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Ostrander Road Bypass Bridge Replacement Project

Completed September 12, 2011

Summary

The Ostrander Road Bypass Bridge Replacement Project was a unique approach to providing citizens access to their homes during flood conditions. In August and September of 2011, the Cowlitz County Department of Public Works placed a new modular bridge over Ostrander Creek, in place of a deteriorated timber stringer bridge. The project was designed by in-house County engineers, constructed safely by County forces, provided a training opportunity for the installation of temporary bridges, had no environmental impacts, provides a safe all-weather access to citizens during flooding conditions, was completed for approximately five percent of the originally estimated project cost, in less than three weeks and was available for use immediately.

Construction

This project consisted of the removal of the deteriorated timber stringer bridge, placement of new abutments and installation of a temporary bridge. The existing log abutments were left in place to help maintain bank stability and to avoid impacts to Ostrander Creek. The construction window that is generally allowable for Ostrander Creek as is permitted by the Washington State Department of Fish and Wildlife (WDFW) is from July 15th to September 15th. The project began on August 25, 2011, when a private contractor (Heavy Hauling) was hired to transport the two halves of the modular bridge, manufactured by Roscoe Bridge, to the construction site. Horsely Timber and Construction was hired to provide expert installation guidance.

The modular bridge installation included placement of two new abutments and two superstructure halves. Two large excavators were rented and one County loader was used for the installation. The loader and one of the excavators were used to lift and push the 44,000 pound superstructure halves across the existing timber bridge structure and creek. Round timbers were placed on the old bridge deck to allow the leading end of the modular bridge to roll. The second excavator was positioned on the other side of the stream to pick up the leading end of the structure when it came within reach. The half structure was then set downstream of the existing bridge and the second half structure was moved across and stacked on the first structure. The original bridge was then cut with chain saws and large segments were removed in their entirety. Ostrander Creek was undisturbed during the removal process.

Once the original bridge was removed, excavation for the abutments was completed. The timber abutments of the timber log bridge were left in place to minimize disturbance to the stream. The abutments that were placed consisted of hollow steel forms, called "Supersills" (Roscoe Bridge proprietary item), that were filled with concrete. When the concrete cured, the superstructure halves were placed on the abutments, bolted to the abutment, and then bolted together. Once the structure was in place, large rock and gravel were placed to complete the approaches to the bridge. The deck of the bridge was then filled with gravel for a driving surface.

The project was completed on September 12, 2011. Seven of the 12 project days were unused waiting for the concrete to cure. The total project cost was approximately \$205,000, five percent of the originally estimated \$4 million for the realignment project.

Safety Performance

The project was completed without time-loss injuries. The safety program was similar to that employed in daily operations with additional emphasis placed on specific tasks particular to bridge placement. Emphasized safety items included potential for severe pinching injuries, equipment stability relative to boom load and communication between ground crew and equipment operators. Each shift began and ended with a tailgate safety meeting for those involved in the on-site construction activities.

Environmental Considerations

Every effort was made during design to minimize construction impacts to Ostrander Creek and the surrounding environment. Road grading and widening was limited to the minimum necessary to allow for construction equipment maneuvering and bridge deliveries. Crews staged equipment in a manner that did not require water crossings or work within the active channel. The abutments for the existing bridge were removed to ground level but were otherwise left in place to ensure that there were no impacts to the creek's channel and banks and to minimize turbidity and sediment transport.

Construction was completed during the 'in-water work window,' a time period designated by the WDFW as the period of time least likely to affect aquatic species, such as salmon, although no in-water work was ever considered. Cowlitz County elected to use a minimalistic design to complete the project, which saved materials and reduced the on-site footprint of the bridge. Overall the costs and impacts of the project were substantially lower than a traditional concrete bridge or the originally evaluated Ostrander Road Realignment Project.

Community Relations

The Ostrander Road Bypass Bridge Replacement Project was developed in response to significant and reoccurring flooding of Ostrander Creek, submerging Ostrander Road and making it impassable for the approximately 300 households stranded behind the flooding roadway. The 1980 eruption of Mt. St. Helens caused the Cowlitz River bed to rise significantly from volcanic ash deposition. Ostrander Creek is a tributary of the Cowlitz River, so any increase in water level has the potential to cause a backwater condition in Ostrander Creek, leading to an increased frequency of flooding. Since 1980, the portion of Ostrander Road adjacent to Ostrander Creek has been submerged, on average, approximately once per year.

For many years, a narrow, gravel road traversing a private timber company's property (Longview Timberlands) has been used as a bypass route when the road becomes impassable. A primitive timber stringer bridge along the bypass route crosses Ostrander Creek. The bridge was constructed many years ago to provide a crossing for logging operations.

In 1996, a significant flood event impacted the County. The impact to the Ostrander Road area included the loss of numerous homes and personal property. Following this event, a County project was authorized to evaluate a realignment of Ostrander Road to a location that would provide all-weather access. After significant evaluation, it was determined that the proposed project alignment would have a cost in excess of \$4 million dollars, have a measurable environmental impact, include a significant number of property acquisitions and would require a long and difficult permitting process. The funding

for a project of this magnitude was not readily available and the environmental and property impacts were significant enough to consider alternative approaches to provide all-weather access.

As a result of not moving forward with the realignment project, use of the existing Ostrander Road bypass route was continued. Even though the timber stringer bridge was not part of the County's bridge inventory, regular inspections were completed by County staff to ensure safety for the public during flood events. Recently, one such inspection revealed that the timber stringers and log abutments were rotting and the bridge was no longer sufficient to carry bypass traffic or any other traffic. The bridge was closed and access was blocked.

Fortunately, another bypass was identified that would provide access to the residents during flooding. However, the alternate bypass route was five miles of gravel road as compared with the 1.25 mile gravel road that had been used for years. This bypass route was used during a flooding event but a number of problems were identified including citizens becoming lost on the numerous other logging roads that merged with the bypass route, citizens becoming stuck in snow and mud, imposition on the property owner and the concern for the significant response times of emergency services on a five mile gravel bypass. Since the all-weather realignment proposal was no longer being considered and the five mile bypass route was too long and cumbersome, the County began looking for alternatives to improve the original bypass route.

The only option for obtaining access across Ostrander Creek on the original bypass route was to construct a new bridge. The County was unable to install a permanent bridge on private property so a project was initiated to purchase approximately 800 feet of property from Ostrander Road to the Ostrander Creek crossing location. The purchased property would become County right-of-way and a new permanent concrete bridge would be constructed. The total project cost was estimated in excess of one million dollars.

In December 2008, there was an extreme snow event that was followed immediately by a flooding event in January 2009 that caused significant County-wide damage. The repair of the damage included numerous Federal Emergency Management Agency (FEMA) and Federal Highway Administration (FHWA) Emergency Repair projects. One specific County bridge was significantly damaged. Because of the bridges location at the end of a County road, the FEMA and the County came to the conclusion that the bridge would be closed and not repaired, and the funds associated with the repair could be used in the form of an Alternate Project. The alternate project that was selected was the purchase of a "temporary bridge." The County actually acquired two identical temporary bridges to be installed in emergencies situations.

Temporary bridges, or more formally referred to as "modular" bridges, are transportable structures that can be built to meet AASHTO standards. Bridges of different lengths, widths and load ratings can be readily available. Modular bridges have the advantage of being engineered to be stable with minimal footing preparation. Modular bridges are often used in logging operations in the Pacific Northwest and may be set permanently or semi-permanently. A modular bridge would open up the opportunity to safely serve the public while minimizing costs.

In consideration of the temporary bridges and the costs of constructing a permanent concrete bridge at the Ostrander Creek crossing location, a decision was made in 2009 to install one of the temporary bridges in a semi-permanent basis at the creek crossing on the original Ostrander Road bypass route. The alternate approach saved a significant amount of installation time and County resources. The bridge is available for relocation if it ever becomes necessary.

Additional Considerations

The County negotiated a permanent easement with Longview Timberlands to install and maintain the bridge and to use the bypass route when Ostrander Road is flooded. The agreement requires that the County perform maintenance on the bypass route after use by the public for emergency access. Longview Timberlands will perform maintenance on the bypass route after logging or other timber operations.

The public/private partnership with Longview Timberlands provides many benefits to Cowlitz County citizens, the Department of Public Works, and Longview Timberlands. Cowlitz County citizens gain safe emergency access to and from their homes during frequent flooding events. The citizens also benefit by not incurring the expense of the initially proposed alignment of the road or the concrete bridge alternative. The Department of Public Works gains all-weather access to a roadway that the Department will only maintain after use has occurred. The project also presented an opportunity to train Road Operations staff, from each of the County's four shops, on how to place a modular bridge during emergencies and Longview Timberlands gained a functional access point to its property.

Cowlitz County Ostrander Road Bypass Bridge Replacment

Figure 1: Illustration of the commonly flooded area, bridge replacement location and bypass road connection to Holcomb Road to the south.

Legend

-  Bypass Bridge Location
-  Bypass Route
-  Frequently Flooded Area



1,750 875 0 1,750 Feet

Cowlitz County Ostrander Road Bypass Routes

Figure 2: Illustration of the two routes used by Ostrander Road residents for emergency access. The route to the North was used during 2009 flooding events and resulted in lost individuals, motor vehicles stuck in mud and snow and hassle to private landowners.

Legend

- ★ Bypass Bridge Location
- Bypass Routes
- ▨ Frequently Flooded Area



6,400 3,200 0 6,400 Feet



Photo 1: Ostrander Creek flooding Ostrander Road. Note turbidity and depth of water.11/07/2006.



Photo 2: Ostrander Creek flooding across Ostrander Road at culvert crossing. 11/07/2006.



Photo 3: Flood damage and mud immediately following flood event. 01/09/2009.



Photo 4: Following the 2009 floods the Ostrander Road Bypass bridge was declared unsafe. 01/15/2009.



Photo 5: East bridge approach pre-project. 02/05/2010.



Photo 6: Bridge inspectors took this photo of deteriorated original treated timber structure. 01/06/2009.



Photo 7: The old bridge abutments were left in place, which minimized impacts to the streambed. 09/09/2011.



Photo 8: Heavy Hauling delivered the bridge halves to the project site. 08/24/2011.



Photo 9: County crews coordinated to lift and set the bridge from the trucks. 08/24/2011.



Photo 10: County crews lifted, pushed and pulled the bridge halves into position. 08/25/2011.



Photo 11: County crews used the old bridge to roll the leading edge of the first half across the creek. 08/24/2011.



Photo 12: Abutments pads were prepared and the SuperSills poured in place. 08/29/2011.



Photo 13: After SuperSills had cured, County crews used excavators to place the bridge halves. The level was used to place the bridge precisely as needed. 09/09/2011.



Photo 14: Bridge halves went quickly into place. 09/09/2011.



Photo 15: Approach construction and bolt tightening occurred immediately. 09/09/2011.



Photo 16: Project complete on 09/13/2011. 09/16/2011.