

ASCE Seattle Section Local Outstanding Civil Engineering Achievement (LOCEA) Projects 2020

Outstanding Transportation and Development Engineering Project:

Granary Avenue and Laurel Street Project

Location: Bellingham, WA

Project Team: KPFF Consulting Engineers, City of Bellingham, Elcon Associates, GeoEngineers, Transpo Group, Walker| Macy, Wilson Engineering, Aspect Consulting

The Granary Avenue and Laurel Street Project is a new arterial roadway constructed within the old Georgia Pacific paper mill site adjacent to the Whatcom Waterway in Bellingham. The road will support future development of the 74-acre site by the Port of Bellingham.

Utility construction, which crossed under the BNSF railroad, included new stormwater outfall, public utilities, sewer lift station, and coordination with franchise and port utility construction. The project accommodated discovery of numerous unforeseen concrete foundations, pipes, timber from original trestle, unsuitable contaminated soil, and rock seawall.

Sustainability measures included, reuse of suitable on-site soil and crushed concrete as roadway fill, raw water system for non-potable uses, utility buoyancy mitigation for sea-level rise, recycled concrete aggregate for flatwork concrete, enhanced water quality treatment via rain gardens, and warm-mix asphalt. The new roadway embraces multimodal transportation with a separated cycle track facility and signals, a new BNSF at-grade crossing, wide pedestrian sidewalks, benches, pedestrian lighting, on-street parking, and amenity-zone landscaping treatments and future parcel access.

The one-percent for art was used to relocate the old Georgia Pacific pulp-mill acid ball into a feature at the adjacent Waypoint Park that quickly became a landmark feature for all to enjoy.



Outstanding Small Project:

CSO 171 Outfall Project

Location: Seattle, WA

Project Team: HDR, Seattle Public Utilities, CivilTech Engineering

Located on the shore of Lake Washington, Chinook Beach Park provides crucial habitat for juvenile salmon. However, an eroding slope and crumbling 40-foot-long timber bulkhead not only threatened access to the scenic viewpoint at the park entrance, but undermined a 36-inch-diameter combined sewer overflow outfall and allowed pipe bedding to migrate into the lake. Using innovative ways to reduce the construction duration, several key materials were acquired in advance, such as sheet piles for the new bulkhead, the 36-inch concrete pipe, a precast concrete vault and a fish-exclusion Tideflex check valve; all of which saved months of schedule and allowed construction to be completed in just 90 working days following notice to proceed.

The project team overcame a steep, narrow driveway that needed to remain open; a shoreline location; and a limited construction window to provide a cost-effective, structurally sound bulkhead and lakefront overlook that improved the lake habitat. Further, the CSO Outfall 171 project restored the integrity of the pipe, removed the rotten timber bulkhead, installed shoreline revetment to eliminate future scour, filled in-ground voids, re-paved the scenic overlook area, and provided new fish habitat along the structure.



Figure 1. Before

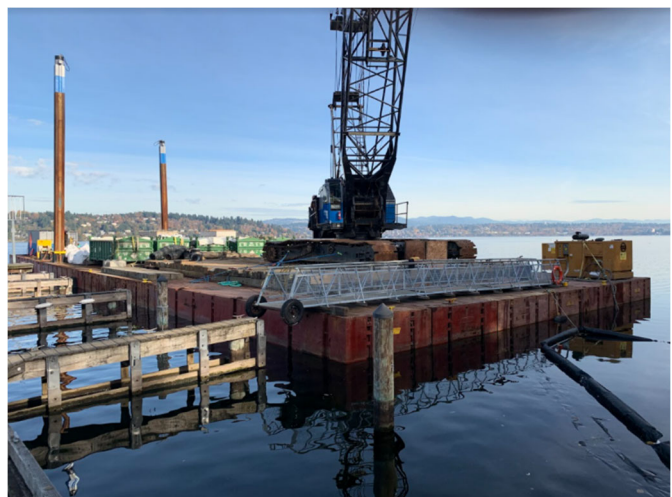


Figure 2. After

Outstanding Geotechnical Project:

Lake Crescent Roadway Improvements Project

Location: Port Angeles, WA

Project Team: Aspect Consulting, FHWA Western Federal Lands Highway Division, Strider Construction

A stretch of US Highway 101 follows the steep, rocky shoreline of Lake Crescent in Olympic National Park. The Federal Highway Administration's (FHWA) Western Federal Lands Highway Division (WFLHD) determined that this 400-foot-long section of roadway, which was exhibiting signs of instability, needed a permanent solution

to stabilize and widen the road to current standards and install new guardrails. FHWA WFLHD recommended the unstable side-cast shoulder fill be removed, and a mechanically stabilized earth (MSE) wall to be constructed at or above the lake level. Strider Construction, tasked with designing and building the wall, determined this concept would be difficult and risky due to the highly variable depths to bedrock and deep cuts that would be required adjacent to the active northbound traffic lane. Strider turned to Aspect Consulting to develop a more predictable, constructible alternative. Aspect's geotechnical engineers collaborated with Strider and Integrity Structural Engineering to design a cast-in-place, reinforced concrete moment slab. The moment slab eliminated the need for major excavations, temporary shoring, and construction dewatering, and was completed without disturbance to Lake Crescent. Ultimately, the project was completed three weeks earlier, and saved the project over \$100,000, as compared with the original MSE wall concept.



Outstanding Structures Project:

NE 45th Street East Approach Seismic Retrofit Project

Location: Seattle, WA

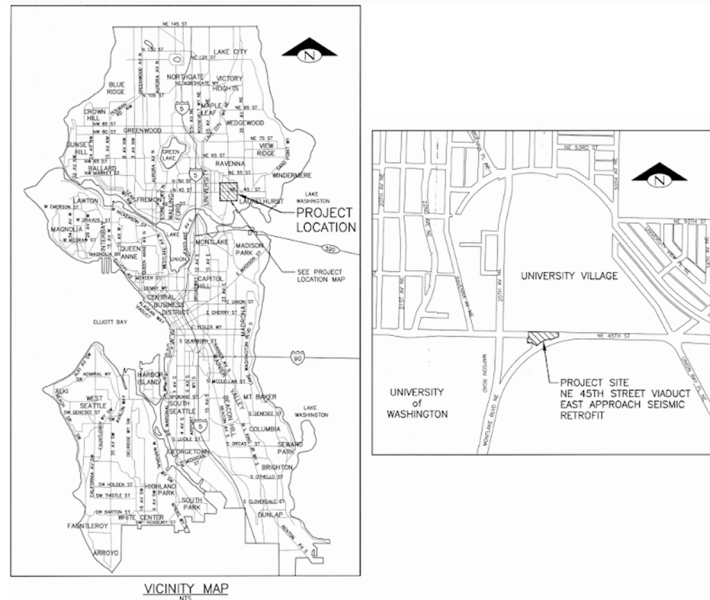
Project Team: HDR, Seattle Department of Transportation, Casseday Consulting, Ott-Sakai & Associates, RHC Engineering, Shannon & Wilson, Stepherson & Associates Communications, Tierra Right of Way Services

Reconstructed in the 1970s with limited reinforcing steel and foundations buried in loose, non-competent soil, Seattle's 45th Street Viaduct was vulnerable to catastrophic failure from earthquakes. The viaduct plays an important role in earthquake resiliency and response as it's a vital route from Interstate 5 to University Village, Laurelhurst and Seattle Children's Hospital.

The project completes the Seattle Department of Transportation's 20-year effort to widen, reconstruct and seismically retrofit the viaduct. By adding a catcher bent, steel column jackets, and an infill wall; the team overcame concerns from a unique "pig-tail" ramp and improved the structure's seismic ductility, reducing its vulnerabilities and improving corridor resiliency.

Overcoming highly liquefiable soils; 1970's structural detailing; cultural resource concerns; and wetlands below the viaduct, the team designed the retrofits to be minimally invasive while enhancing the viaduct's structural integrity. Underlain by poor quality, highly liquefiable soils, the geotechnical team reused their innovative work from SR 520 due to the project's proximity. This effort saved approximately \$50,000 in exploration costs.

After 20 years of work, the city has an earthquake-resilient direct route from Interstate 5 to Seattle Children's Hospital. By completing the under-budget, on-schedule NE 45th Street East Approach Seismic Retrofit, the entire bridge is now more resilient to seismic events.



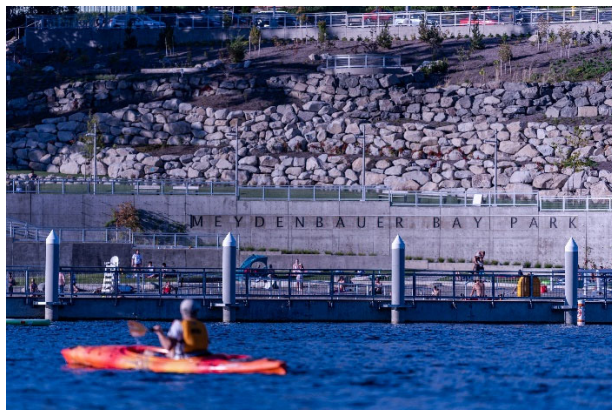
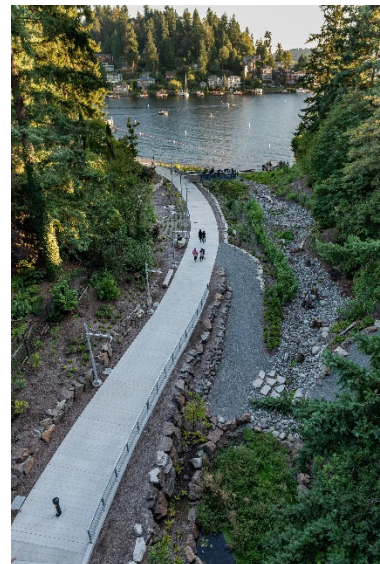
Outstanding Water Resources & Environmental Engineering Project:

Meydenbauer Bay Park Project

Location: Bellevue, WA

Project Team: Anchor QEA, LLC, City of Bellevue Parks and Community Services Department, Moffat & Nichol, Perteet, Inc., Cross Engineers, Salt Studio, LLC, Rainbow Consulting, William Stewart Irrigation Design, Framework

The Meydenbauer Bay Park Phase 1 project is the first step toward realizing the City of Bellevue's vision of connecting its downtown to the Lake Washington waterfront. The park invites Bellevue back to Meydenbauer Bay, where Euro-American settlement took root in 1869. Prior to project implementation, the City operated a small park on the waterfront that was difficult to access and hidden among private residences. For more than 20 years, the City worked on acquiring property to expand the park. In March 2019, the public was welcomed to an expanded 7-acre park with water-focused recreational facilities, upland recreational amenities, improved access, restored habitat, upgraded utilities, a wide array of viewpoints, and pathways that tie Lake Washington Boulevard to the shoreline at Meydenbauer Bay. The design of the project includes unique features, such as a newly daylighted creek, viewing platforms suspended over a restored ravine, a sweeping pedestrian pier that extends more than 400 feet into Lake Washington, green stormwater infrastructure, and a terraced landscape constructed with rock facing, mechanically stabilized earth (MSE) walls, and reinforced concrete retaining walls to accommodate the steep terrain. The highly visible project required extensive stakeholder and public involvement, permit approvals, and on-site mitigation.



Outstanding Ports and Waterways Project:

WWPS043 Emergency Force Main Replacement Project

Location: Seattle, WA

Project Team: Staheli Trenchless Consultants, Inc., Seattle Public Utilities, Osborn Consulting, Inc., Environmental Science Associates (ESA), Flow Science

Seattle Public Utilities and Staheli Trenchless Consultants completed emergency replacement of approximately 1160 ft. of a damaged 12-inch cast iron sewerage force main extending under the Shilshole Bay Waterway west of the Ballard Locks. This work was substantially complete just 18 months after initiating the project. In September 2017, the force main was found to have a leak offshore and operation was stopped. SPU implemented a temporary above ground bypass system and attempted to repair the pipe at the break location, however, the pipe was so damaged, it could not be repaired. The upland portion of force main was determined suitable for continued use, therefore SPU began the WWPS043 Emergency Force Main Replacement project to replace only the portion of pipe that crosses the waterway and complete upland connections. This project was phased in an attempt to shorten the timeline for issuance of Federal, State and City permits. Phase I included design, permitting and installation of the HDD pipeline replacement under the waterway; Phase II included completing civil design and construction of above ground appurtenances which included the connection to the King County transmission line and installation of a new bypass vault which brought the system up to current standards.

