wish to pursue similar mitigation action.



Mitigation Project:

The Evergreen State College began exploring seismic risk initially through an engineering study in the early 1990s but gained momentum for mitigation projects after the Nisqually Earthquake in 2001, and again after *The Big One* was published in *The New Yorker* in 2015. These events supported interest in developing a better sense of what assets were most vulnerable to earthquakes and what opportunities existed to mitigate those vulnerabilities. Through FEMA PDM and HMGP funding, Evergreen received four grants for seismic retrofit projects and explored creative ways to engage the student body in hazard awareness. This project highlights the success of a dedicated staff member who developed stronger relationships with the campus community in order to gain support of integrating seismic mitigation into the scopes of existing infrastructure projects. These mitigation projects have enhanced resilience of the College as both a functioning educational facility and as a community to staff and students.



Defining the Hazard:

The Washington State coast is at-risk to earthquakes and tsunamis. In 2001, Olympia experienced the 6.8 magnitude Nisqually earthquake, which elevated political and public awareness of local vulnerabilities to seismic events. In addition to seismic hazards, Evergreen highlighted potential disruptions to students, faculty and essential operations if an essential facility, such as the library, were to be severely damaged. While Evergreen functions as a small city, reaching the student body in the summer and developing methods for reaching permanent and seasonal populations pose unique problems to keeping project stakeholders engaged and informed.

Grants Information

FEMA-1734-DR-WA-27-R

Clock Tower Seismic Retrofit (HMGP)

- Project Amount \$1,005,600 (\$791,700 Federal Share and \$131,950 Local Share)
- Project for The Evergreen State College to seismically retrofit the 122-foot clock tower at the Library building to prevent catastrophic collapse.
- Project completed in October 2012
- Amount expended on project \$251,534 (\$188,650 Federal Share and \$62,884 Local Share)
- Project had a considerable underrun due to lower than estimated construction costs, which resulted in a large amount of funds being de-obligated.

FEMA-1817-DR-WA-20-R

Residence A Seismic Retrofit (HMGP)

- Project amount \$1,456,463 (\$1,092,347 Federal Share and \$364,115 Local Share)

- Purpose of the project is for the Evergreen State College to undertake multiple seismic retrofits to Residence Hall A in order to improve the life and safety rating of the ten-story structure that houses 175 students and professional staff.
- Project completed September 2013
- Total expended on project \$1,219,546.57 (\$914,659.93 Fed Share and \$304,886.64 Local Share)

EMS-14-PC-0013

Lab II Office Wing Seismic Retrofit (PDM)

- Original project amount \$136,252 (\$102,189 Federal Share and \$34,063 Local Share)
- Purpose of the project is for the Evergreen State College to seismically stabilize the structural components of its Lab II building's office wing by adding sheer walls in areas identified on the seismic analysis included in the project

application. In its current condition, the Lab II building does not meet the life safety seismic performance standard. The retrofits are intended to bring the office wing into compliance with at least the life safety seismic standards.

- Project completed in August 2018. Awaiting final project closeout.
- Amendment executed in December 2016 adjusting the funding.
- Updated project award through 2016 amendment was \$360,941 (\$270,706 Federal Share and \$90,235 Local Share).
- Estimated final project cost is \$281,401 (\$211,051 Federal Share and \$70,350 Local Share).

FEMA-4188-DR-WA-3-R

CUP Seismic Retrofit (HMGP)

- Project Amount \$382,713 (\$287,034.75 Federal Share; \$47,839.12 State Share; and \$47,839.13 Local Share)
- Purpose of the project is to seismically retrofit the Central Utility Plant to reduce the likelihood of catastrophic high-pressure boiler failure and to maintain essential campus utilities following an earthquake.
- Project ongoing, with estimated completion in August 2019.
- Amendment executed in April 2018, extending period of performance to November 2019.

LESSONS LEARNED:

- A key staff person dedicated to learning BCA software modules and championing grant applications was integral to the success of these projects.
- FEMA BCA training is supportive for navigating the grant application process and understanding how to look at potential impacts of a natural hazard event on community assets.
- Strong partnerships developed through the planning process for the county HMP and other engineering studies were key to the success of many projects. Necessary political support for retrofit projects was also developed through these planning processes.
- The process for leveraging FEMA grant funds is slower and more comprehensive than using Capital Budget for retrofit projects; however, political support could be gained by using FEMA funding.
- Explore potential creative outreach projects in your community. For example, other colleges could reach out to professors and graduate students for project management.
- A smaller entity, such as a small liberal arts school, can be successful accessing FEMA grant funding by listening to advice from successful grantees, learning FEMA's planning and grant processes, and taking time to accurately represent the nuanced details the grant will support.

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