Critical Waterline Seismic Retrofit Success for Island Homes

Full Mitigation Best Practice Story

Thurston County, Washington

Lacey, WA - Holmes Island lies within the waters of beautiful Long Lake in western Washington State. Less than 30 homes are on the island, with only one road and bridge for access and one pipeline for its water source. That waterline follows along Holmes Island Road and across the bridge.

In the summer of 1995, a project was undertaken by the City of Lacey, Public Works Department. Approximately 200 feet of pipeline were replaced on each side of the bridge and across totaling 450 foot. Flexible joints were designed to rotate, extend, retract and twist. Connections were high density 8-inch sleeved polyethylene water main pipes that were run through 10 inch steel pipes for extra protection. The total cost for this project, funded through the Water Utility Funds for Capital Improvement, was $162,000.

In the event of an earthquake, these pipes move along with the bridge and avoid rupturing, which would cause loss of water to the island and thousands of dollars in repair. "It would cost $4,000 for one coupling alone," states Mark Russell, Design and Construction Manager for the City of Lacey, Public Works Department. "A temporary system would cost $15,000 to $20,000."

The Holmes Island Bridge and waterline were tested on February 28, 2001, when a strong 6.8 earthquake struck the Puget Sound Region of Western Washington.

Approaches to the bridge slumped 6 to12 inches, and bridge supports were pulled away from the banks. The ground all along the road moved at least that much. The water main pipes dropped 8 inches. Because of the flexible expansion capability of the waterline under the road, no pipes were broken and water supply was never compromised.

The City of Lacey is currently seeking $50,000 in Federal funds to replace a portion of the waterline that is out of alignment from the earthquake. Had the city not planned ahead, they could have spent up to $20,000 for a temporary "fix" and still would have to spend the $162,000 or more dollars for a new pipeline. More importantly, the residents of Holmes Island did not lose their water source, and now have reassured confidence that their lives will not be compromised from loss of water.

Activity/Project Location	
Geographical Area:	**Single County in a State**
FEMA Region:	**Region X**
State:	**Washington**
County:	**Thurston County**
City/Community:	**Lacey**

Key Activity/Project Information

Sector:	**Public**
Hazard Type:	**Earthquake**
Activity/Project Type:	**Retrofitting, Structural; Utility Protective Measures**
Activity/Project Start Date:	**06/1995**
Activity/Project End Date:	**Ongoing**
Funding Source:	**Local Sources**
Funding Recipient:	**Lifelines - Water/Sewer**
Funding Recipient Name:	**City of Lacey, WA., Public Works Department**

Activity/Project Economic Analysis

Cost:	**$162,000.00 (Actual)**

Activity/Project Disaster Information

Mitigation Resulted From Federal Disaster?	**No**
Value Tested By Disaster?	**Yes**
Tested By Federal Disaster #:	**No Federal Disaster specified**
Year First Tested:	**2001**
Repetitive Loss Property?	**Unknown**

Reference URLs

Reference URL 1:	**http://neic.usgs.gov/**
Reference URL 2:	**http://emd.wa.gov/**

Main Points

- In the event of an earthquake, the pipes move along with the bridge and avoid rupturing, which would cause loss of water to the island and thousands of dollars in repair.
- The Holmes Island Bridge and waterline were tested on February 28, 2001, when a strong 6.8 earthquake struck the Puget Sound Region of Western Washington.
- Because of the flexible expansion capability of the waterline under the road, no pipes were broken and water supply was never compromised.