Project Purpose and Need

WSDOT maintains four floating bridges in Washington that are built on large concrete pontoons. One of these bridges, the SR 520 Evergreen Point Bridge, has been damaged by past windstorms and is vulnerable to catastrophic failure.

WSDOT has identified the availability of new pontoons as the most time-critical element of replacing the Evergreen Point Bridge in the event of a catastrophic failure. There are currently no facilities within a reasonable pontoon-towing distance from Lake Washington where multiple pontoons could be constructed in a timely manner.

What is the purpose of the Pontoon Construction Project?

The purpose of the Pontoon Construction Project is to expedite the construction of pontoons sufficient to replace the existing traffic capacity of the Evergreen Point Bridge. The pontoons will be stored in case they are needed for catastrophic failure response or until they can be incorporated into the planned bridge replacement.

To achieve this purpose, WSDOT is proposing to build a new casting basin facility that can accommodate simultaneous construction of multiple pontoons. WSDOT intends to maintain the availability of the proposed facility for construction of additional pontoons needed to accommodate foreseeable improvements to the Evergreen Point Bridge.

A secondary purpose of the Pontoon Construction Project is to maintain long-term access to the proposed facility to build pontoons for future WSDOT floating bridge repairs or replacements.

Why is the project needed now?

The Evergreen Point Bridge is a critical component of the Puget Sound region's transportation infrastructure. It carries one of the two highways that span Lake Washington and link Seattle with the growing Eastside communities. Past windstorms have damaged the floating portion of the bridge, and although the bridge has been repaired, it is at risk of catastrophic failure. The consequences of severed connectivity to the region's transportation system would be severe. The Pontoon Construction Project is needed now to reduce delays in replacing the floating portion of the Evergreen Point Bridge if the bridge were to suffer a catastrophic failure.

Currently, about 115,000 vehicles cross the Evergreen Point Bridge each day. Without the bridge, the movement of goods and supply of services across Lake Washington would be impaired. Commute times, trip mileage, and travel costs would increase for cross-lake travel as individual motorists, transit operators, and commercial drivers switch to alternate routes, thereby increasing congestion on other roads across and around the lake.

Because of the current vulnerability of the Evergreen Point Bridge and its importance to regional transportation and the region's economy, WSDOT began planning in 2006 for the possibility that catastrophic failure of the floating portion of the bridge could occur prior to its planned replacement. Part of this planning process involved identifying what measures might be taken to expedite the replacement of the existing floating bridge in the event of a catastrophic failure. The construction of pontoons was identified as having the longest lead time of any single activity related to such an effort; therefore, WSDOT determined that constructing and storing a supply of pontoons sufficient to replace the existing floating bridge was a key element of catastrophic failure planning.

How did WSDOT determine the need for the project?

The Evergreen Point Bridge is at risk for catastrophic failure.

The Evergreen Point Bridge opened in 1963. The bridge was originally designed to withstand sustained winds of 57.5 miles per hour (mph). In 1999, the bridge was strengthened to sustain winds up to 77 mph; in the past 25 years, Lake Washington has experienced multiple storms with winds of at least 77 mph. WSDOT closes the bridge to protect public safety if winds reach and maintain an average speed of 50 mph or more for 15 minutes. In 2006, the bridge was closed three times for a total of 34 hours due to windstorms.

When wind conditions require the closure of the bridge, WSDOT's bridge maintenance crews open the draw span to relieve some of the wind and wave strain on the structure and allow the two halves of the bridge to move independently. Wind and wave action of severe storms has damaged the floating portion of the 45-year old bridge, which has made it increasingly vulnerable to catastrophic failure. About 6,000 linear feet of cracks have developed in the pontoons, thus weakening the overall structure. Repairs to the bridge have made it heavier, causing it to float about 1 foot lower in the water and making it easier for waves to splash over the barriers.

The Evergreen Point Bridge can fail in three ways during a severe storm: (1) sinking of the eastern or western half of the floating bridge; (2) sinking of the whole floating bridge; or (3) failure of the drawspan portion of the bridge, rendering it inoperable.

When one pontoon begins to fail, past experience with other bridges in the state demonstrates that this is often an irreversible process in dangerous weather conditions, leading to a "domino effect" in which the other attached pontoons also fail. However, if crews get the drawspan open before failure has begun, only half the bridge might be lost. Also, the two drawspan pontoons are the only pontoons that are not rigidly attached to the other pontoons or anchor cables, which means that either or both of the drawspan pontoons could fail and not affect the rest of the bridge.

It is important to have pontoons ready to restore the Evergreen Point Bridge.

Having new pontoons available would allow WSDOT to quickly restore mobility in the SR 520 corridor across Lake Washington. Whether the entire Evergreen Point Bridge failed, or just half of the bridge, WSDOT would likely replace the entire span due to the poor existing condition of the pontoons. If only the drawspan failed, WSDOT could reopen the bridge by replacing the drawspan with a fixed section (non-opening) using two of the new pontoons.

Floating bridge pontoons can take 6 months or longer per pontoon or group of pontoons to produce. WSDOT engineers estimate that it would take 1 to 2 years to build a new facility with adequate capacity to expedite pontoon construction. Once a pontoon casting basin is constructed, it would take an additional 1 to 1.5 years to produce the pontoons needed to replace the existing floating portion of the Evergreen Point Bridge. Reconstruction of the bridge to restore its highway function would take another 1.5 years. Building the pontoons in advance of a catastrophic failure and storing them for quick deployment would reduce the closure time of the Evergreen Point Bridge by up to 3.5 years.

Why is WSDOT proposing a casting basin facility?

Several construction methods have been considered throughout the conceptual phase of the Pontoon Construction Project site design process. Ultimately, a casting basin (or graving dock) has been proposed as the preferred method of construction. The casting basin is the only method that has been used for building floating bridge pontoons in Washington, and WSDOT has extensive experience constructing pontoons in a casting basin. WSDOT engineers have a high level of confidence, and historic examples, that the construction of these pontoons using the casting basin method will proceed smoothly with a low risk of delays and unforeseen costs.

WSDOT needs a facility that can construct multiple pontoons at the same time.

There are currently no available facilities within a reasonable pontoon-towing distance of Lake Washington that could accommodate the timely construction of multiple pontoons. Also, at up to 75 feet wide, 360 feet long, 35 feet high, and 12,000 tons in weight, floating bridge pontoons are specialty concrete structures that must be built at specialized facilities with access to water. Such large waterfront industrial facilities are in short supply.

There are military facilities in the Pacific Northwest large enough to accommodate pontoon construction. However, none are available for WSDOT use. There is one commercial casting basin facility (Concrete Technology Corporation [CTC] on the Blair Waterway in Tacoma) within reasonable towing distance where pontoons could be built. However, that facility is too small to accommodate the timely construction of multiple pontoons. Only one SR 520 pontoon could be built at the CTC site at a time. It would take about 6 months to build one pontoon; therefore, it would take more than 12 years to construct the 23 pontoons needed to replace the floating section of the Evergreen Point Bridge if just the CTC site were used.

Spending 12 or more years constructing pontoons to replace the floating bridge fails to meet the purpose of the project. Therefore, WSDOT needs to build a pontoon construction facility with a casting basin that will accommodate the construction of multiple pontoons at one time. Such a facility would produce the necessary number of pontoons in less than 2 years.

Listed below are site requirements necessary for a feasible facility location:

- Deep water access for pontoon transport
- Sufficient acreage for constructing multiple pontoons at a time with laydown areas for materials and equipment storage
- Labor and material availability and access
- Access to moorage areas for pontoon storage

Site requirements necessary to meet the purpose of expediting the construction of pontoons include the following:

- The site must be available (i.e., the site has a willing seller or lessor). WSDOT will not, during the preliminary design and alternatives development process, consider condemnation an option for making a site available.
- Development of the site must be consistent with local land use plans and zoning. Major land use actions (such as rezoning) cannot be formally initiated until the NEPA process is completed (a Record of Decision is published in the Federal Register). This would result in schedule delays that would negate the time savings in emergency restoration that this project is designed to provide. In addition, such zoning changes may undermine local land use plans and might not be in the best interest of the public.
- The site cannot be (or have high likelihood of being) a Superfund or Department of Ecology-listed Model Toxics Control Act (MTCA) (state superfund) site. The nature and extent of environmental contamination may not be fully understood until construction is initiated. The schedule implications, risk, and maintenance issues associated with onsite or adjacent hazardous materials make these sites impracticable.
- The site cannot have high potential for cultural resources. The extent and value of such resources may not be fully understood until construction is initiated and could substantially delay the schedule or halt the project.