

# UW CEE Industry Capstone Study

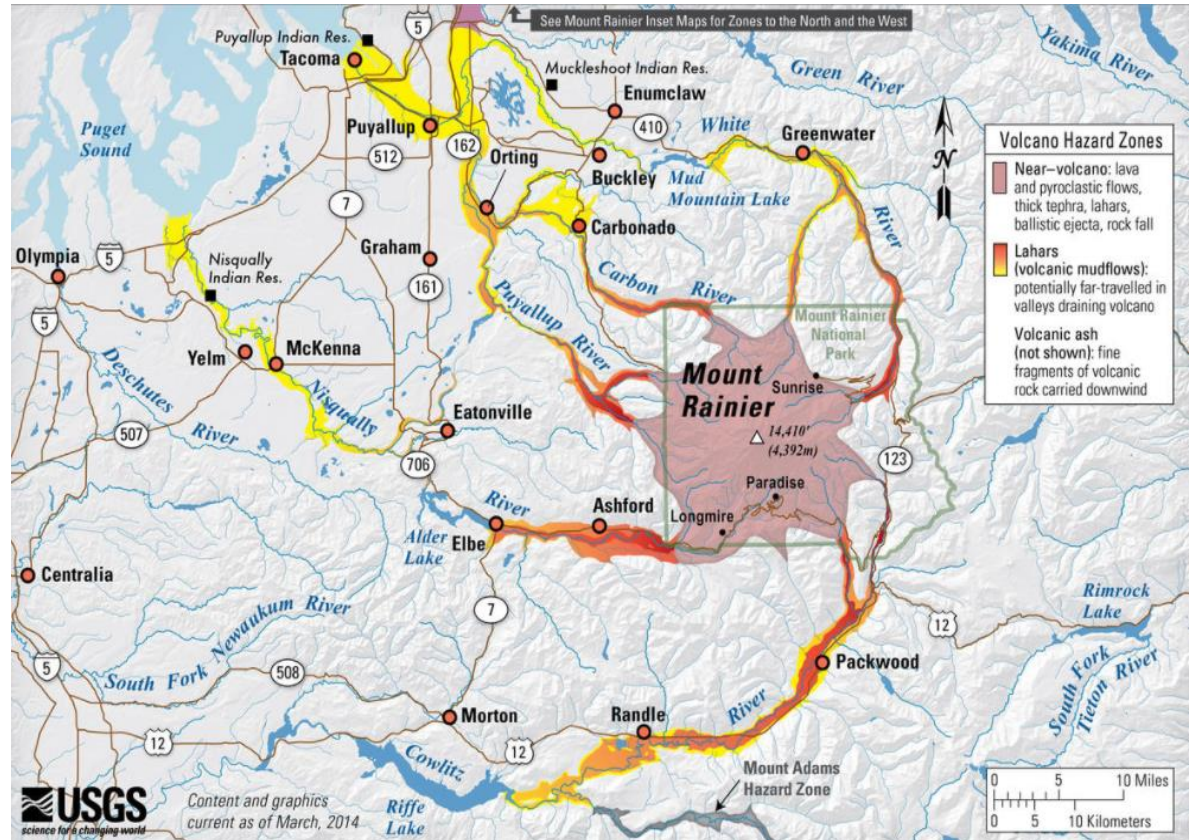
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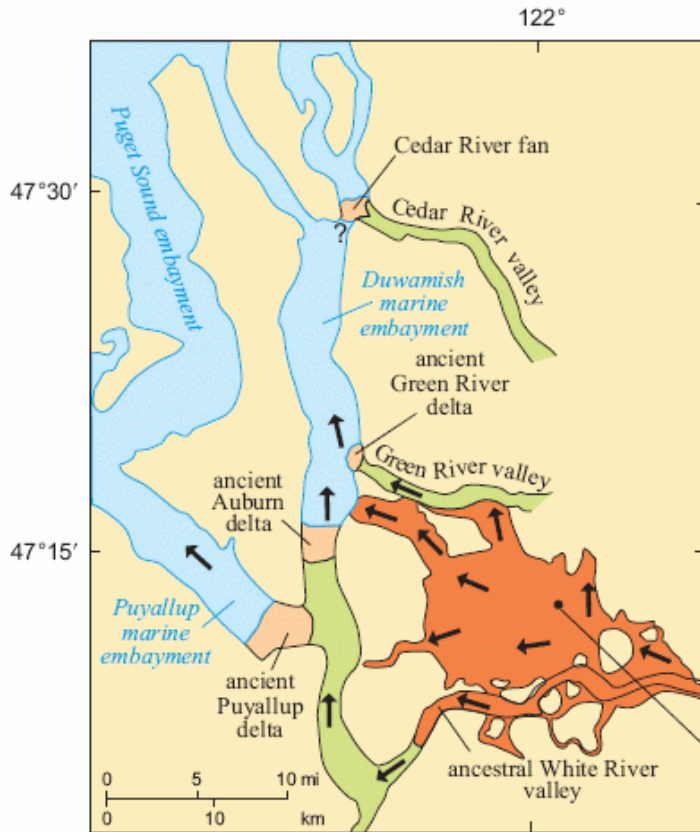
# Lahar Risk

- Snowmelt and hydrothermally-altered rock increases flow
- Fife is at the base of converging flow paths
- Rough average = 10-30 feet, 20-40 ft/s

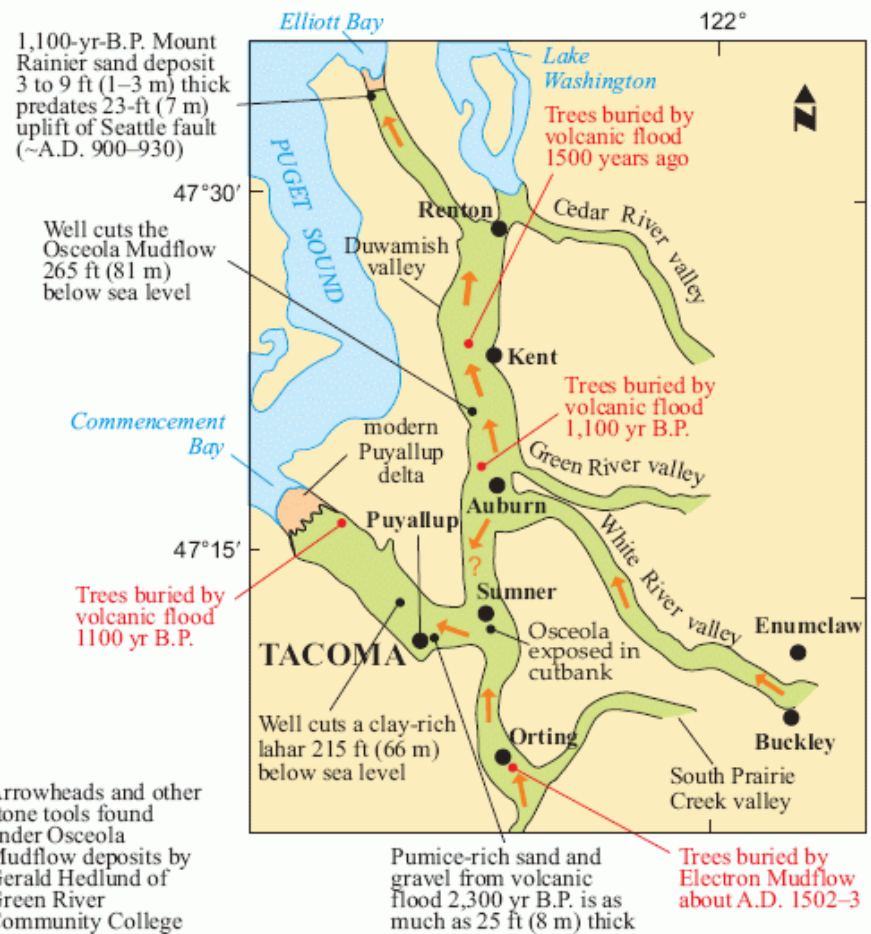


# Lahar Risk

A. About 5600 years ago



B. Present



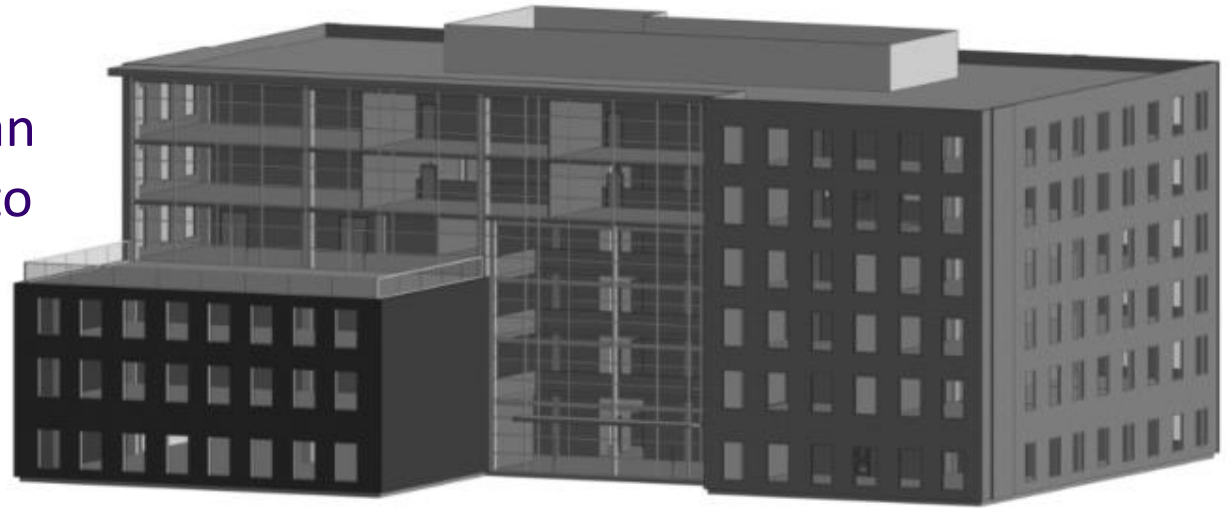
Arrowheads and other stone tools found under Osceola Mudflow deposits by Gerald Hedlund of Green River Community College

- Land surface in valley bottoms
- Osceola Mudflow deposit exposed on glacial drift plain
- Delta
- Path of the Osceola Mudflow
- Path of post-Osceola lahars and volcanic floods

# Design Approach

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We chose to design an archetype structure to explore the hazard-specific needs

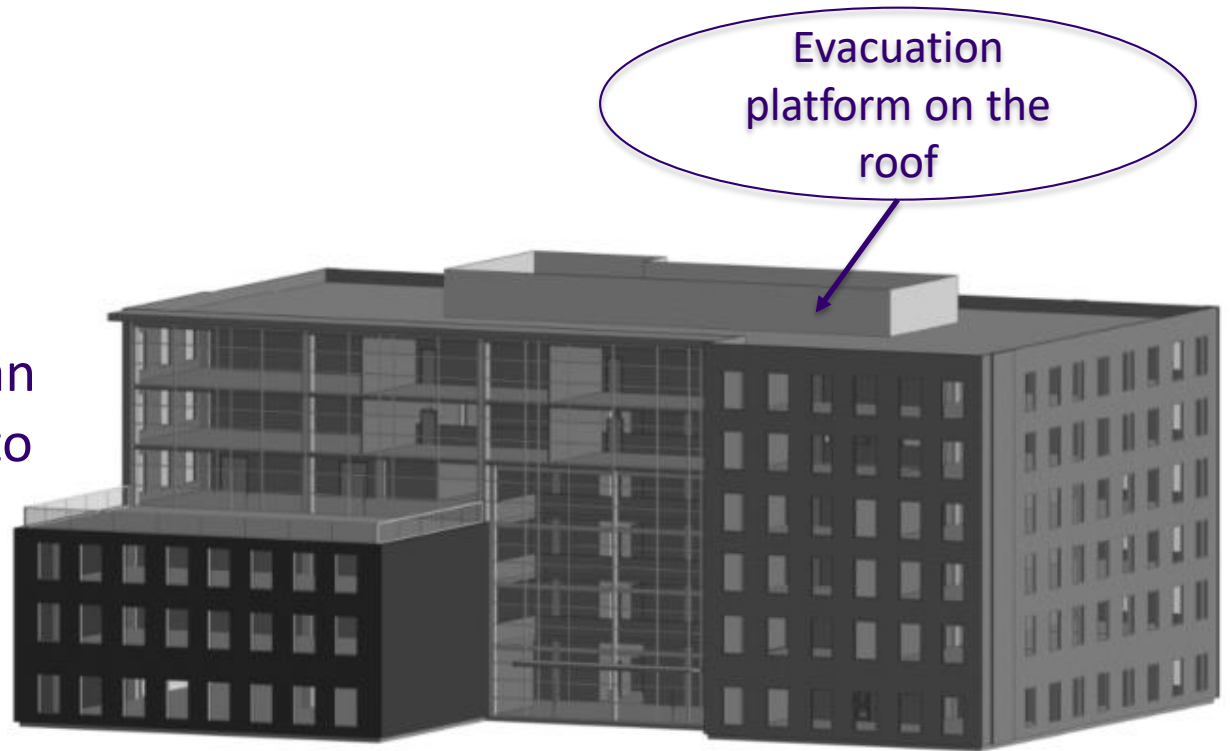


- 6 Stories
- Windscreen at the top
- Terrace at the 4th Floor
- Glass at Entrance up to the roof
- Open atrium from ground floor to floor 4
- Overhang on the roof

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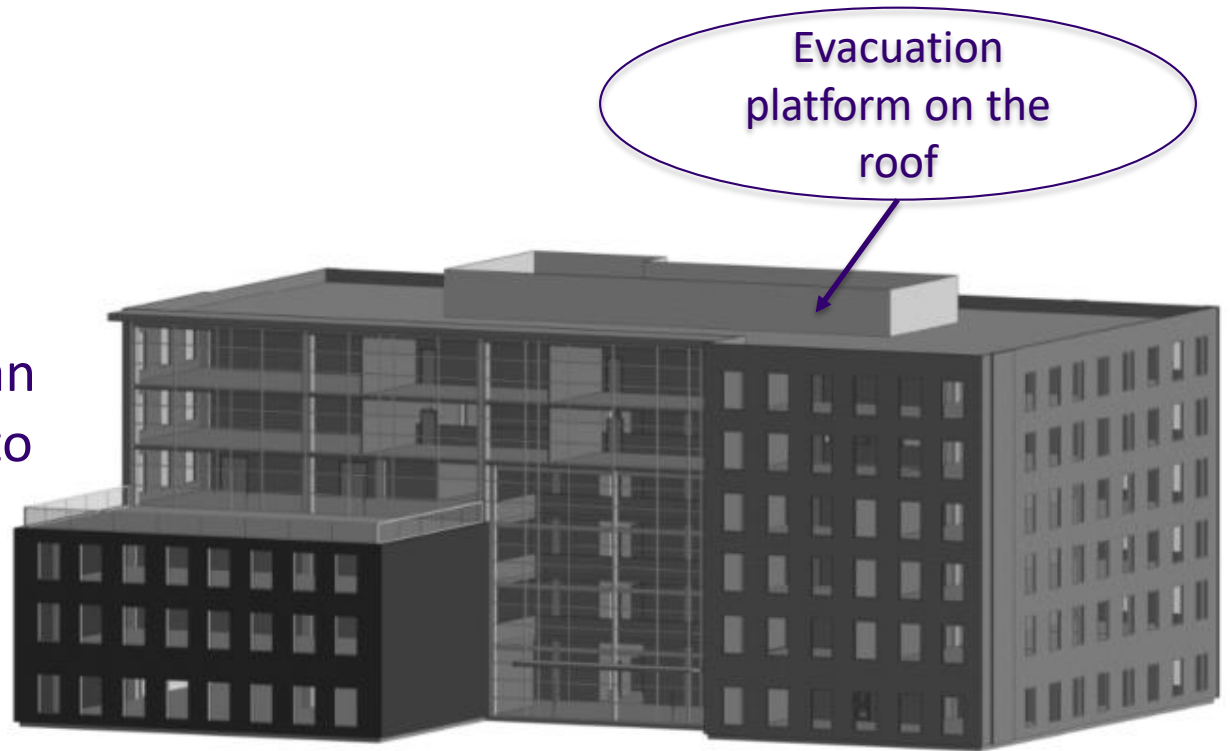
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# Structural Loading

- ❖ All structures in the PNW are designed for significant seismic loading, but tsunami loading was only recently included in the design guidelines

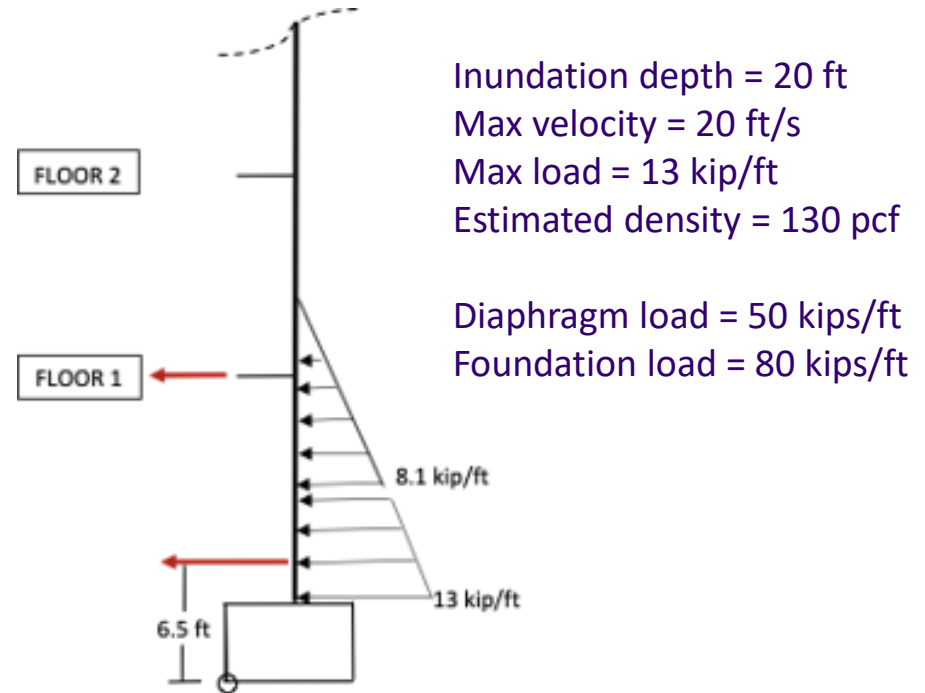
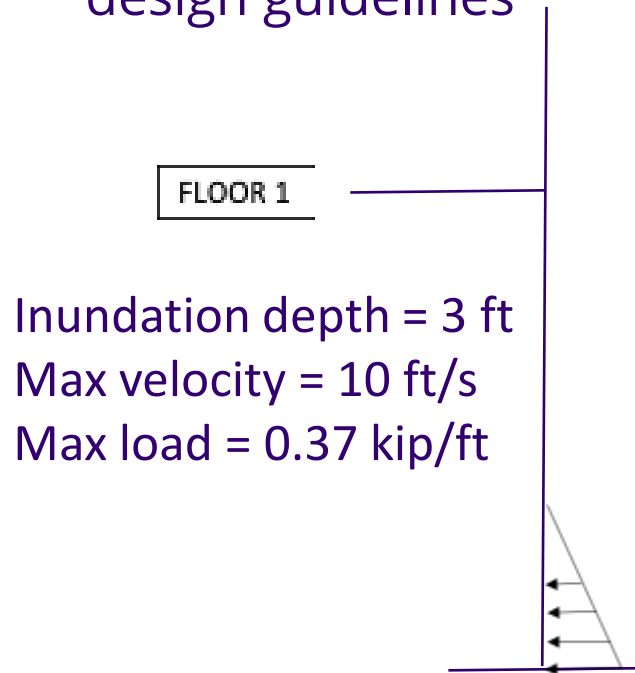


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# Lahar loading

- ❖ Because of the increased magnitude and uncertainty associated with lahar, groups recommended a protection structure instead of designing the building for lahars



Figure from Pierson et al, Journal of Applied Volcanology

- ❖ This will require additional study, but presents an option for simpler structural design of the relevant buildings

# Industry Capstone

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- ❖ Finally, we want to thank the City of Fife for their support
- ❖ Typical enrollment for these courses is ~4-6 students. We had 17 students participate, giving us 3 groups to engage with
- ❖ Special thanks to Greg Vigoren and Taylor Jones for their participation across the duration of this project, as well as Jill Kaatz and Dorian Varga of UW for initiating this discussion