Location: Wilsonville, Oregon
Client: City of Wilsonville
Engineer: AKS Engineering & Forestry, Tualatin OR

MOREY’S LANDING STORMWATER OUTFALL

Threat to private property
The stormwater outfall at Morey’s Landing had a history of erosion and slope instability. Twelve years of erosion had created deep ruts and neighbors were watching their property slowly slide down the hillside. AKS Engineering & Forestry was tasked with redesigning three outfalls and stabilizing the main channel all the way down to the Willamette River.

A study in extremes
The steep and extremely narrow site caused significant challenges in design and construction. Creative solutions were necessary to slow the flow of water as it dropped approximately 65 feet in elevation in a run of 425 feet. Approximately 80 lineal feet of retaining wall was built, ranging in height from approximately 5 to 10 feet tall. Nearly 600 cubic yards of rock and fill material were brought in, and over 700 cubic yards of unsuitable soil and debris was removed.

BRING ON THE RAIN

Mother Nature throws a curveball
Several record-breaking storms occurred early in construction within two weeks of each other. The September storms washed away much of the work completed to date and damaged much of the remaining work. The storms prompted the team to revisit and strengthen the design after seeing how water had eroded the existing channel and rock ramp during the large storm events.

Reaping the benefits
AKS developed an attractive 20-step pool design that mimicked the flow of a natural stream and supported the entire system with an engineered rock ramp. Over 1,000 trees and shrubs and 2,985 square yards of grass seed were planted. The team overcame significant challenges to create a beautiful natural area that provides wildlife habitat while serving the important function of collecting, conveying, treating, and releasing stormwater in a manner that protects private property.
The OR 217 ATM project incorporates an innovative, low-cost approach to improving safety, travel time reliability, and mobility along OR 217 between US 26 and I-5.

**Location:** Washington County  
**Client:** ODOT  
**Firm:** DKS Associates, Portland

This project includes completely automated: 1) travel time signs that display estimated travel times to key destinations; 2) traveler information signs that alert drivers to crashes, congestion, road conditions, closures, and other traffic-related information; 3) advisory speed signs based on current traffic and weather conditions; and 4) an adaptive ramp metering system that adjusts rates based on traffic conditions. The project includes 5) targeted shoulder widening at three locations to help provide room for quick incident removal from travel lanes and 6) increased barrier heights. 7) As shown below, travel times are automatically overridden by higher priority messages like automated queue warnings.
Established in 1995, Hood River is known for its outdoor recreation, wineries, and breweries, with vineyards and orchards surrounding the city. The water supply system supporting the city was over 85 years old. The pipeline, over 15 miles long with a vertical drop of over 1,500 feet, had experienced numerous failures and exceeded its life. The city needed a new system to support their livelihood and development.

Funding was granted through the U.S. Department of Agriculture (USDA) Rural Infrastructure and also through the American Recovery and Reinvestment Act. The project, from start to finish, took over 13 years and was completed in three phases.

**Hood River Waterline Replacement**
City of Hood River, Oregon

**GO THE EXTRA MILE**

As the City’s Engineer for design and construction management, BergerABAM analyzed the entire transmission system that ranged from the base of Mount Hood all the way to the Wilson Reservoir just inside city limits. The hydraulic gradient was evaluated to determine stabilizing pressures throughout the pipeline. In addition, the pipeline was up-sized from 14 to 24 inches and the alignment was evaluated to develop a more efficient and reliable transmission system that also provided better access for operation and maintenance.

Or 5 in this case. The project was delivered ahead of time and under budget, as planned, in hopes to complete the additional 5 miles that was not covered in the funding that was granted. Hood River was able to secure the remaining funds to continue the final 5 miles, after twice appealing the USDA’s determination.

Today, Hood River is happy to have a complete, innovative, 20-mile, state-of-the-art water system that will serve the community and support their economic development for generations to come.
The Crown Point Viaduct is a National Historic Landmark, located along the Historic Columbia River Highway, and is one of the most visited tourist locations in Oregon. Opening in 1914, the viaduct offers impressive 360 degree panoramic views of the Columbia River Gorge. It celebrated its 100-year anniversary with a newly restored 600-foot-long viaduct, which surrounds Vista House, the observatory that commemorates Oregon pioneers and serves as a beautiful rest stop for more than one million visitors traveling along the highway.

Due to significant safety concerns and deteriorating structures, the Western Federal Lands Highway Division of the Federal Highway Administration and the Oregon Department of Transportation recognized that rehabilitation of the structure was necessary to address the failing of the viaduct, prolong the life of the structure and provide a safe roadway for public use. The project team worked to rehabilitate and restore the structure while maintaining the visual and historical integrity of the viaduct.

The project also included restoration of portions of the Historic Highway between Larch Mountain Road and Latourell Falls. The restoration of the viaduct benefits Crown Point visitors, and has given new life to the Historic Columbia River Highway.

The rehabilitation design strengthened the structural elements to provide a 50-year service life, while maintaining the visual integrity of the viaduct. Innovative restoration details included micropiles to fortify existing foundations, self-consolidating concrete poured under the existing sidewalk, epoxy crack injection, and top-down construction of soil nails at a tall stone masonry wall, under the viaduct.

**Owners**
Oregon Department of Transportation  
Western Federal Lands Highway Division

**Location**
Historic Columbia River Highway, Oregon

**Consultant Team**
David Evans and Associates, Inc.

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Rehabilitation work included a thicknessed deck and larger columns  
Historic Columbia River Highway and guardrail realignment

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American Council of Engineering Companies of Oregon
As an example of the importance of the region’s outbound freight movement, 75% of Intel’s manufacturing is done within the US; whereas 75% of its revenue comes from outside the US.

Today, exports fuel over 24% of the region’s economy. Based on the Greater Portland Export Initiative, the region plans to double its exports by 2017 and create and retain over 103,000 new jobs.

Findings:
1. Route choices limited
2. US 26 travel time unreliable
3. I-5 travel time unreliable
4. US 30 to Columbia Blvd involves out-of-direction travel
5. Cornelius Pass Rd conditions not optimal
6. Ramp meters frequently spill onto arterials causing delays

The team found that freight movement between the westside C&E cluster and the PDX freight consolidation area depends on two routes: 1) US 26 to I-405 north to I-5 north; and 2) Cornelius Pass Rd to US 30, heading east on the St. John’s Bridge to Columbia Blvd.

**Westside Freight Access and Logistics Analysis**

**Location:** Portland Westside Region  
**Client:** Port of Portland  
**Firm:** DKS Associates, Portland
Sandy High School
Greenfield Site Design

Upon conceiving of the new Sandy High School for the Oregon Trail School District—encompassing over 300,000 square feet—DOWA-IBI Group Architects, Inc. envisioned a campus where the wonder of learning is on display everywhere, extending to the building’s exterior; even the surrounding grounds provide a variety of educational activities. In that spirit, GHD was a part of the project from inception, assisting with master planning and providing design for the school’s 80-acre greenfield site.

Initially, GHD conducted considerable site analysis (involving a wetlands delineation and wildlife habitat assessment) and consulted with both the District and the City of Sandy. Then, knowing that environmental stewardship was a key component of such an educational experience, GHD followed a LEED approach, employing a “green street” concept that incorporated, amongst many measures, vegetative treatment swales and green roofs, which effectively addressed major water quality concerns. Further integrating site function with the school building, GHD laid out a heating/cooling system using heat exchangers with water circulated through miles of piping installed under the new athletic fields.

DOWA-IBI’s five-level concept accommodated 60 feet of site topography, which required context-sensitive grading: nearly 100,000 cubic yards of earthwork, configuration of 600 parking stalls, a bus parking area, storm drainage and treatment, new athletic fields and tennis courts, utility mains, and erosion control.

Together, GHD and DOWA-IBI achieved a LEED Gold rating for the District’s first major new school building in over 30 years.

Entering Firm
GHD Inc.
Portland, OR

Location
Sandy, OR

Client / Owner
DOWA-IBI Group Architects, Inc. / Oregon Trail School District

American Council of Engineering Companies of Oregon
The Custom Plywood Mill Site is the largest Washington State-funded cleanup in history. Industrial operations at the site began in 1892 and included a succession of mills: sawed lumber and trim, shingles, box parts, wooden water pipes, and plywood. Over 100 years, mill operations contributed to the deposition of approximately eight acres of wood waste and fills, thousands of creosote-treated piles, and industrial debris, including remnants of two substantial fires, the last of which leveled the facility in 1992.

In addition to visual blight, the mill operations had left a legacy of contamination, including toxic hydrocarbons, dioxins, metals, and wood waste. And while the decay of wood waste is a natural process, the huge quantities of waste decreased the amount of available dissolved oxygen in the water and released hydrogen sulfide and ammonia, all of which are toxic to the benthic community.

The solution involved separate interim remedial actions to address the upland and in-water impacts. The upland remedy involved demolishing all upland structures; excavating and disposing of 30,000 tons of TPH- and metals-contaminated soil/waste; removing more than 1,000 piles; and constructing an estuarine wetland complex. The in-water remedy included removing 1,400 creosote piles; demolishing remaining in-water structures; removing 52,000 tons of contaminated sediment; and placing 140,000 tons of new habitat substrate—all of this ultimately restoring nearly a mile of beach and nearshore habitat for forage fish and juvenile salmonid use.
Lawnfield Road Connector, Phase 3

Client: Clackamas County, Oregon
Location: Clackamas County, Oregon

This project encompassed the reconstruction of Lawnfield Road between SE 97th Avenue and SE 98th Avenue. The existing roadway had grades exceeding 14%, sub-standard horizontal and vertical curves, and no pedestrian facilities. The improved roadway design reconstructed the entire roadway to provide a maximum grade of 6.75%, improved horizontal and vertical curves, and an improved landing and pre-emptive signal detection for trucks approaching the Lawnfield/97th intersection. HHPR provided full consulting services on this project including an initial value engineering analysis that reduced costs from a planning-level cost estimate between $17 and $24 million to a constructed cost of $8 million.

The new roadway improves truck access into the industrial area and includes the installation of a truck priority system to extend green time for any larger trucks traveling uphill to the 97th/Lawnfield signal. Providing an accessible route for large trucks in and out of this industrial area is a critical component required for the completion of the Sunrise Corridor JTA project. In addition to the construction of regional stormwater treatment and detention facilities, the project also improved downstream drainage conditions which resolved decades of flooding in the area.

Construction of bio-engineered fill slopes, mechanically stabilized earth walls, and drilled shaft soldier pile walls along the corridor helped limit the construction footprint, thus reducing overall project costs. The project also installed a cured-in-place (CIP) liner to provide sanitary sewer rehabilitation, reducing costs of reconstructing of a 30-foot deep system.
Commercial Avenue Wharf Renovation

The Port of Garibaldi is a hub for water-based and water-related activity along the Oregon coast. The poor structural condition of the existing Commercial Avenue Wharf limited its use and reconstruction of the wharf was recognized as having the potential to address significant barriers to local economic development, including aging infrastructure, community image, a lack of visitor attractors and activities, and underutilized land and resources.

The Port amassed diverse funding methods through federal, state and local sources. This was one of the few U.S. Economic Development Administration funded projects in Oregon and the first wharf project. To address the EDA funding schedule and in-water work window requirements, engineering and permitting were fast-tracked and the project was completed more than a year ahead of schedule.

To meet the project’s programmatic needs, HHPR designed the wharf with the flexibility to add buildings to any portion of the wharf deck. However, the upper 100 feet of soils underlying the project site are exceedingly susceptible to liquefaction, posing significant structural challenges. To address the associated challenges, the new wharf was founded on concrete-filled steel piles driven approximately 110 feet through the problematic soils and into a competent gravel layer below.

Project Benefits

- Saves 250 jobs and adds over 200 jobs to the community over the next ten years.
- Adds $7.22 million dollars annually to the community.
- Promotes tourist access to commercial fishing activities and to fresh Oregon seafood.
- Creates and protects marine habitat.
OUR ROLE
The Collaborative Life Sciences Building (CLSB) and Skourtes Tower is a true collaboration between OHSU, Portland State University, and Oregon State University. Interface Engineering designed several high-performance systems throughout the LEED Platinum teaching and research facility, and as a result, the project is expected to achieve 45% energy and 60% water savings—a remarkable achievement for a building that has significant demands on both resources.

Throughout CLSB, 26 different piping systems are used to aid the facility in providing real-world education, including the 200 dental chairs used for instruction.

The modern facility also includes the latest technologies, including one of the largest dental vacuum systems in the United States. The complex design pushed the limits on design ingenuity and cost control.

The heat recovery system uses rejected heat from many portions of the building and reclaims it for conditioning laboratory air.

The facility was designed using IDP at a co-located space.

Utilizing BIM software enabled the team to work out conflicts between the systems.
Tigard’s Main Street’s preexisting conditions did not adequately provide the urban amenities and safe balance between vehicular and pedestrian traffic needed to generate economic development in the downtown area. This segment of the downtown area was impaired by poor design.

Traffic from the adjacent Highway 99 used Main Street as a high traffic bypass, adding to congestion. Sidewalks were generally narrow and deteriorated with many non-ADA compliant areas. Street light levels were inconsistent, stormwater management was generally poor, and public utilities were in need of replacement.

Harper Houf Peterson Rigghellis Inc.'s multi-disciplinary team provided a creative, innovative, sustainable, and cost-effective design for the Main Street Improvement Project that has transformed the Tigard downtown area into a pedestrian-friendly and transit-friendly area with a strong sustainability theme that connects people, place, and community. This project has incorporated innovative green street elements for both stormwater quality and quantity, reducing negative impacts to the environment. In addition, the finished product improves parking along with vehicular, bicycle, and pedestrian circulation which encourages local traffic to enter the downtown area to support local businesses. The use of balanced and aesthetically pleasing elements as a unique redevelopment option and economic catalyst is a model for other cities with downtown atmospheres.
Bend, Oregon

RIVERSIDE/FRANKLIN PEDESTRIAN AND BICYCLING INFRASTRUCTURE

Through a grant from Oregon Department of Transportation (ODOT) encouraging bold and innovative ideas, the City of Bend implemented multimodal improvements along the NW Riverside Boulevard and NW Franklin Avenue corridors. These corridors serve an important east-west connection across the City and provide connections to Drake Park, the Deschutes River Trail, the Galveston commercial corridor, and downtown Bend.

KAI led the team responsible for design of corridor improvements, which also included outreach to stakeholders and delivery of construction documents.

Additional improvements include:
- Permeable pavers for stormwater treatment
- Street trees and landscaping
- Widened and improved sidewalks
- A bicycle parking shelter

"Looking at this corridor from a before and after perspective, it is a night and day difference. This is a fantastic demonstration project."

— Lucas Freeman
Bike Around Bend

American Council of Engineering Companies of Oregon
Helsinki, Finland
US Embassy Compound Renovation and Chancery Addition, Phases 1 and 2

Owner :: US Department of State, Bureau of Overseas Buildings Operations
Entering Firm :: KPFF Consulting Engineers | Portland, OR |

The Helsinki Embassy campus renovation represents a new pinnacle for KPFF and for the US Department of State Overseas Buildings Operations’ Design Excellence program. The project’s Innovation Center achieved LEED Platinum, exceeding original goals—a first for an overseas US diplomatic facility.

The challenges presented by the 101-year-old campus site perched on a craggy hillside were daunting and intriguing, prompting the need to compress operations into an unusually small space. The KPFF team repeatedly exercised ingenuity to balance modern security and functional needs with aesthetic values in less than a third the usual space. The Embassy also needed to remain secure and operational despite extensive blasting for rock excavation.

KPFF’s approach to US Embassy projects was developed over a shared history with OBO of 15 years and 75 projects. We’re proud our work in Helsinki is likely to prove especially valuable to future projects with similar constraints.

1. Large retaining walls with local stone cladding.
2. Blasting construction activity after blasting and mass excavation where completed.
3. LEED Platinum Innovation Center.
4. Roadways, pathways, and retaining walls navigate challenging topography.
5. Helsinki’s persistent winter snow and darkness require highly sustainable lighting design. This is the first US diplomatic building with 100% LED and organic LED for interior and exterior lighting.

Photos owned by the U.S. Department of State – Bureau of Overseas Buildings Operations. Permission has been granted for the photos to be available for public release to be used without limitations.

American Council of Engineering Companies of Oregon
The KPFF team worked closely with City of Portland and neighbors to transform 29 blocks of run-down arterial roadway into one of the first green main streets in the nation.

Goals were clear: A Shared Economy, Clean and Green Environment, and Healthy Community. All contributed to the ultimate goal of “Making a Place.” KPFF provided a backbone of solid engineering to support these aims.

Rehabilitating existing roadway pavement, replacing key sections of the combined sewer system, signalization upgrades, and incorporation of green street design elements were priorities throughout the corridor.

Placemaking of green street facilities required detailed analysis and collaboration to achieve balance between traffic, parking, pedestrians, bicycles, transit and freight needs, preserving/improving existing utilities while also providing stormwater management at key locations to address the risk of surcharging.

The KPFF team ultimately incorporated 64 stormwater facilities through a flexible collaborative approach with City engineers, and a toolbox of customizable facility types. Given the constrained conditions and myriad users, we’re proud to have successfully incorporated green street facilities into a congested urban streetscape.

The project’s success is reflected in a surge of new development, spurring USA Today to name SE Division one of 10 Up and Coming U.S. Neighborhoods.

1. Pedestrian “bridges” provide enhanced access and continuity of stormwater planters and swales.
2. Artwork integrated to meet the stated goal of “Making a Place.”
3. Transformation of a busy and disjointed arterial corridor into a vibrant neighborhood.
4. Swales integrated with curb extensions and bus stops.
5. Swale/painter curb extension accommodates existing trees.
6. Bike corrals improve active transportation.
Newton Creek Gets a Step Up

Location: Roseburg, Oregon
Client: Roseburg Regional Airport
Client Location: Roseburg, Oregon

Roseburg Regional Airport faced the challenge of balancing the need to improve airfield safety while providing fish passage and maintaining floodplain function. Mead & Hunt and ESA Vigil-Agrims designed the culvert extension and fish ladder to meet these requirements and simulate habitat through skilled engineering. Enhancements included a pool and chute fishway, a roughened downstream channel, and structures within the culvert to simulate a natural streambed condition. These improvements maintain hydraulic capacity to convey flood flows without increasing flood stages.

Concrete pool and chute fishway provides a series of steps for fish passage transitioning grade from existing culvert to downstream creek

Riffles and anchored boulder clusters provide shelter for fish passage within the culvert designed to withstand flood flows.

The completed system for fish passage is adjacent to critical airfield operations. Channel improvements maintain flood storage and conveyance. Banks are stabilized with rock toe protection and riparian plantings transitioning the uplands.

Although natural channels are often preferred for restoration and fish passage, permitting agencies favored a concrete step-pool structure because of peak scour flows and stability concerns.
"WHERE THE WATER RIPPLES & RUNS FAST"

Bearing a Kalapuya name, the Whilamut Passage Bridge honors the Native American people who historically called the Willamette Valley their home. Art pieces installed at the project site also honor this heritage.

Interstate 5:
Willamette River Bridge Project
Eugene / Springfield, Oregon

After serving West Coast travelers for almost 50 years, the Interstate 5 Bridge over the Willamette River was badly in need of replacement. The complex and highly visible Interstate 5: Willamette River Bridge Project was the largest bridge replacement in ODOT’s $1.3 billion OTIA III State Bridge Delivery Program, and it improved a crucial component of the heavily traveled I-5 corridor that connects commuters, tourists, and freight haulers all along the West Coast.

The complexity of the project prompted ODOT to use CM/GC contracting for the first time, which allowed construction to start two years ahead of schedule thanks to ongoing collaboration between ODOT, OBE Consulting Engineers and Hamilton Construction.

The Whilamut Passage Bridge opened in August 2013 amid much public celebration. Hundreds of citizens visited the site to enjoy a walking tour of the bridge, the surrounding design enhancement locations, and park improvements, including a chance to explore the bridge deck on foot before it opened to traffic.
West Main Street Realignment; Kelso, Washington

This project realigned eight blocks of Main Street through the business district of downtown West Kelso to make a smooth connection from SR 4 to the Allen Street Bridge. Work consisted of realigning and widening the streets with sidewalks, intersection improvements, parking, and bicycle facilities. Phase 1 widened West Main Street and Catlin Street between 1st Avenue and 4th Avenue. Phase 1 also overlaid Catlin Street from 4th Avenue to SR 4 and realigned traffic through the existing intersection of SR 4 and Ocean Beach Highway. Phase 2, once funded and designed, will continue the widening of Catlin from 4th Avenue through the SR 4/Ocean Beach Highway intersection.

Construction commenced in November 2013 and was substantially complete in July 2014, nearly two months ahead of schedule. The project team coordinated with the adjacent businesses and homeowners to minimize disruptions and staged work to maintain traffic at all times through the use of signed detour routes.

American Council of Engineering Companies of Oregon
One Project. Multiple Improvements.
NW Bethany Boulevard Project enhances mobility in Washington County.

With the completion of the NW Bethany Boulevard Project in 2014, Washington County fulfills a long-standing commitment to improve mobility and safety on this main north-south arterial. The project included numerous stakeholder agencies and organizations that collaborated and cooperated extensively to achieve success. With an eye toward improving the overall regional system, Washington County coordinated with multiple agencies to upgrade facilities in anticipation of the NW Bethany improvements, including rolling up unrelated projects into the construction bid package for improved cost-effectiveness. This atypical approach resulted in a more seamless, cohesive system to accommodate growth.

NW Bethany Boulevard Project Integrated Improvements:
- New multi-use path improves connection to the existing Tualatin Hills Park and Recreation District (THPRD) regional bicycle and pedestrian trail system.
- NW Bethany Boulevard crosses U.S. Highway 26 on an overpass bridge owned by ODOT. The bridge’s widening and associated road improvements were part of this project, while two unassociated ODOT ramp projects adjacent to the project site were added to the same bid package for cost-effectiveness and better integration.
- A new Tualatin Valley Water District water line was constructed on the overpass bridge and north to West Union Road to enhance supply system.
- Approval coordination for City of Beaverton and Clean Water Services (CWS) water quality system improvements and repair/replacement of portions of the existing CWS stormwater system was included as part of the project.

Title and Location of Project:
NW Bethany Boulevard Project
Washington County, Oregon

Client:
Washington County

Entering Firms’ Name and Location:
Parsons Brinckerhoff
Portland, Oregon

WHPacific
Portland, Oregon

American Council of Engineering Companies of Oregon
Facing severe drought conditions in 2013, the City of Ashland recognized the need to construct an emergency connection to the City of Medford’s water system through the Talent Ashland Phoenix waterline. Anticipating that their existing water supply may become inadequate to meet their needs, they took steps to quickly complete the work. The project included one new pump station, modifications of two other pump stations, and construction of 15,000 LF of transmission main in ODOT right-of-way, including two Bureau of Reclamation irrigation siphon crossings and one railroad crossing. The project was completed on time and under budget in 167 days from conception to completion.

**ACCELERATED SCHEDULE**

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<tr>
<th>Task</th>
<th>TAP Schedule</th>
<th>Typical Schedule</th>
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<td>Pre-design Evaluation</td>
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<td>Design</td>
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<tr>
<td>Construction</td>
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**INTERNAL COORDINATION**

- 30 Employees
- 7 Offices in OR & WA
- 3503 Hours
- 167 Days

**AGENCY INVOLVEMENT**

- Cities of Ashland, Talent, and Phoenix
- Oregon Department of Transportation
- Infrastructure Finance Authority
- Oregon Health Authority
- Talent Irrigation District
- Bureau of Reclamation
- Genesee Wyoming Railroad

Firm: RH2 Engineering, Inc.
Firm HQ: Bothell, Washington
Project: TAP Emergency Intertie
Client: City of Ashland, Oregon
Location: Ashland, Oregon

**How RAPIDLY can EMERGENCY SUPPLY be DESIGNED and BUILT?**

- Installed and tested 15,000 LF of 16" transmission mainline within Highway 99
- Designed and constructed a temporary booster pump station

**$4.3M Budget**

**$3.6M Actual**
In 2012, Oak Lodge Water District requested a seismic analysis and recommendations for their View Acres reservoirs, built in 1966 and 1989. RH2 performed a detailed evaluation and proposed upgrades that would help mitigate damage that could prevent access to critical services during an earthquake. Destructive testing was performed on the reservoir shells to determine the strength and verify thickness of the steel, and structural calculations were completed to precisely ascertain what upgrades were required. These extra investigative measures eliminated the need to make conservative assumptions about the tank construction, which saved the District tens of thousands of dollars in construction costs and allowed RH2 to complete the project set of plans that resulted in a completed project with less than 1% change orders.
Astoria 11th Street CSO Separation

In the 30-block project area, a new conveyance system was constructed to separate stormwater flow from sanitary sewer flow — in an urban residential area stretching across two large, active landslides. This system significantly reduces untreated CSO discharges to the Columbia River and reduces inflow to the City’s wastewater treatment plant. Challenges included slopes up to 28% and shallow groundwater.

Through careful geotechnical and civil planning and design, our team achieved comprehensive risk assessment and management. Key to project success were extensive geologic research and mapping, strategic selection and placement of pipeline materials like HDPE pipe and flexible fittings, and design of a permanent groundwater collection system. The finished product is a resilient system that accommodates ground movement and controls groundwater. Based on preliminary post-construction monitoring, the design has reduced ground movement.

Designing Pipelines [ THROUGH AN ] Active, Urban Landslide

Shannon & Wilson, Inc.
Lake Oswego, OR
Gibbs & Olson, Inc.
Longview, WA
Owner City of Astoria

The project was designed to meet — and in some cases surpass — the City of Astoria’s goals. Permanent drainage helps lower and control groundwater, reducing seepage and improving landslide stability. The selected pipeline materials, flexible fittings, and specialized manhole connections increase pipeline durability and accommodate ground movement. The project provides the City with a longer useful pipeline service life.
BIG PROJECT
- 6 miles + 10 bridges,
  up to 1,800 ft. long + 45 retaining walls, up to
  1 mile long + 4 excavations up to 40 ft. + shoring
  & dewatering + pavement design + viaduct construction

DIFFICULT CONDITIONS
- Deep organic
  fill = Confined groundwater = Soft, compressible
  soil = Liquidable soils = Variable rock surface =
  Very close to existing buildings & infrastructure =
  Rapid loading & seismic settlement conditions due to
  tall wall construction = Seismic hazard-induced wall
  slope instability & settlement = Pile/shaft downdrag
  forces due to settlement = Lateral loads on bridge
  foundation shafts from slope instability

GEOTECHNICAL SOLUTIONS
- Staged construction to avoid expensive ground
  improvement = Lightweight fill to avoid excessive
  settlement & global instability = Underpinning of
  existing buildings to avoid construction damage
  = Large-diameter drilled shafts to resist seismic-induced
  lateral spreading & abutment wall instability

Geotechnical Design
Portland-Milwaukie Light Rail East Segment

Constructing the MAX Orange Line from
the east bank of the Willamette River
through downtown Milwaukie

American Council of Engineering Companies of Oregon
DELLIVERING A SUCCESSFUL MAP-21 ENVIRONMENTAL DOCUMENT

The Oregon 62 Corridor is a critical business connection for freight, tourism and commuters in southern Oregon. The corridor currently exceeds capacity, and future growth projections in the area are expected to significantly increase traffic volumes. To address the safety, mobility and multi-modal impacts of this expected growth, the Oregon Department of Transportation began a planning and environmental documentation process for a new 7.5-mile expressway from the Interstate 5/I-62 interchange in Medford to Dutton Road.

URS was selected to complete the planning and environmental analysis for the project. URS team members served as an extension of ODOT staff, bringing specialized expertise in the wide array of disciplines required to complete the environmental documentation under the National Environmental Policy Act (NEPA). URS successfully responded to new federal guidelines under the Moving Ahead for Progress in the 21st Century Act (MAP-21). MAP-21 seeks to streamline the project development and environmental compliance processes by allowing combined Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) documents. Previously, a ROD could be issued only after an FEIS was issued.

In May 2013, with URS assistance, ODOT delivered Oregon’s first, and the nation’s second, combined FEIS and ROD for the OR-62 project. In early 2014, the OR-62 FEIS/ROD was recognized for its overall document quality and compliance with NEPA. It was featured as the most cited document in ASHRAE’s “Strategies of Effective Techniques for Improving the Quality of Environmental Documents,” a publication teaching excellence in NEPA documentation. By its inclusion in the report, the OR-62 project will serve as a model for other public agencies and consulting firms to prepare more effective environmental documents.

The OR-62 project is Oregon’s first, and the nation’s second, combined FEIS/ROD document.
OR 22
BRIDGE
VERTICAL
CLEARANCE
PROJECT

Salem, Oregon

Project Goal: Provide increased vertical clearance from Lancaster Drive to Exit 9 and reconstruct the corridor under traffic minimizing disruption to the traveling public and local businesses.

Project Scope: The project raised two bridges and lowered the highway under two bridges to provide a vertical clearance of 17'-0" through the corridor.

The project team's achievements included:

- Innovation by performing the first differential bridge raising in Oregon
- Proactive public outreach focused on reduction in impact for businesses affected by the Lancaster ramp closure
- Maintenance of traffic for multi-phase reconstruction in one of Salem's busiest corridors
- Accelerated 60-hour reconstruction to reduce closure impacts on Lancaster Drive
- Collaborative modification of the design during construction to reduce the cost of the work, saving over $1m

Message to Tim Potter, CDOT
"The pavement extension on the North end of the Hwy 22 project and the new deck on Lancaster look great! I want to personally thank you and your project staff for helping us get this added. It has helped make this project a real success!"
- Donald Jordan
  (CDOT District 3 Manager)

Response to
Donald Jordan
"Ken (Kahll) and the WHPacific crew were above and beyond to get this stuff done. The thanks need to go to them. "
- Tim Potter