



Johnson Broderick Engineering

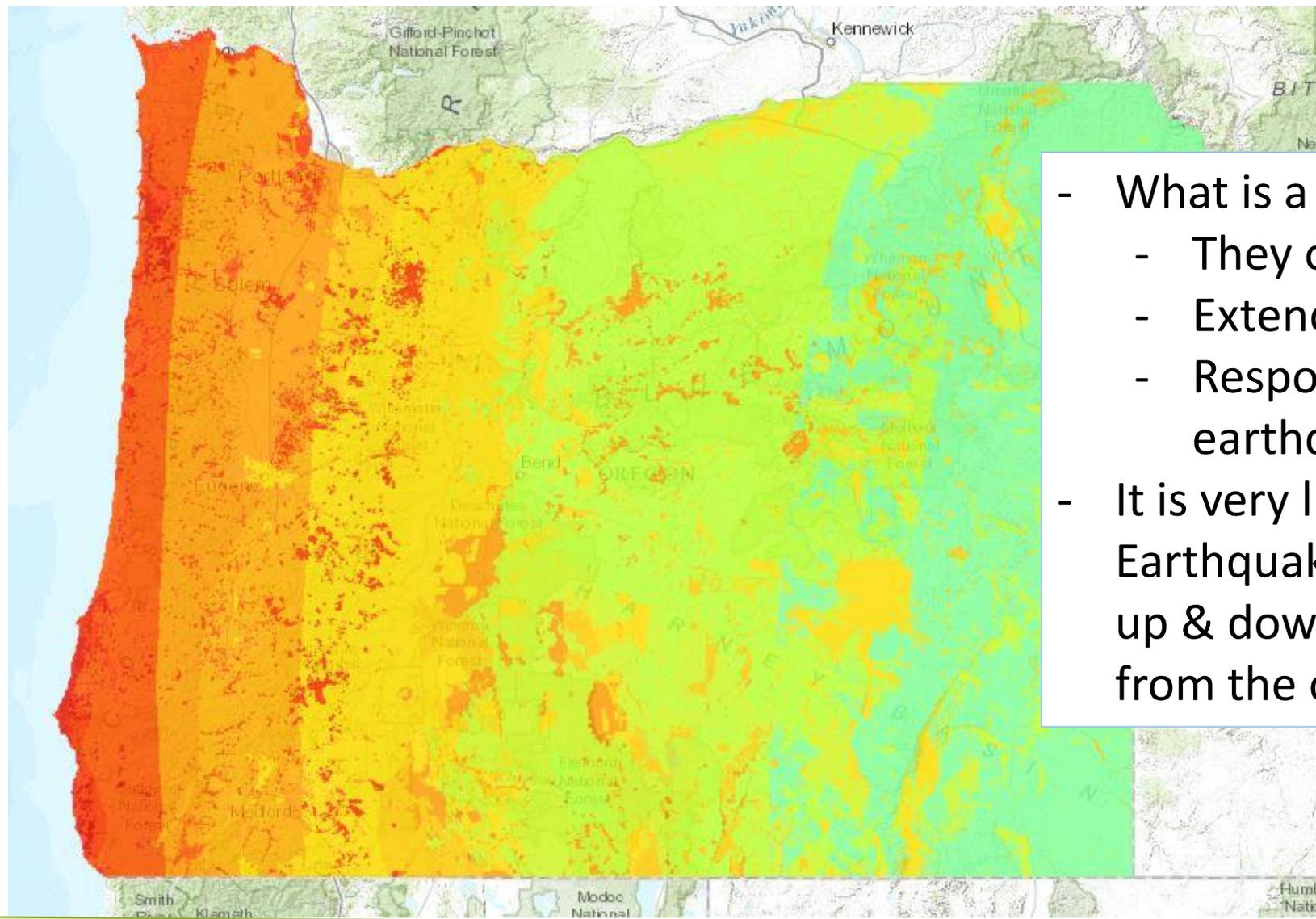
is a structural and civil engineering firm located in Eugene, Oregon.

We have been serving the local building and design community for the past 13 years.

We have the expertise that allowed us to serve on the design teams of large-scale projects and the approachability to assist the homeowner, contractor, architect, and business owner.

No project is too big or too small.

Feel free to call us, stop by and pay a visit, or send us an email - we'd love to hear from you.

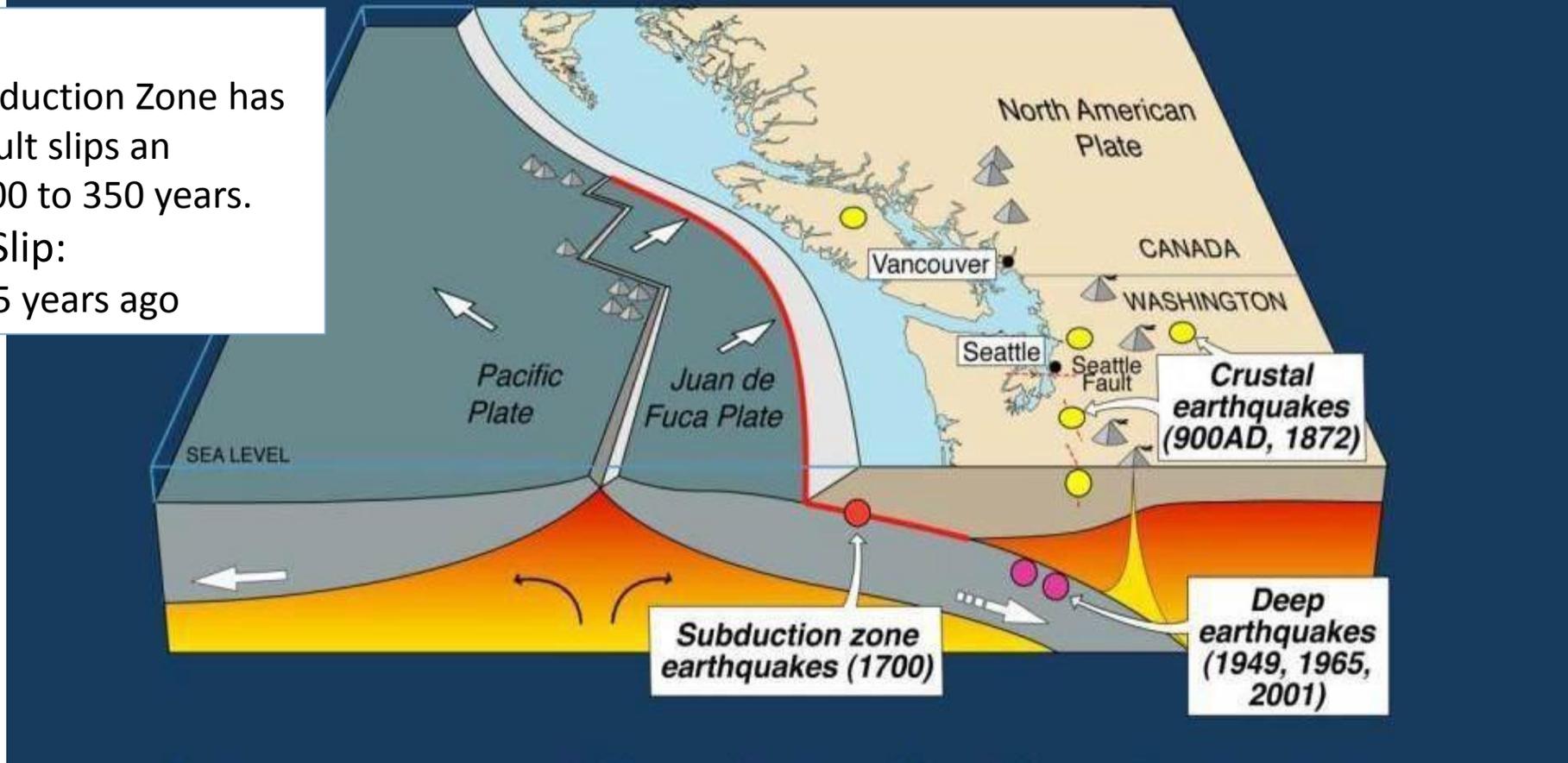


- What is a subduction earthquake?
 - They occur deeper
 - Extend along fault lines for many miles
 - Responsible for the largest-magnitude earthquakes
- It is very likely a Cascadia Subduction Earthquake will cause massive devastation up & down the entire Pacific Northwest from the coast inland to the cascades.

<http://www.oregongeology.org/sub/hazvu/>

CASCADIA SUBDUCTION ZONE

Historically:
Cascadia Subduction Zone has had major fault slips an average of 300 to 350 years.
Last Major Slip:
Jan 1700; 315 years ago



pnsn.org

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EARTHQUAKE IMPACTS

GROUND EFFECTS:

- Shaking
- Liquefaction
- Subsidence
- Land Slides
- Tsunami



keithwoodford.wordpress.com

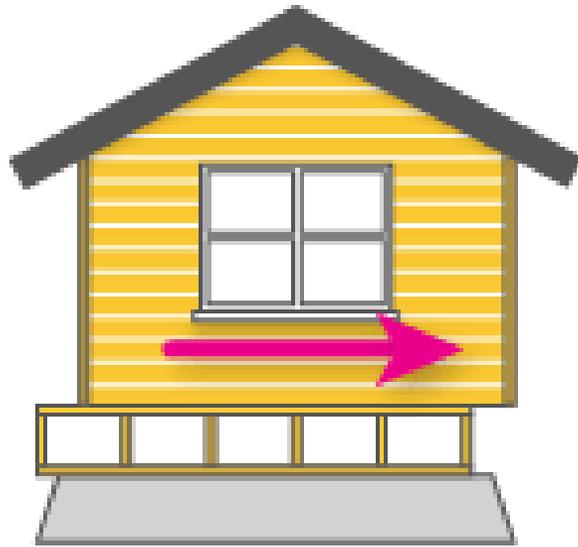


walrus.wr.usgs.gov/tsunami/sumatra05/subsidence.html



lbtimes.co.uk

STRUCTURAL IMPACTS OF AN EARTHQUAKE

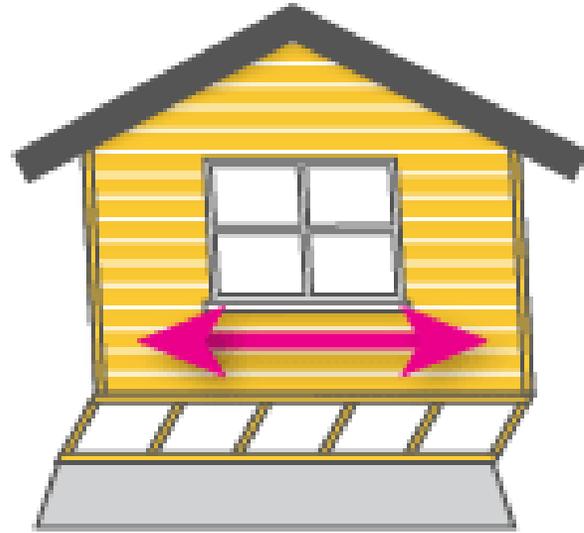


Sliding



www.oldhouseweb.com

STRUCTURAL IMPACTS OF AN EARTHQUAKE

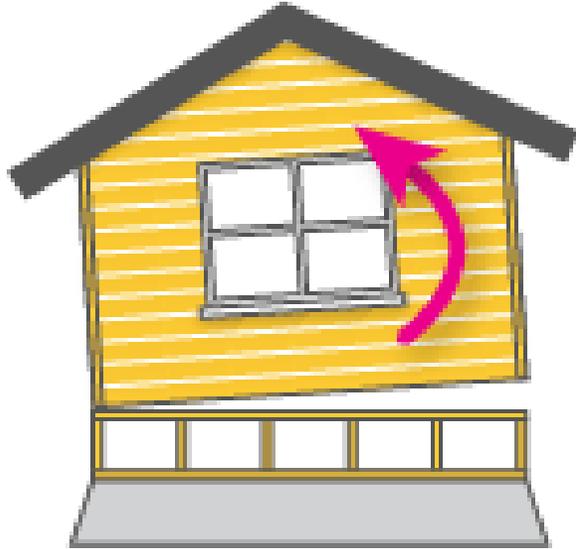


Racking



www.BayAreaRetrofit.com

STRUCTURAL IMPACTS OF AN EARTHQUAKE



Overturning



peer.berkeley.edu

STRUCTURAL IMPACTS OF AN EARTHQUAKE

Masonry Failures

-Chimneys, Brick Walls, &
Retaining walls



www.juliansrockandiceblog.blogspot.com/

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STRUCTURAL IMPACTS OF AN EARTHQUAKE

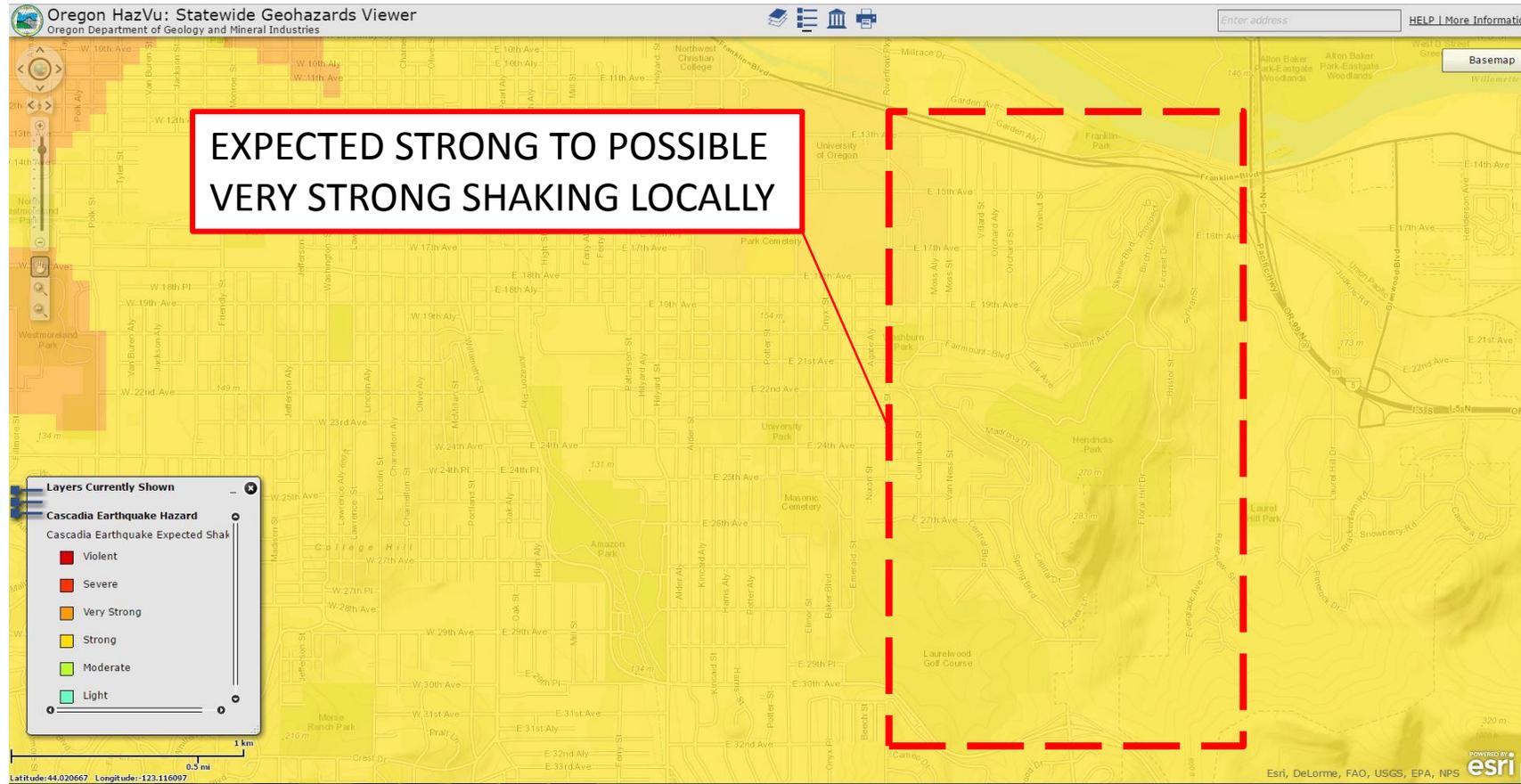
Non-Structural Hazards

-Water heaters, bookshelves,
& other large unsecured
furniture

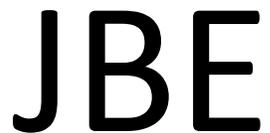


www.neighborhoodlink.com

FAIRMOUNT NEIGHBORHOOD – GROUND SHAKING



www.oregongeology.org/sub/hazvu/



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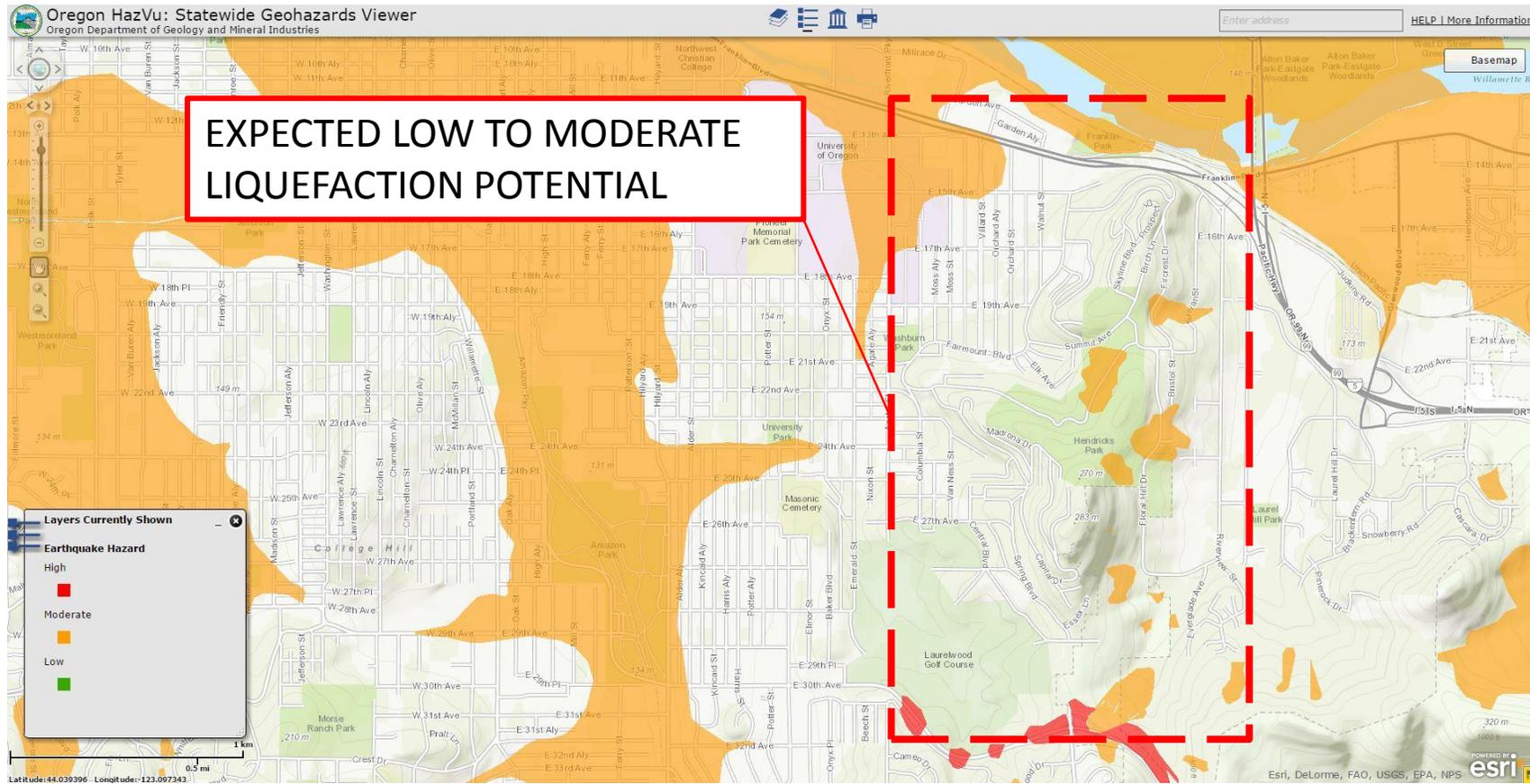
FAIRMOUNT NEIGHBORHOOD – GROUND SHAKING

STRONG: Difficult to stand or walk; damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.

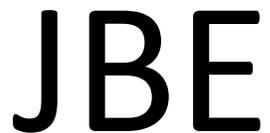
VERY STRONG: Difficult to stand or walk, damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.

www.oregongeology.org

FAIRMOUNT NEIGHBORHOOD – LIQUEFACTION POTENTIAL



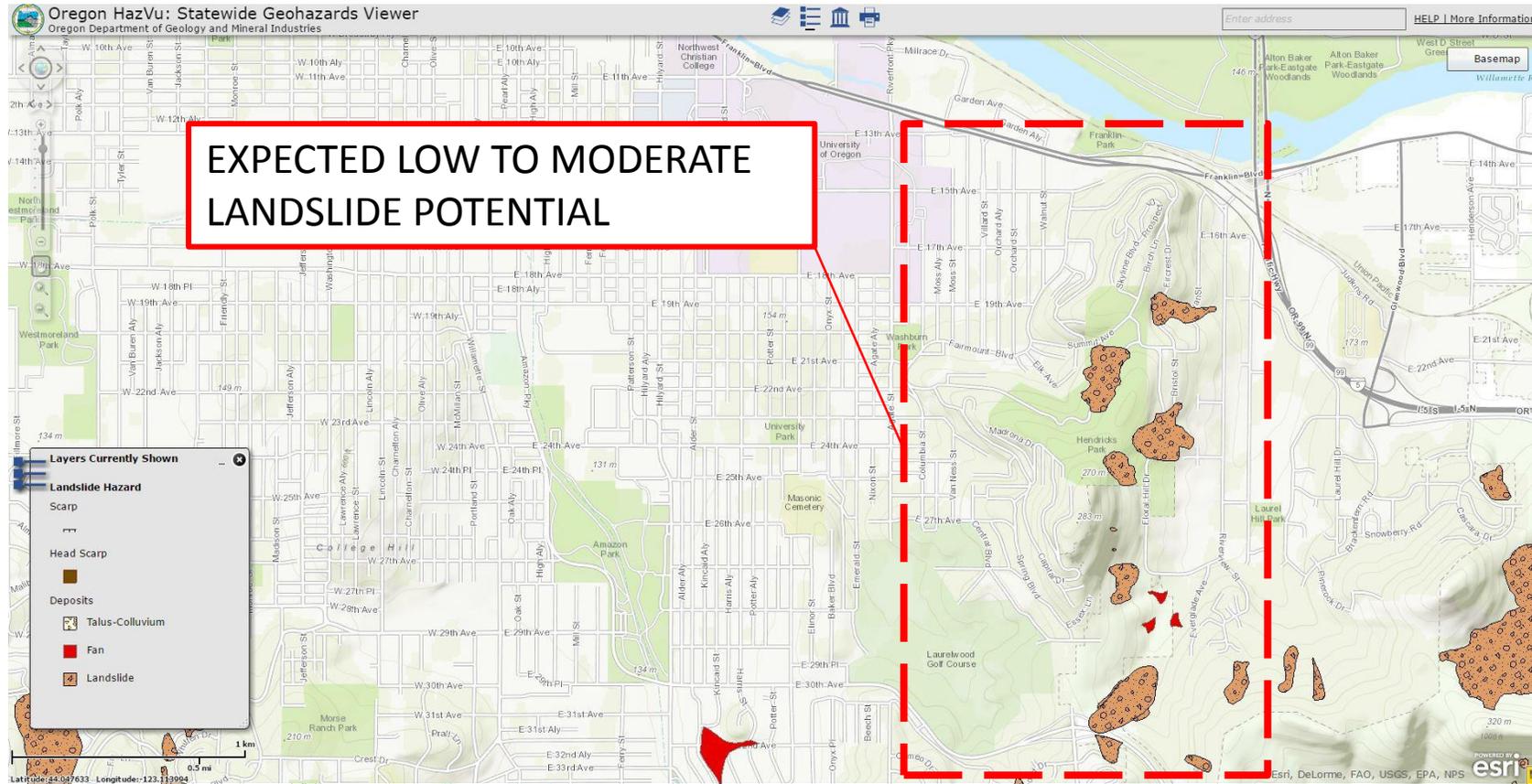
www.oregongeology.org/sub/hazvu/



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FAIRMOUNT NEIGHBORHOOD – LANDSLIDE POTENTIAL



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WHY RETROFIT?

In the Pacific Northwest, prior to 1997, earthquake forces were not given much consideration in building codes; seismic design and detailing was not fully developed or mandatory. Therefore, older homes are more susceptible to earthquake damage.

Furthermore, homes that were built to code requirements after 1997 are typically designed to a minimal collapse prevention/life safety level of performance. Retrofits on new and older homes can enhance a structures ability to withstand earthquake forces increasing your families life safety level.

RETROFIT STRATEGIES

The benefits of seismic retrofits apply to all types of buildings to include: masonry, steel, concrete construction, or traditional wood structures.

Retrofitting an existing building should always consider these minimum key structural requirements:

- Anchorage to adequate foundation
- Adequate lateral load path from the roof to the earth below
- Connection detailing of all applicable lateral elements on the structure

DOES SEISMIC RETROFITTING ADD VALUE TO YOUR HOME?

Retrofitting may not be directly recoverable in the market value of your home. However, retrofitting certainly adds to the marketing features of a home during resale.

A decision against retrofitting an existing structure in need with the current seismic forecast and recommendations is essentially a gamble.

The best value = Peace of mind

Comparison of Cost: Prevention Measures vs. Post Earthquake Repairs	
Project Cost	Cost to Repair after and Earthquake
\$550 to \$5,000	\$25,000 to total value of home (if complete failure occurs)

WHAT CAN A STRUCTURAL ENGINEER DO FOR YOU?

SITE SPECIFIC: Each Structure is Different

- Foundation Type
- Anchorage to Foundation
- Building Type
- Age
- Existing Conditions

OWNER SPECIFIC: Level of Service and Structural Performance Desired

- Insurance Requirements
- Life Safety Retrofit
- Immediate Occupancy Retrofit
- Identify Opportunities for Retrofit
 - Reroofing, New Insulation, Residing, Foundation Repairs, Drywall, Non-Structural Anchorage

OUR GOAL AT JOHNSON BRODERICK ENGINEERING:

Provide our clients with the most practical solution to a desired performance level.

QUESTIONS?