

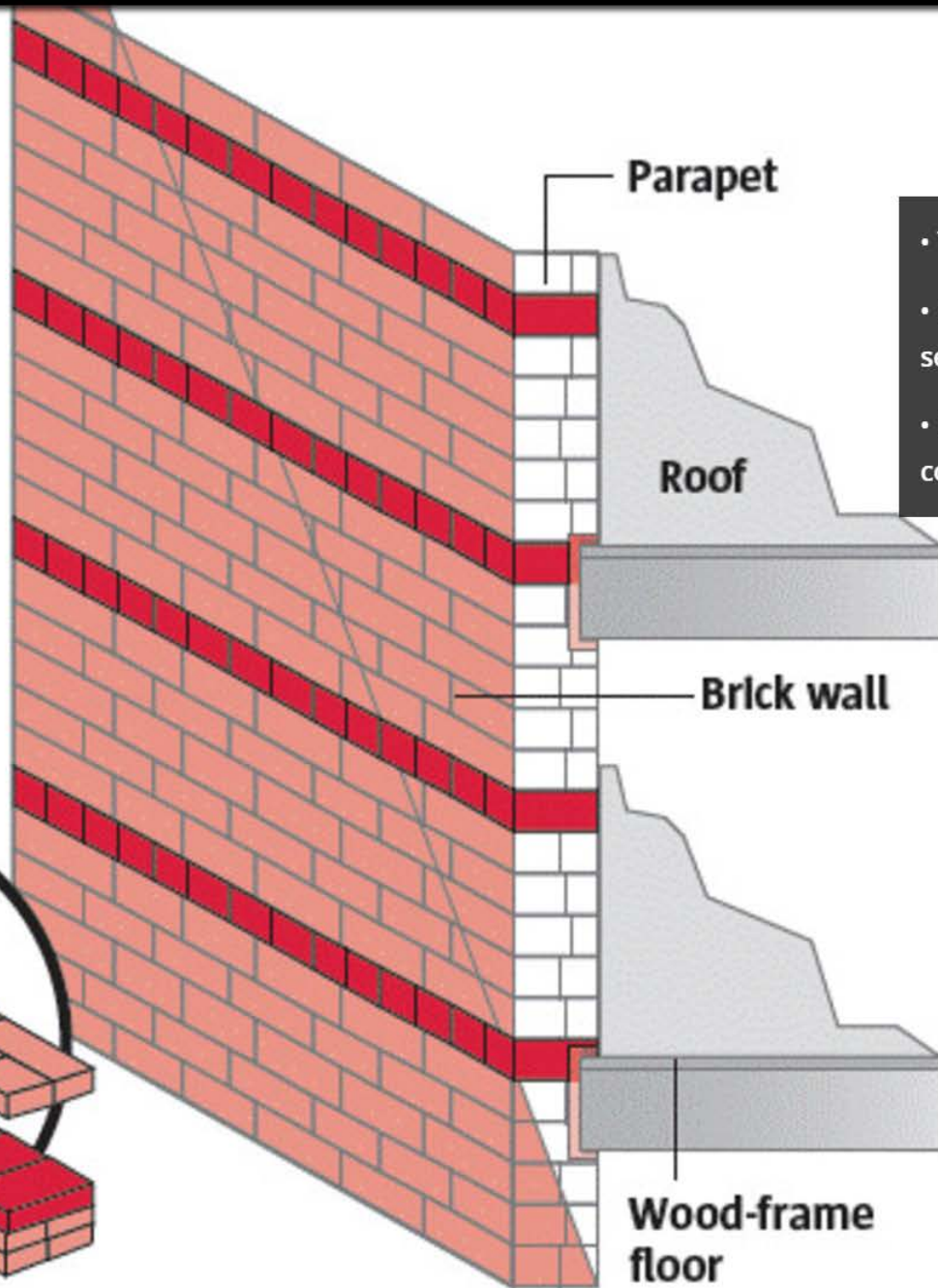
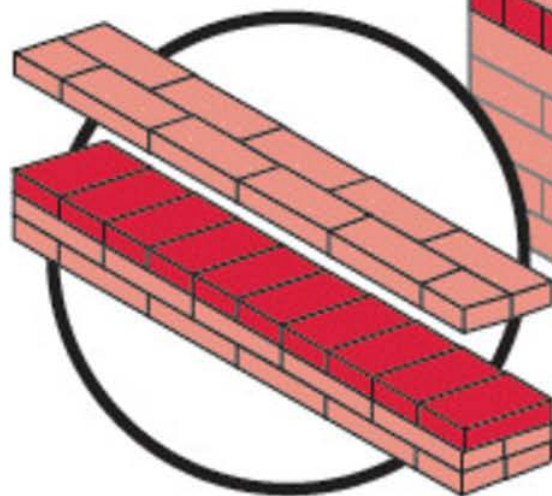


Unreinforced Masonry Buildings





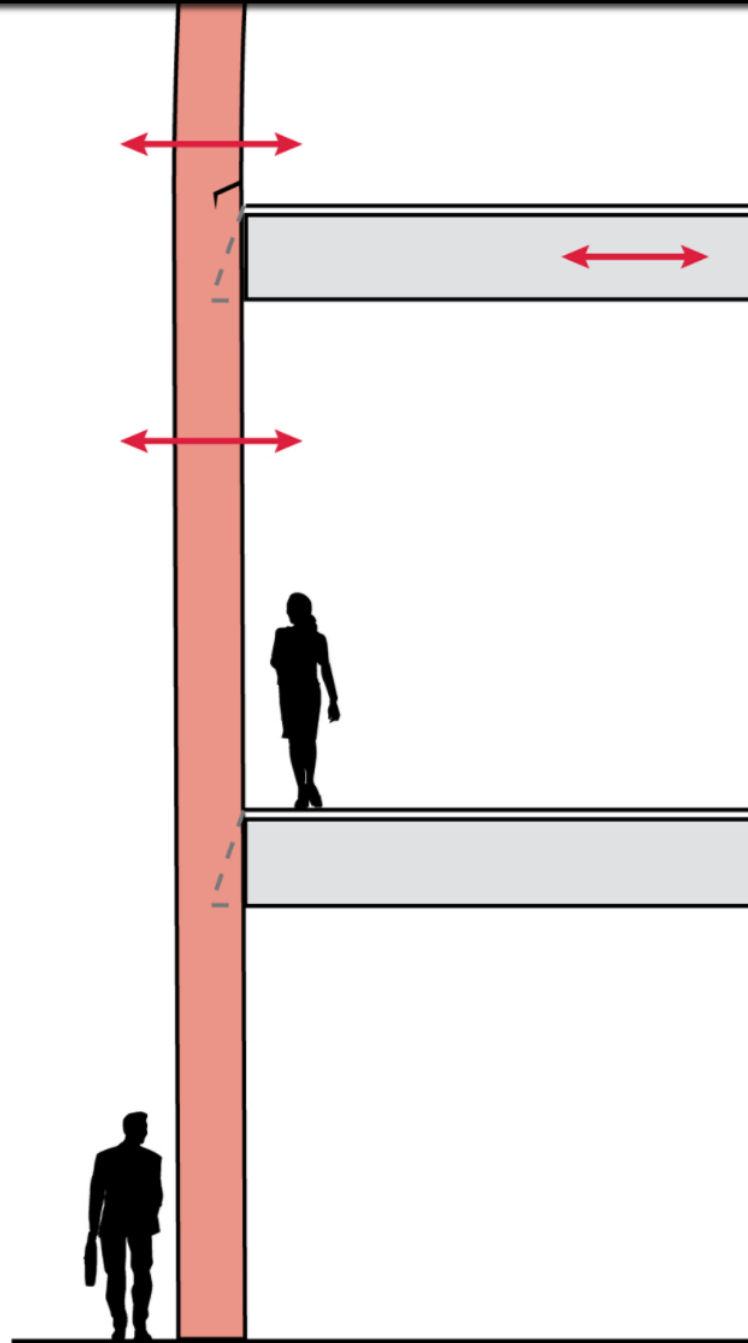
- **Header courses**
Bricks turned on end, leaving no room for reinforcing rods between layers. They occur around every 5th or 6th row of bricks.



- Typically built before 1945
- Parapets and walls are not secured to the roofs and floors
- Do not meet current building code standards



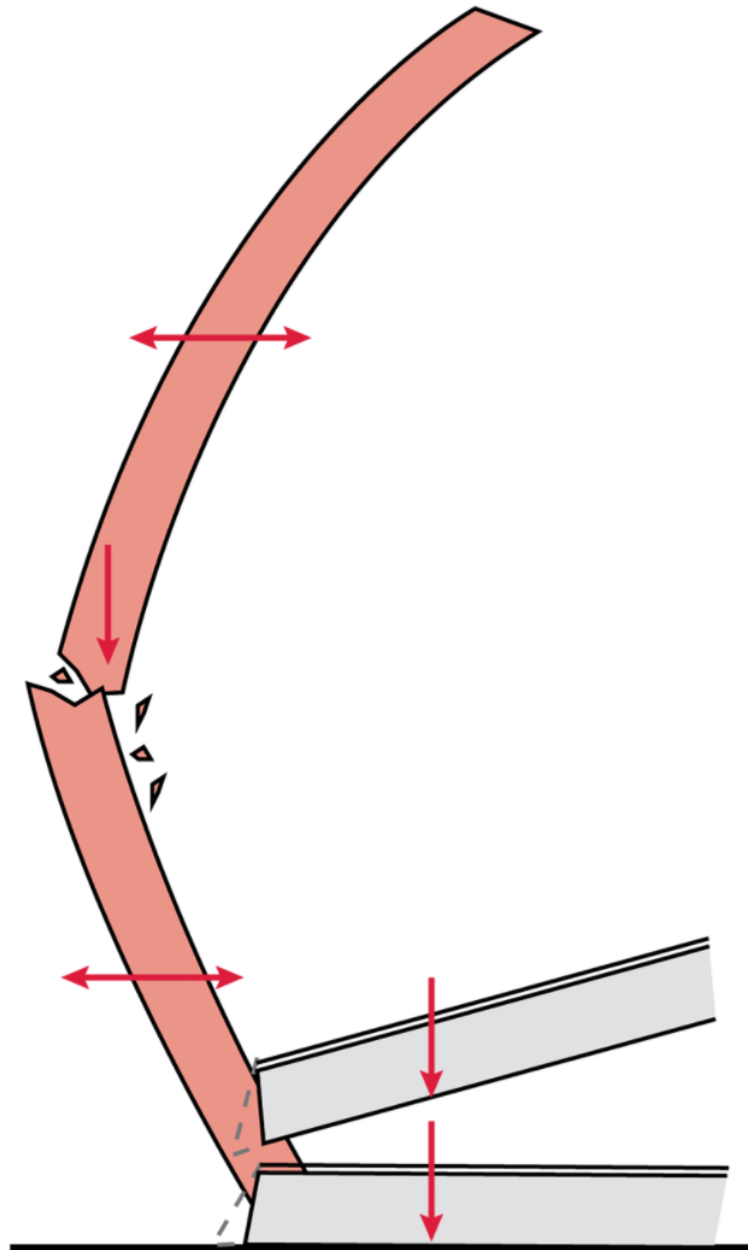
- URM's are at a much greater risk of damage and collapse as the result of an earthquake.
- Failing facades and parapets can injure or kill pedestrians and block the right of way, greatly impeding response and recovery times.





The total collapse of buildings will greatly increase the loss of life and the economic impacts experienced during an earthquake.

**Graphics: Stephanie Redding | The Seattle Times. "Seattle's old brick buildings could see huge damage in big quake," Seattle Times, August 10, 2015.*



Cadillac Hotel



Above: Ca 1920; Below: 2001



Above: post-Nisqually; Below: 2014

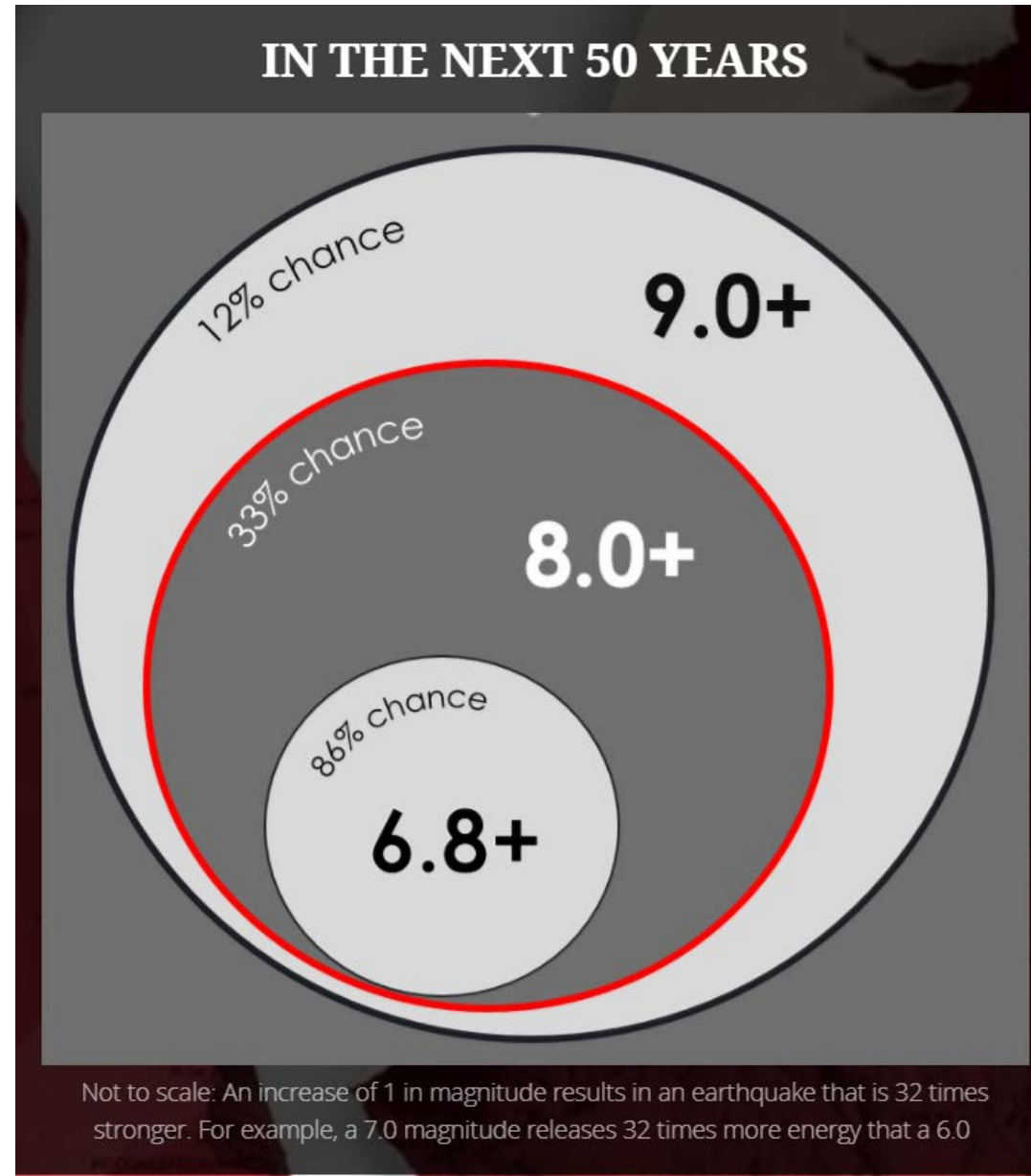


Christchurch 2011



Seattle's Earthquake Risk

Not to scale: An increase of 1 in magnitude results in an earthquake that is 32 times stronger. For example, a 7.0 magnitude releases 32 times more energy than a 6.0



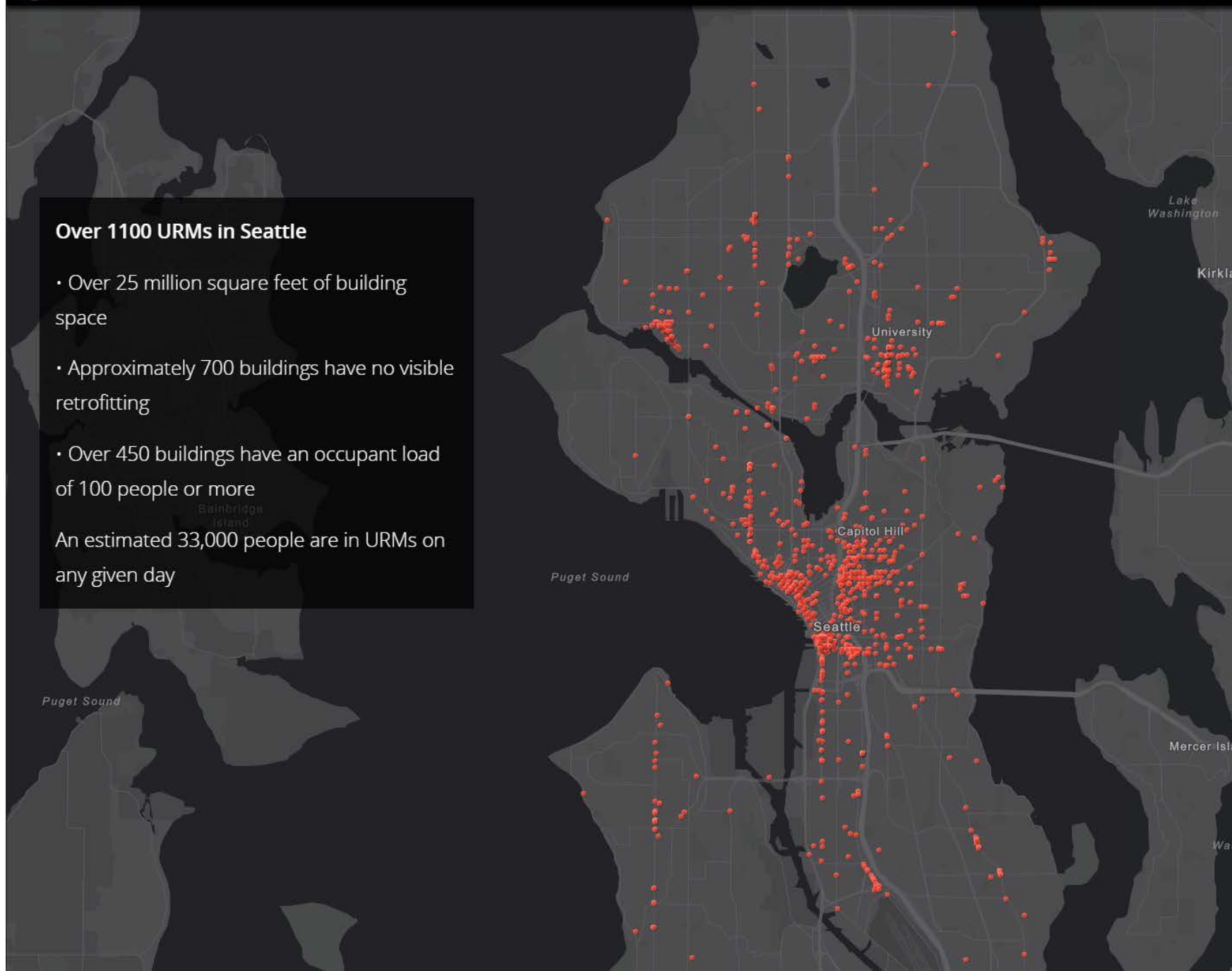


Unreinforced Masonry Buildings

Over 1100 URMs in Seattle

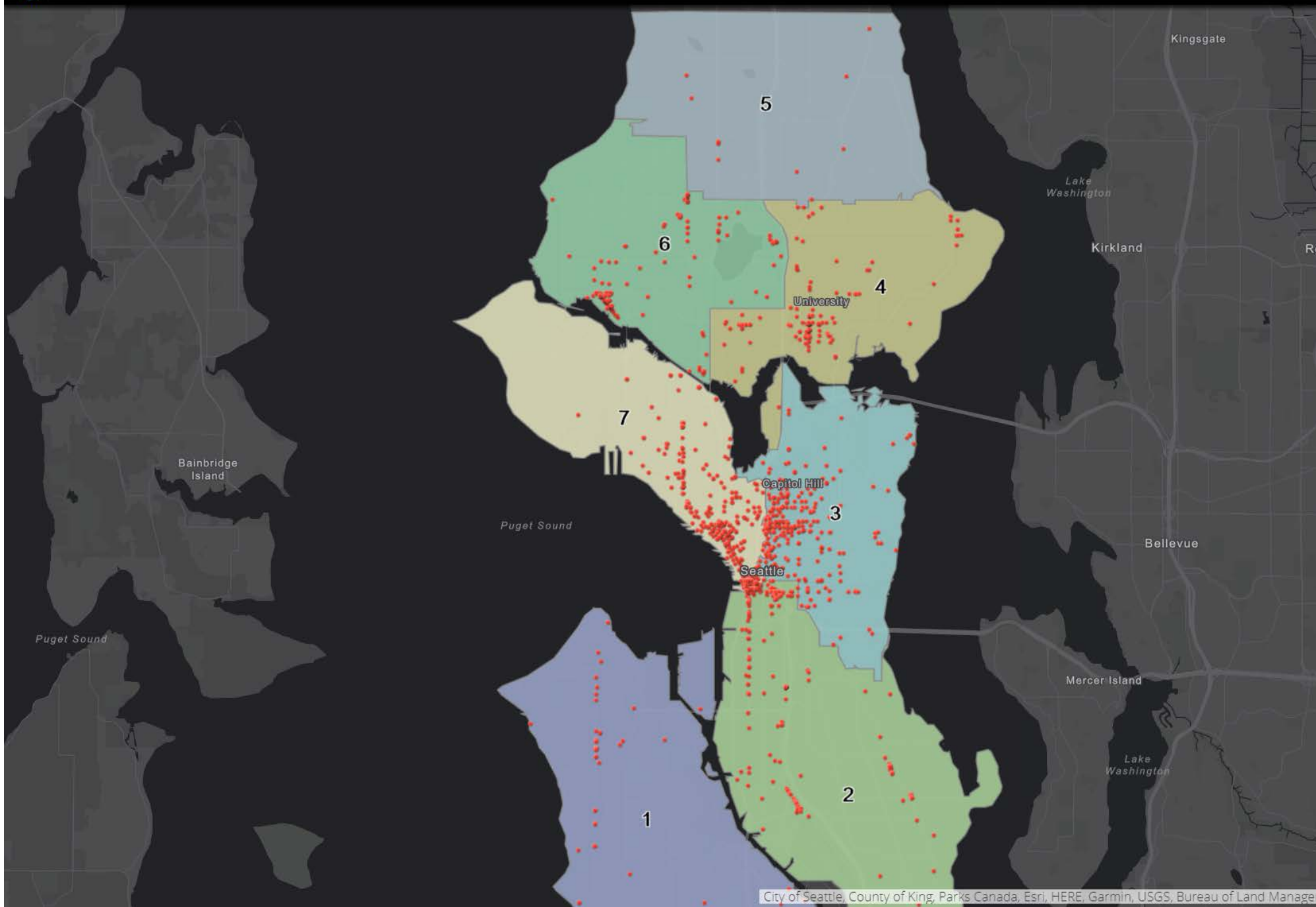
- Over 25 million square feet of building space
- Approximately 700 buildings have no visible retrofitting
- Over 450 buildings have an occupant load of 100 people or more

An estimated 33,000 people are in URMs on any given day





Unreinforced Masonry Buildings





RECOMMENDED RETROFIT ORDINANCE

- (1) parapets be braced;
- (2 and 3) floors and roofs be structurally connected to URM walls;
- (4) out of plane wall bracing

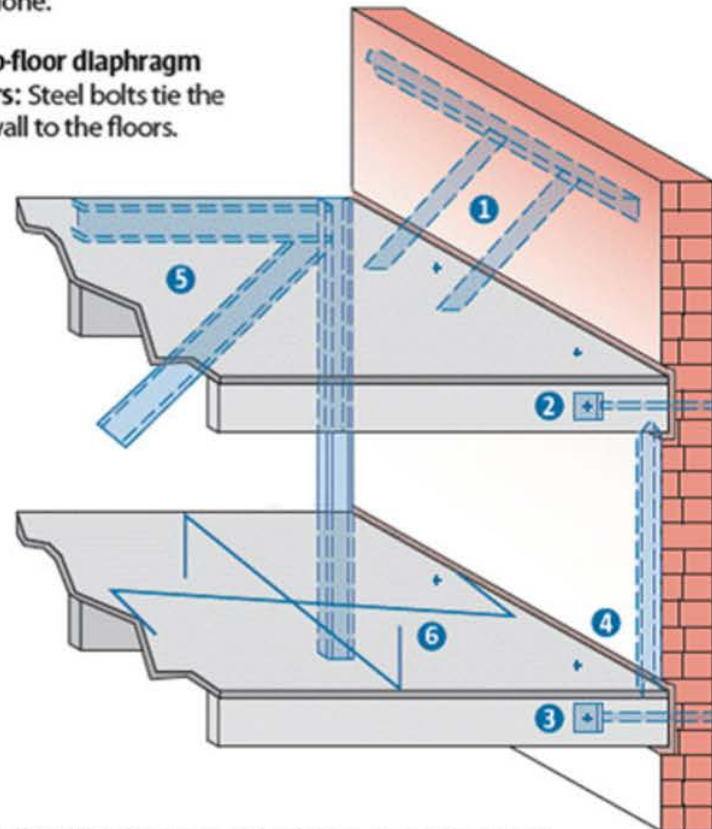
***Graphics:** Stephanie Redding | *The Seattle Times*. "Seattle's old brick buildings could see huge damage in big quake," *Seattle Times*, August 10, 2015.

REQUIRED

- 1 Parapet bracing:** The portions of a wall that extend past the roof (parapet) need a diagonal bracing that is generally made of steel.
- 2 Wall-to-roof diaphragm anchors:** Steel bolts horizontally secure the brick wall to the roof. Rosettes seen on the outside of a building can indicate that this retrofit has been done.
- 3 Wall-to-floor diaphragm anchors:** Steel bolts tie the brick wall to the floors.

SOMETIMES REQUIRED

- 4 Out-of-plane wall bracing:** Steel beams that vertically connect the brick wall to the floors to keep the wall from bending.
- 5 Overall building bracing*:** Steel beams that increase a building's overall strength.
- 6 Diaphragm strengthening*:** Plywood sheathing that strengthens floors and roofs.



Note:* Overall building bracing and diaphragm strengthening are often important for buildings with large windowed shops on the first level.



Policy Committee Recommendations

CRITICAL Risk: schools and critical facilities (hospitals, fire stations, etc.). This category

77 buildings

	CRITICAL Risk
Notification	year 0
Assessment	+1 year
Apply for Permit	+1 year
Approve Permit	+1 year
Retrofit Completion	+ 4years
Total time allowed (notification to retrofit completion)	7 years





Policy Committee Recommendations



HIGH Risk: buildings greater than 3 stories on **poor soil** (**liquefaction**, **potential slide**, **steep slope**) or buildings with more than 100 occupants in an assembly space.

183 buildings

	HIGH Risk
Notification	year 0
Assessment	+2 years
Apply for Permit	+2 years
Approve Permit	+1 year
Retrofit Completion	+5 years
Total time allowed (notification to retrofit completion)	10 years

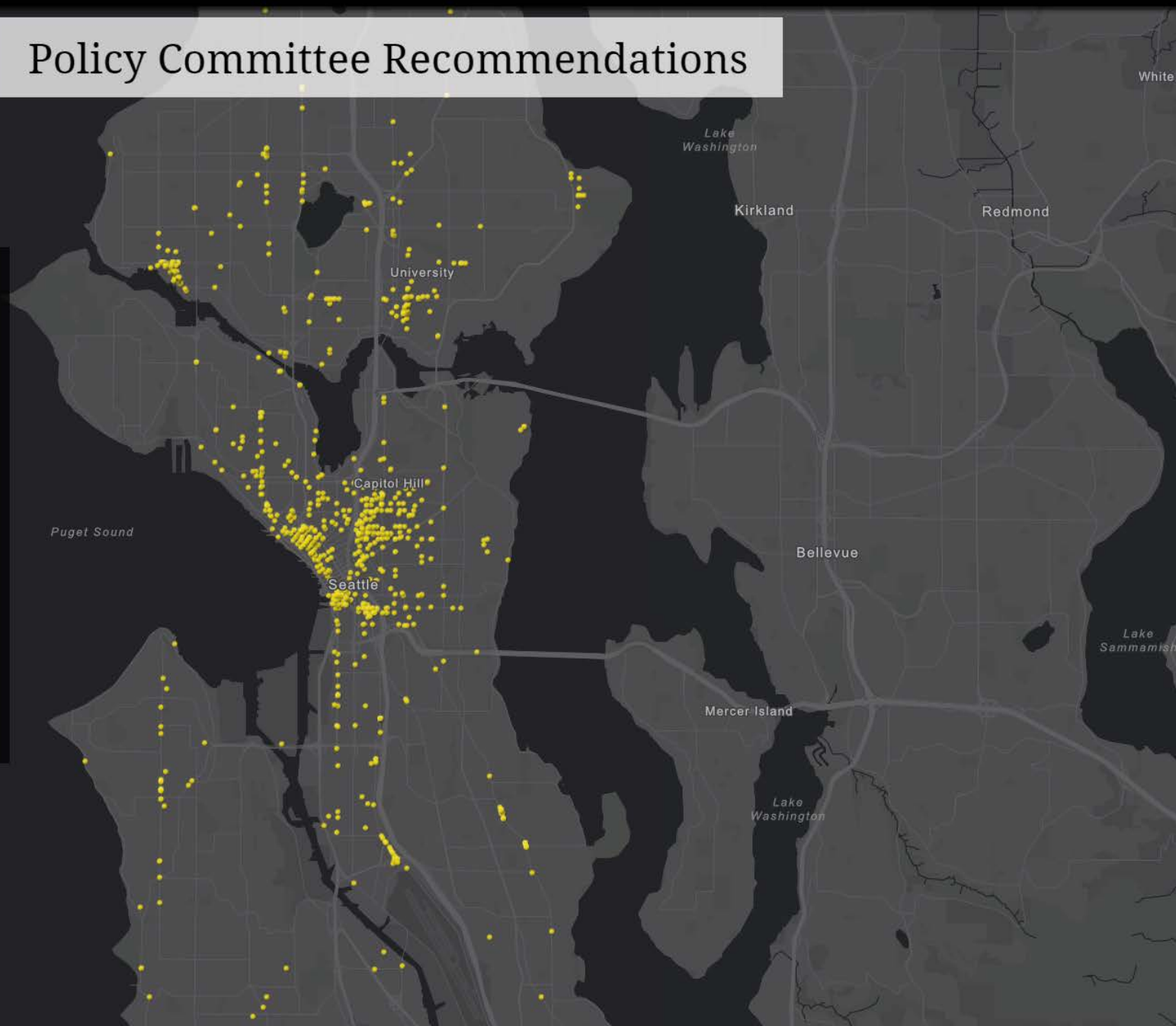


Policy Committee Recommendations

MEDIUM Risk: all other URM buildings.

902 buildings

	MEDIUM Risk
Notification	year 0
Assessment	+3 years
Apply for Permit	+ 2 years
Approve Permit	+1 year
Retrofit Completion	+7 years
Total time allowed (notification to retrofit completion)	13 years





Policy Committee Recommendations

Risk Category	Number of Buildings	Time to Complete Retrofit
Critical	77	7 years
High	183	10 years
Medium	902	13 years

Puget Sound

Seattle

Capitol Hill

University

Lake Washington

Kirkland

Redmond

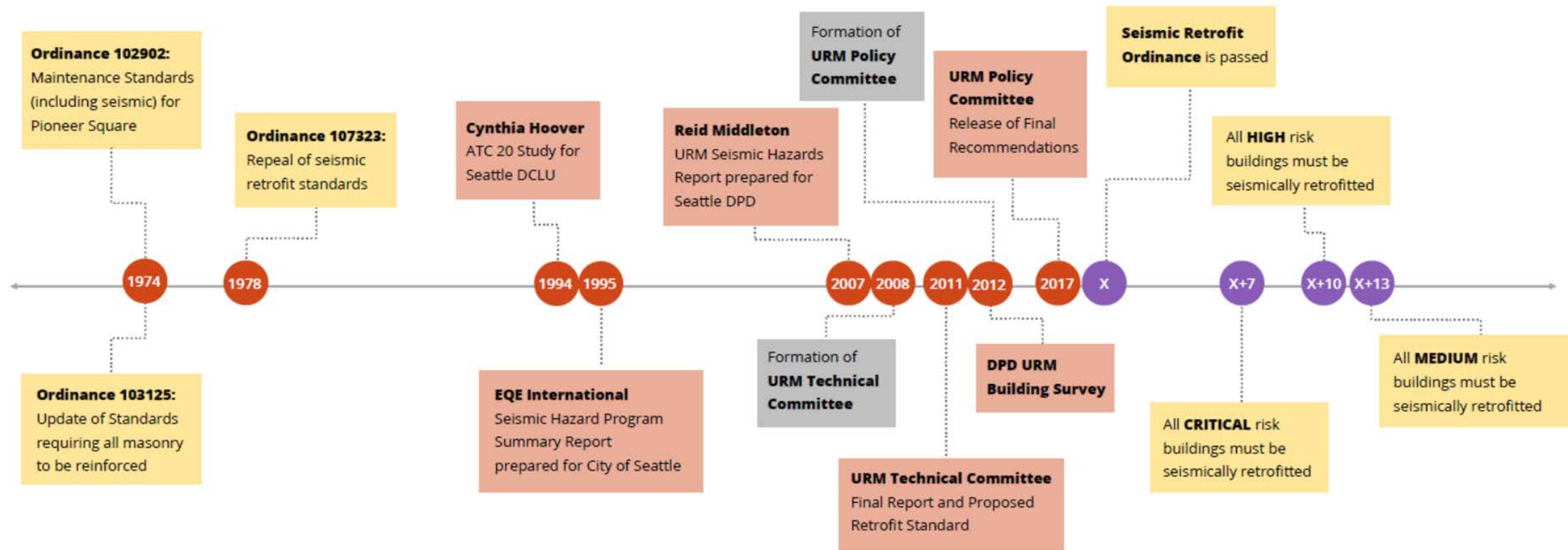
White

Bellevue

Lake Sammamish

Mercer Island

Lake Washington



Ordinance

Study or Report

Committee

*Timeline events reference the department name at the time of the event:

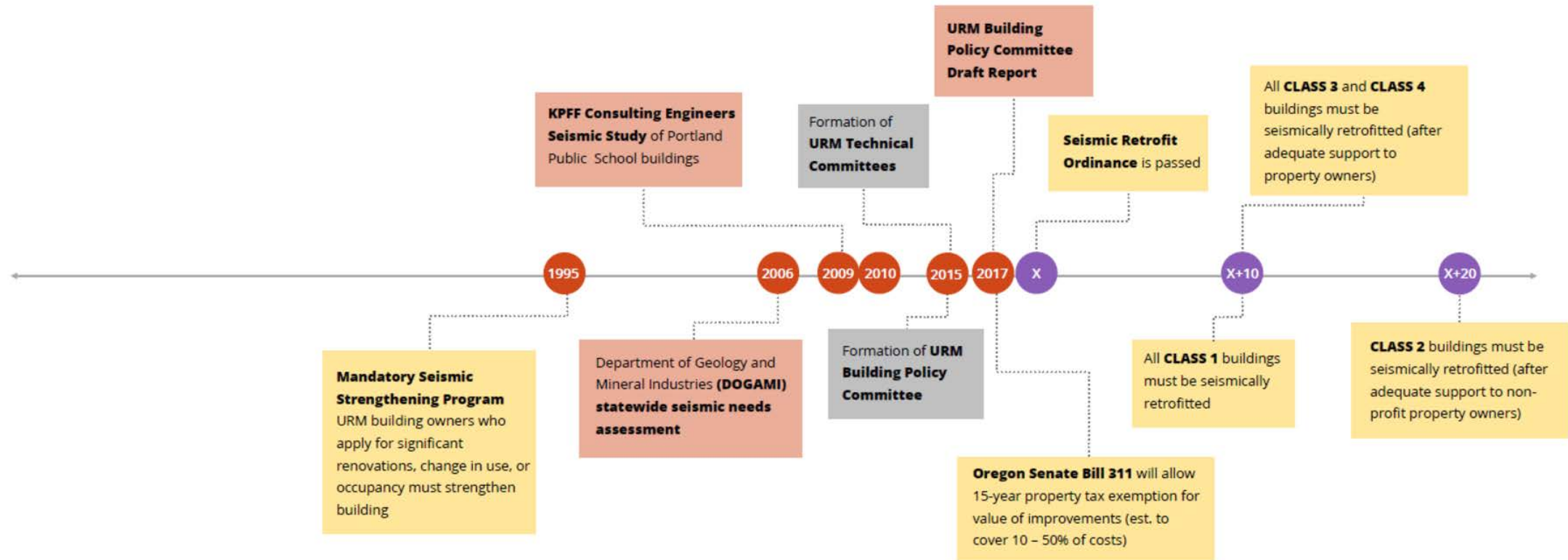
Prior to 1999: Department of Construction and Land Use (DCLU)

1999-2003: Department of Design, Construction and Land Use

2003-2016: Department of Planning and Development (DPD)

2016-Present: Department of Construction and Inspections (SDCI)





Ordinance

The following terms are used by the URM Building Policy Committee in their Draft Recommendations:

Study or Report

CLASS 1: Critical Buildings

CLASS 2: School buildings, or Risk Category III Buildings

CLASS 3: All URM buildings that have 10+ occupants that are not critical facilities, schools or Risk Category III buildings

CLASS 4: 1 and 2 story buildings with 0-10 occupants

Committee

