

## FREQUENTLY ASKED QUESTIONS

### Where is the landslide?

It is on Rattlesnake Ridge, 13 miles south of Yakima, WA. The area of concern is located above and north of a quarry managed by Columbia Asphalt. The quarry is bounded by Thorp Rd. to the south and west.

### Has the landslide already happened?

The landslide is currently moving south toward the quarry. There are large cracks in the ground above the quarry that were first noticed in late October 2017, suggesting potential for a landslide. Immediately after the cracks were reported, mining operations stopped and monitoring instruments were installed.

# The Rattlesnake Hills Landslide Yakima County, WA



## Event Summary

Approximately 20 acres on Rattlesnake Ridge near Union Gap, WA is currently moving at a rate of ~1.5 ft/week in a southward direction. The movement is ongoing and a failure event is projected to occur in late-January or February 2018, based on current estimates from geologists and engineers monitoring the landslide. The type of movement expected is a translational landslide composed of blocks of basalt sliding on a weaker sedimentary layer. The geologists and engineers monitoring the landslide suggest that the most probable scenario is that the landslide will move south and accumulate into the quarry. In this scenario, rockfall is expected to the west and south that may impact Thorp Rd., which has been closed since late December by Yakima County as a precaution. There are other low-probability scenarios where the landslide could reach I-82 and impact homes south of the quarry, or potentially reach the Yakima River. These scenarios are less likely. Precautions and plans are in place to take action if monitoring data suggests that this may happen.

## Contact Information

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### Washington Geological Survey, Washington State Department of Natural Resources:

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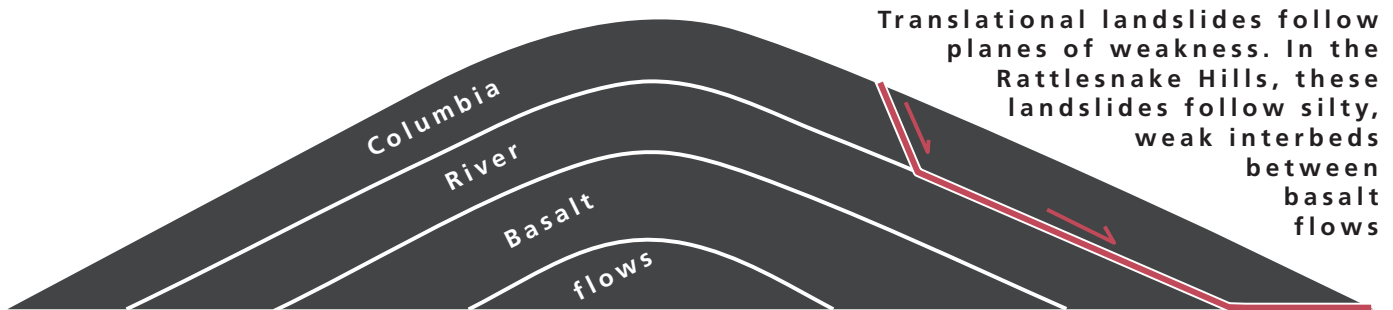
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# THE RATTLESNAKE HILLS LANDSLIDE

## Geology

The landslide consists of Columbia River Basalt flows sliding over a weaker sedimentary interbed on a limb of the Rattlesnake Hills anticline (fold). The interbed is dipping (sloping) toward the quarry at about 15 degrees. Water does not appear to be a factor in this landslide.

## Rattlesnake Hills Anticline and Translational Landslides



## WHAT DO WE KNOW?

### Rate of Movement

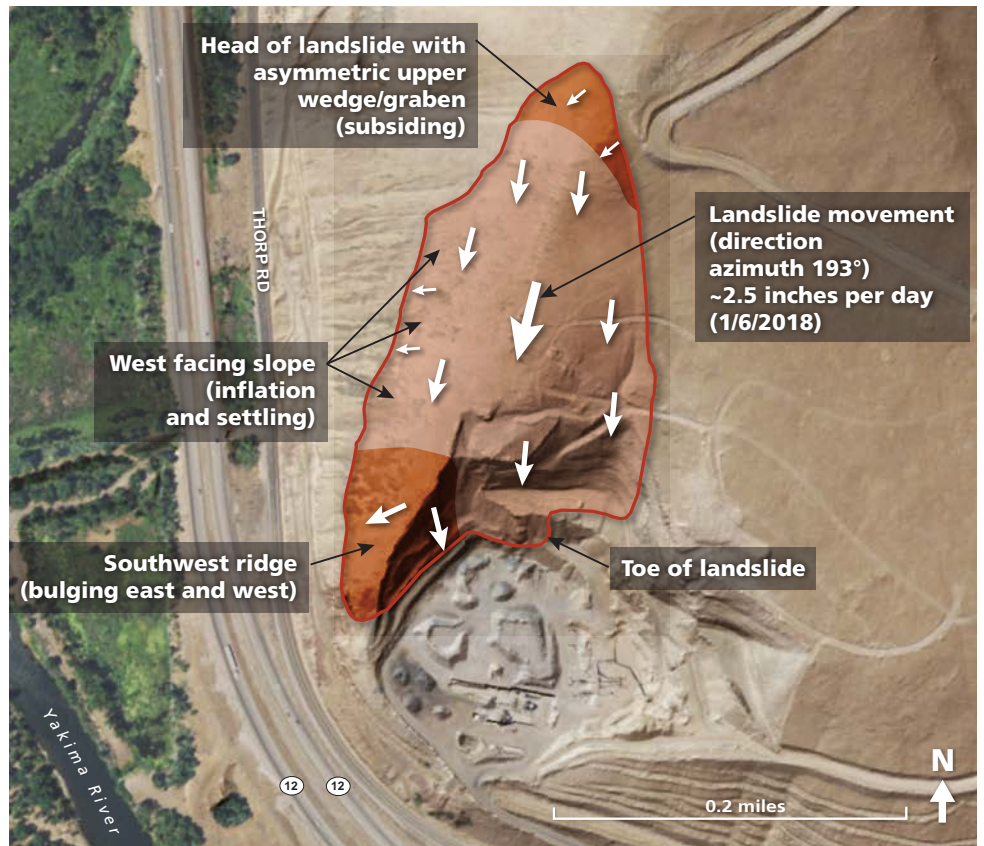
Based on monitoring, we know that the landslide mass above the quarry is moving downhill toward the south (~190-degree azimuth), at an average rate of 1.5 ft/week, or ~2.5 inches/day based on the most recent measurements (1/3/2018). When monitoring began, the landslide mass was moving at a rate of approximately 1.0 ft/week. This implies that the landslide mass is gaining momentum.

### Cracks

There are large ground cracks that trend north-northwest that are visible in the quarry and farther uphill. These cracks have been widening and new cracks have developed since October.

### Size

It is estimated that the landslide volume is ~4 million cubic yards and covers an area of about 20 acres.



Direction and magnitude of landslide movement.



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## THE RATTLESNAKE HILLS LANDSLIDE

### WHAT DO WE THINK WILL HAPPEN AND WHEN?

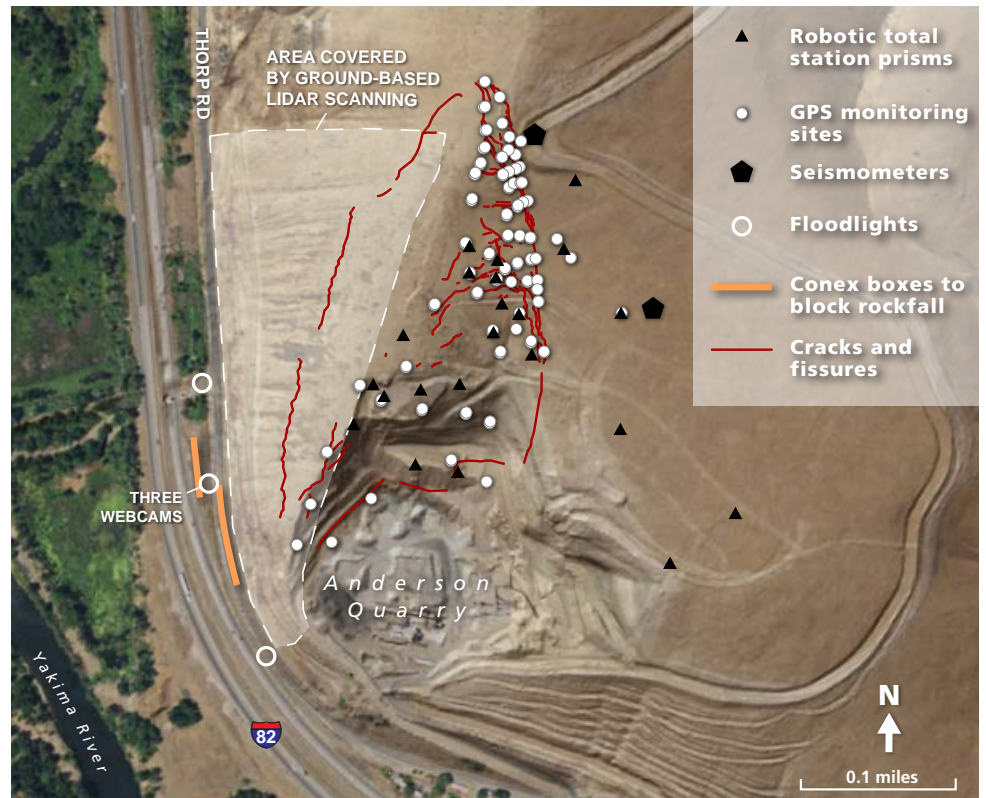
#### What

The honest answer is no one knows for certain. There are a number of possibilities. The most likely scenario is that the landslide will continue to slowly move to the south, where the landslide mass will fall into the quarry pit and accumulate. Monitoring data suggests most of the mass will remain in the pit and on the hillside. Some rocks are expected to fall around the pit and to the west in this scenario, likely reaching Thorp Rd. In this scenario the landslide is not expected to reach I-82 or the Yakima River.

In less likely scenarios, the landslide may move beyond the quarry and potentially damage the houses to the south of the quarry and Thorp Rd. and possibly reach I-82. A very unlikely scenario is that the landslide will run out beyond I-82 and reach the Yakima River. Based on the measured movement direction of the landslide, the slope of the sedimentary interbed, a landslide that moves west and blocks I-82 and the Yakima River is extremely unlikely.

#### When

Based on monitoring data, geologists and engineers who are studying the landslide estimate an event will occur sometime between January 14 and February 28, 2018. This estimate is approximate and is continually updated as more information is gathered.



Deployed monitoring network and Conex boxes.

### WHAT ARE WE DOING ABOUT IT?

#### Monitoring

Multiple agencies have collaborated to deploy GPS monitoring stations, seismometers, total station receivers, aerial imagery, and terrestrial lidar. The site is also under 24-hour observation.

#### Blocking

Large shipping containers filled with concrete (Conex boxes) have been placed on the southwest corner of the landslide mass along Thorp Rd. to block rockfall from I-82. Yakima County has closed Thorp Rd.

#### Evacuating

A Level-3 evacuation order has been issued for residents south of the landslide. To date, most residents have evacuated and have been provided with hotel rooms and emergency services.

#### Preparing for the worst

Local, state, and federal agencies, the Yakama Nation, and mine operators are working together to monitor the landslide and adjust plans as more information is gathered. Detour routes have been planned for I-82, and the interstate will be closed if the landslide's acceleration rate increases. Plans have been implemented for possible scenarios where the landslide could impact or dam the river.

## THE RATTLESNAKE HILLS LANDSLIDE



### WHO IS INVOLVED IN MONITORING THE SITUATION?

Columbia Asphalt (quarry owners)

Cornforth Consultants

Yakima Valley Office of Emergency  
Management

Washington Geological Survey (Washington  
State Department of Natural Resources)

Washington State Department  
of Transportation

Yakama Nation

Yakima County and several local  
city officials

Washington State Patrol

Mine Safety and Health Administration

U.S. Bureau of Reclamation

Washington State Department of Ecology

Washington State Department of  
Fish and Wildlife