Atlas Precast Concrete Wind Tower Base

Client       Tindall Corporation
Conley, Georgia

Consultant   BergerABAM
Portland, Oregon

Sites near the existing transmission grid are limited, the demand for alternative energy is increasing, and backers are looking to recoup their investments sooner. How does a wind energy company reconcile these challenges? Raise the height of the turbine tower to access stronger, steadier wind power so the site can generate power more consistently, efficiently, and profitably.

Any Size Turbine
The typical 12-stave base can be adjusted for larger or smaller turbines by changing the number of staves which requires minimal adjustments to the stave formwork, equipment, and fabrication.

Low Maintenance Means Low Maintenance Costs
Designed to endure with minimal service, the Atlas CTB is virtually maintenance-free. The exterior finish never needs painting. The base has no bolts that need to be tightened. And the larger footprint foundation is less sensitive to foundation settlement.

Economical
The cost of the wide footprint tower base is minimized by using a shallow ring foundation instead of a thick gravity foundation without a decline in foundation stiffness or capacity.

Higher Hub Wind Tower
Raising the hub height of a wind tower can result in an increase in the power output of a turbine. The Atlas concrete tower base (CTB) raises the conventional steel tower by 30 meters to a hub height of up to 130 meters for a significant increase in power output.

Conical Concrete Base
The base is built of tubular precast concrete sections supported on a cone made of precast concrete stave members on a cast-in-place ring foundation. For a maintenance-free fatigue life beyond the typical wind industry 20-year service life, the elements are connected with post-tensioning tendons without a single bolt.
Finally
A Way To Quantify “Soft” Costs in Decision Making

Making sound long-term transportation policy and resource allocation decisions has become increasingly challenging as needs have grown, funding diminished, and a wider range of modes and “soft” goals have become part of the mix. Up to now, there has not been a way to measure indirect “soft” costs, but the Oregon Department of Transportation (ODOT) is changing that. ODOT is developing a decision-making tool that will compare direct and indirect costs on the same page, making it possible to weigh the true cost of transportation options for the first time.

Project: Oregon’s Least Cost Planning
Client: Oregon Department of Transportation/Oregon
Entering Firm: CH2M HILL/Portland, OR

Drawn from best practices around the world, Oregon’s Least Cost Planning project will provide a method to measure the true costs of transportation projects, increasing transparency and the diversity of information considered. More importantly, it will provide a more accurate assessment of benefits relative to costs and impacts, livability, accessibility, safety, land use and growth management, equity, economic vitality, and environmental stewardship will be evaluated side-by-side with traditional considerations such as capital costs.
The 2010 Oregon Rail Study summarizes 13 individual studies commissioned by the Oregon Department of Transportation at the request of the Oregon Legislature. The purpose of the study was to better understand Oregon’s rail system and to assemble data to support statewide rail planning.

Because of the private sector nature of the state’s rail companies, much information on the state’s rail system—both services and infrastructure—was dispersed, not easily accessible, or simply unknown. For the 2010 Oregon Rail Study, research from the 13 studies was illustrated graphically, and important conclusions and relationships were highlighted. The resulting report compiles and presents the data in a comprehensive yet concise format, making key information accessible to policy-makers, industry users, and the public. The study contributes to the state’s knowledge about how the rail system is working, how it is used, and how decisions are made within the industry by:

- Assessing the infrastructure of shortline railroads, including identifying lines at risk for abandonment and estimating costs to upgrade them;
- Updating the state’s commodity flow analysis to identify rail corridors with growth potential;
- Reviewing state ownership models to determine an appropriate model for Oregon;
- Studying the feasibility of two intercity passenger services and a commuter service; and
- Identifying potential funding sources, strategies, and return on investment measures.

The format, data, and analysis of the study provides an authoritative resource that will inform planning and strategic investment decisions for rail transportation in the future.
Department of Veterans Affairs - Portland B100
Pile Cap Study
Portland, Oregon

Problem
In order to gain additional clinical and administrative space needed, the VA explored the feasibility of adding one level on top of the third floor roof areas of Building 100, the facility’s main hospital. Degenkolb Engineers was retained to assess the structural impacts of the expansion and found that four types of pile caps would be overstressed under the added gravity loads. Strengthening the existing pile caps would be extremely expensive and disruptive due to excavation work required to expose the pile caps.

Solution
To minimize the scope of pile cap retrofit, we advised the VA to perform a full-scale load test of each potentially deficient pile cap. Test specimens replicated existing pile cap construction details and material strengths.

Results
Testing demonstrated that the vertical load capacity of the pile caps is significantly higher than predicted by standard design equations. This testing program has eliminated the need for a multi-million dollar pile cap retrofit project and has also resulted in a construction savings for the VA of at least 50 times the cost of testing.
Engineering Excellence 2012

CAMPUS-WIDE STEAM & CHILLED WATER LOOP
Category B: Building and Technology Systems

Aging infrastructure inadequate for University growth projected to 2018
Developed Master Plan to prioritize capital improvements and meet growth plans
Master Plan created “shovel ready” document to justify funding sources
Phase 1 - Cramer Hall East chiller plant addition of 750 ton chiller; chilled water loop extensions along existing east loop; extension of the Loop across 6th Avenue under Light Rail to new ASRC facility
Phase 2 - Addition of new South and West loops in new underground walk-through tunnel system, with steam and chilled water piping sized to meet future loads; new 4,000 ton chiller plant in SB2 with initial 2,000 ton chiller installed; new 1,000 ft deep injection well
Phase 3 - Geothermal Heat Recovery chiller addition to provide preheating to outside air at SB3 using existing well, water extended from Cramer Hall
Sustainability and reduced energy usage attained using efficient new chillers; optimized automatic controls; variable frequency drives
Reduced Green House Gases by 3,500 tons when Master Plan fully implemented

Year savings of 9,268 million BTU and $111,000 per year in energy costs
Oregon Economic Stimulus Project $ 17.7 M
BETC, ETO, PSU Fund $ 600 K
AWRA $ 1.0 M

American Council of Engineering Companies of Oregon
Fire damaged the old shipyard building originally constructed during WWII where Oregon Iron Works were continuing their structural steel fabrication efforts in Vancouver, Washington. The timber and wood building was damaged severely and could not be economically salvaged, so a replacement building of slightly larger size was constructed. During demolition activities for the new structure, it was found that the old wood pilings were significantly damaged from decay and were effectively useless.

Working closely with the geotechnical engineering consultant, a new foundation system was devised using a structural concrete mat design. The original floor level and the adjacent site grades were raised slightly so that the new mat foundations could be installed over the original floor slab saving demolition costs. The new fabrication facility is approximately 376 long and 96 wide and contains two (2) 80 ton bridge cranes that clear span the width of the building.

Reinforced concrete foundations and floors were used for the mat foundation system. Precast concrete walls were used to 24 above the finish floor. The bridge crane rails were needed to be 48 above finish floor for clear usable space for fabrication of large assemblies. Structural steel columns and roof girders formed moment frames to support gravity, cranes, and lateral loads from wind and seismic. Light gage framing for wall girts and roof purlins were used to span between the frames and support light gage roofing and siding.

HHPR’s multi-disciplinary team provided project management, design, construction engineering, construction administration and inspection services on this privately funded project. The total cost of the redevelopment was approximately $4.2 million and the project was completed in December of 2009.

CLIENT: Oregon Iron Works
LOCATION: Clackamas, Oregon
Stretching across the environmentally-sensitive North Umpqua River in Douglas County, Oregon, the North Umpqua River Brown Bridge, along with its temporary detour, were constructed with locally-fabricated weathering structural steel plate girders with a cast-in-place composite deck—an unusual alternative in Oregon where the majority of highway bridges are constructed with pre-stressed concrete elements.

Emphasizing sustainability and innovative design elements, this long-span bridge replacement project utilized salvaged and modified materials from the County’s maintenance yard stockpile, including the main steel girder spans of the temporary detour bridge. Continuing this dedication to sustainability, the detour’s concrete deck panels and steel beams were also subsequently disassembled and stored, allowing the County to once again repurpose the leftover material for future bridge replacement projects. By utilizing innovative and sustainable design elements and materials, OBEC and Douglas County benefitted from the economic and scheduling advantages of constructing a steel alternative.
Category E: Environmental
Paradise Creek Ecosystem Restoration

Installation of 18,000 riparian plants, sedge sod and native seeding from local resources.

The installation of the new trunk sewer line and creek crossing for the City of Moscow.

New concrete deck placement for the Line Street traffic bridge which serves as the primary entrance to the University.

Completed 1,100 ft of restoration providing flow channel, improved water quality, habitat and aesthetics.

Major rain event provided an opportunity to demonstrate the flood control measures designed and constructed were successful.

Project Location: Moscow, Idaho
Client: USACE, Walla Walla District
Local Beneficiary: University of Idaho
Entering Firm: McMillen, LLC
Total Construction Cost: $4,050,082

American Council of Engineering Companies of Oregon
World’s First Buoyant Gravity Sewer

The original interceptor was undersized and corroding and would collapse in an earthquake. Lake Oswego needed an affordable, reliable, and minimally disruptive fix. The first-ever buoyant gravity sewer pipeline was the answer.

Why build a sewer in a lake and why make it buoyant?
A land-based solution would have required six pumping stations and nearly twice the pipe length, resulting in high costs, energy consumption, and disruption. In-lake replacement on pile supports was judged impractical for much of the route due to deep, soft lake sediments.

Built to last
The buoyant pipeline, held safely beneath the lake surface by ground anchors and tethers, follows a serpentine path to allow expansion/contraction while maintaining grade through wide-ranging water temperatures. More than 26,000 feet of 18- to 42-inch sewer and buoyancy pipe were installed. Six submerged buoyant manholes with removable caissons allow inspection and maintenance. Fused joints prevent leakage. Stainless steel and cathodic protection control corrosion. System flexibility maximizes seismic resistance.

Demanding work
The project faced numerous challenges: difficult topography, soft sediments, flat pipe graces, significant thermal expansion of HDPE, limited lake access and staging sites, and deep future drawdowns. Innovation was essential. The stakes and expectations were high.

Successful outcome
The program was completed on schedule ahead of the summer recreation season, 10 percent under budget, and with broad public support. The robust system now quietly does its job, out of sight, driven only by gravity, and is expected to serve Lake Oswego for a century or more.

Brown and Caldwell

Project Title
Lake Oswego Interceptor Sewer (LOIS)

Owner
City of Lake Oswego, Oregon

Firm
Brown and Caldwell (Portland, Oregon)
Saving the Columbia Waterway through Deicing Collection and Treatment

Portland International Airport (PDX) serves over 14 million travelers annually. Stormwater runoff containing aircraft deicing fluid, propylene glycol, was previously discharged into a local slough where it consumed high levels of dissolved oxygen in the waterway. The Port was concerned about environmental impacts in the slough and from its planned new outfall on the Columbia River — home to over a dozen species of threatened salmonid.

The Port of Portland’s five-year, $74-million Deicing System Enhancements Project addressed these environmental concerns:

- Expanded the airport stormwater collection and pumping system with five new and modified pump stations
- Expanded the storage system for dilute and concentrated runoff, testing three new storage tanks with 13 million gallons of storage
- Constructed 0.5 miles of pipeline that included horizontally directional drilling for major segments
- Installed a new outfall to the Columbia River with invert-to-shore pipe installation to minimize environmental impacts
- Constructed an onsite treatment plant with anaerobic fluidized bed reactors—the largest application of this technology in the world

The Port Deicing Enhancements Project allows the Port to continue deicing aircraft while protecting aquatic and plant life in the Columbia River basin. The Port will see an 85 percent reduction in bioavailable oxygen demand displacement, helping to protect a watershed habitat with a diverse population of urban wildlife and aquatic species.

**Project:** Engineering Services for Deicing Collection and Treatment System Enhancements, Portland International Airport (PDX), Portland, Oregon

**Client:** Port of Portland, Oregon

**Firm:** CDM, Portland, Oregon

American Council of Engineering Companies of Oregon
Portland’s Balch Consolidation Conduit Project: Partnering for CSO Success

Kennedy/Jenks Consultants

Walk the former Guild’s Lake area in Northwest Portland and you will find what appears to be typical Portland style mixed-use neighborhood. Only, now, below the surface lays a project that exemplifies how large projects can be successfully designed and delivered.

In 1991, the City of Portland Bureau of Environmental Services started a 20-year program to control combined sewer overflows to the Willamette River. One of the projects on the Westside of the river, the Balch Consolidation Conduit, presented many unique challenges including varied soil conditions, contaminated soils, a need to reduce neighborhood and business disruption, and a December 1, 2012 regulatory deadline for project completion.

The final success of this $74 million project resulted from an innovative contracting and partnering approach to design and construction. Together, the entirely local team (City-Consultant-Contractor) broke traditional barriers and partnered together early in design reducing overall project costs by $35.6 million, meeting the regulatory deadline, eliminating over 20,000 tons of landfill material, using innovative microtunneling and cutter soil mixing equipment, exceeding the MWESB participation by 400% and concurrently informing the public about the role this project would have in minimizing business disruption while cleaning our rivers.

As City Project Manager Scott Clement liked to say, it took partnering with a little “p” to achieve such success on such a large infrastructure project.

CLIENT/OWNER: Bureau of Environmental Services, City of Portland
ENGINEERING FIRM: Kennedy/Jenks Consultants, Portland, OR
The River’s Renaissance

EAST SIDE COMBINED SEWER OVERFLOW TUNNEL, PORTLAND, OREGON
WILLAMETTE RIVER CSO TUNNEL PROGRAM

The East Side Combined Sewer Overflow (ESCSO) Tunnel helps reverse a century of heavy pollution in the Willamette River in Portland, Oregon.

Through a unique alternative contracting mechanism, the City of Portland Bureau of Environmental Services worked with Parsons Brinckerhoff and contractor Klewitz/Billfinger Berger JV to successfully design and build this final phase of the largest public works program in the city’s history.

The project achieved major milestones for the U.S. tunneling industry, including the use of a large-diameter slurry mix-shield tunnel boring machine and steel fiber-reinforced concrete tunnel segments, and the largest single microtunneling drive ever successfully completed in the United States.

Completed on time and under budget, the ESCSO Tunnel secures cleaner water in the Willamette, enhancing livability, improving wildlife and fish habitats, and promoting recreational river use. The river’s renaissance restores the city’s “heart” and helps create a cleaner, healthier future for Portland and its residents for generations to come.
Benton Irrigation District (BID), located in Benton County, Washington, hired Anderson Perry & Associates, Inc. (AP) to design a $35 million pressurization improvement project that would abandon 60 miles of canal, modernize the irrigation system, conserve water, increase stream flows, and improve fish habitat in a degraded stretch of the Yakima River.

The first challenge the team faced was to design a river pump station capable of delivering 27,000 gallons of water per minute (enough water to fill an Olympic-size swimming pool in 27 minutes) from the Yakima River without placing a dam structure in the river channel. Low summer flows in the river have historically required irrigators to add dams to the river to allow water to be diverted to thirsty crops during hot summer months.

Using fluvial geomorphology and some creative thinking, AP engineers designed a pumping station that did not require any structures to be placed in the river channel and could operate in a wide range of flow conditions. By keeping the diversion out of the river, in-water maintenance activities are eliminated, thereby sustaining river and fish habitat and eliminating the need to acquire permits. The project has successfully improved the efficiency and reliability of the irrigation system while at the same time preserved the health of the river by avoiding the addition of a significant structure to the river.
Category G: Water Resources
TCE Removal GWTP Design-Build Project

1960's Atlas Missile Site #4 bunkers were likely source of contamination.

Final connection of 30" HDPE to 54" BOPO treated effluent line. McMillen installed 2,800 ft of HDPE yard piping and excavated more than 15,000 cubic yards.

McMillen's organizational structure allowed the project to meet a 15-month schedule, from design through startup and testing.

Volatile removal via air-stripping technology with a low profile tray system for gravity flow installation.

Four air-stripping units treat 1,000 gpm each. Air strippers led by a gravity flow-split hydraulic structure.

Completed GWTP operates continuously (24/7) "unmanned". Providing TCE-free (< 0.1 ppb) water to the city of Cheyenne.

Project Location: Cheyenne, Wyoming
Client: USACE, Omaha District
Local Beneficiary: City of Cheyenne Board of Public Utilities
Entering Firm: McMillen, LLC
Total Construction Cost: $5,100,705.00
TURNING ON THE TAP
The City of Sherwood’s 15-year journey to bring high-quality, reliable water supply to a growing community

Sherwood, one of the fastest growing communities in Oregon, experienced rapid growth since the late 1990s, causing the City to exceed the capacity of the existing water supply. The City investigated several options to replace their existing supply source, deciding upon the Willamette River Water Treatment Plant as the most cost-effective, reliable source. As a result of a very successful public education process, City residents voted in favor of this new source in 2005. The water supply improvements included a reservoir and pump station and a major transmission main between Wilsonville and Sherwood. Success of the project required extensive interagency coordination relative to shared facilities and system operations, and the development of complex intergovernmental agreements to bring the new supply to fruition.

MSA served in an overall program management and engineering role to assist in advancing this highly successful water supply project; a nearly 15-year journey that began with investigating the feasibility of using the Willamette River for water supply in 1998 and finished with the commissioning of the new system in 2011. In developing its new supply, the City used forward thinking to develop a system with regional importance, including transmission capacity to meet Sherwood’s 20 million gallons per day (mgd) ultimate demand and an additional 20 mgd for future partners. Countless community benefits are derived from this project, including first class park improvements integrated with the terminal reservoir facilities at the City’s Snyder Park. Long-term benefits also included cost savings for City residents and a high-quality, dependable water source for decades to come.

**PROJECT:** Willamette River Water Supply Improvements Project  
**LOCATION:** Sherwood, OR  
**CLIENT/OWNER:** City of Sherwood, OR  
**DESIGN FIRM:** Murray, Smith & Associates, Inc.; Portland, OR
Sustainability: Standard Procedure

Rather than tack a few stormwater swales on to a conventional roadway design, designers of Southwest Herman Road began by making sustainable stormwater management the baseline assumption. Over more than half of this 1-mile-long roadway improvement, continuously connected street swales capture 100 percent of the surface water runoff, treating it and then allowing it to infiltrate into the groundwater. Only in the case of an overflow does water enter the storm sewer system. The project is “sandwiched” between a sensitive wetland and Portland & Western Railroad tracks and is in an area that is host to an endangered plant species. The design transformed this narrow 2-lane rural roadway with no curbs, few shoulders, and deteriorated pavement into a new 3-lane multimodal cross section that includes 12-foot lanes, a median, bike lanes, sidewalks, and street lighting.

Considered a success by local businesses and City staff, the project improved access to the Lebanon Industrial District while maintaining rail operations, optimizing sustainability, minimizing wetland impacts, and protecting an endangered plant species.

Project: Southwest Herman Road Widening
Client: City of Tualatin/OR
Entering Firm: CH2M HILL/Portland, OR
Central Oregon’s busiest highway, US 97, traverses some of the most sensitive and scenic wilderness in Oregon. It serves the mobility needs of local communities and industry and provides access to local visitor attractions. It is the second most important north-south highway corridor in the state, following Interstate 5.

Traffic volumes are expected to double in the project area over the next 20 years, and major elements of US 97 did not meet the design and operational standards required to accommodate this increase. The resulting congestion and the potential for accidents would significantly impact mobility and safety. In addition, the highway bisects identified wildlife corridors and impacts critical elk habitat.

In response to these challenges, ODOT developed this approximately $85M safety and capacity improvement project that widens and upgrades 10.6 miles of a heavily used section of US 97 using context-sensitive design solutions. The project achieved four key objectives: (1) increase capacity on US 97; (2) improve safety; (3) provide a natural vegetated parklike setting; and (4) improve the connectivity of the forest roadway system.

This project provides many key benefits, including:
- Improved lanes to maintain a high level of service for future traffic demands.
- Enhanced safety by eliminating dangerous intersections and separating northbound and southbound traffic with a wide vegetated median.
- Preserved trees, thereby minimizing visual impacts.
- Improved multi-modal access between recreation attractions.
- Channeled wildlife to prevent collisions and preserve habitat.

This project was selected as a pilot project to evaluate Greenroads, a new roadway design and construction sustainability rating system.
Early in the field work, a 300-ft-wide ancient landslide was discovered in a curve section that required a new culvert. Rather than a costly retaining structure, GRI designed a grading plan that removed the landslide. Oregon-14 dating of tree stumps in the landslide graveled the feature to ~1700 AD.

Simpson Creek Bridge is founded on an innovative, cost-effective system of drilled piles developed by GRI on ODOT Design-Build contracts.

US 20
SIMPSON CREEK CURVES REALIGNMENT

Location: Lincoln County, Oregon
Client/Owner: Oregon Department of Transportation
Region 2, Area 4 Project Office, Corvallis, Oregon
Engineer: GRI, Beaverton, Oregon

US 20 is a major link between Corvallis and Newport, Oregon, built through landslide-prone Coast Range geology. Tight and narrow curves near Simpson Creek resulted in a high accident rate and impaired freight mobility. ODOT contracted GRI to provide engineering geology, geotechnical engineering, retaining wall design, and construction services to straighten, widen, or repair landslide-affected sections of road. The challenging design included eight new retaining walls, new soil and rock cut slopes up to 250 ft high, and a new bridge over Simpson Creek. Rapid and focused field work, innovative engineering, and effective relationships with ODOT resulted in completion of design and plans and specifications within four months of NTP, which allowed ODOT to receive federal ARRA funding. ODOT and GRI provided construction services through completion in 2011, and all elements are performing as designed.

A comprehensive program of explorations, borehole imagery, and rooftop analyses allowed for re-design of a rock outcrop from 250 to 300 ft high for major cost and schedule savings.
Connecting the South Waterfront District to Downtown Portland, SW Moody Avenue from SW Sheridan to SW Gibbs was an unimproved two lane roadway with partial bicycle and pedestrian facilities. A single tracked streetcar system ran parallel to the road. With Moody as the main access into the quickly developing district, the need to bring the corridor up to urban standards was growing. The transportation vision for the area includes a raised network of roadways with SW Moody Avenue 14 feet above existing grade to accommodate the new Portland to Milwaukie Light Rail (PMLR) bridge over the Willamette River and the future OHSU Schnitzer campus.

As the design for both projects progressed, improvements to SW Moody Avenue became an immediate priority. Seizing an opportunity, the City of Portland applied for federal stimulus funds through the Secretary of Transportation’s TIGER 1 program, receiving $23.2 million and becoming one of only 51 projects across the country funded by the program. With additional federal, state and local funds, the City successfully completed design and construction of the over $46 million project within 18 months, meeting the very aggressive TIGER-mandated completion date.

In order to meet the project schedule and address complex site conditions, the project broke new ground with the use of innovative design and construction methods to combat poor soil conditions. Using Low Density Cellular Concrete weighing about one-third that of standard structural fill, the project raised SW Moody Avenue 14 feet above existing grade providing a state of the art connection from SW River Parkway to SW Gibbs. The project includes three traffic lanes, dual streetcar tracks, sidewalks, a cycle track and a backbone of upgraded public and private utilities supporting the existing and future South Waterfront district.

CLIENT: City of Portland
LOCATION: Portland, Oregon

American Council of Engineering Companies of Oregon
The newly reconstructed concrete Runway 10R-28L at Portland International Airport (PDX) serves a critical role in the region's economy. Runway 10R-28L — the 11,000-foot South Runway — is the airport’s primary runway, which serves more than 125,000 aircraft operations use per year. The 60-year-old runway pavement was nearing the end of its useful life and needed to be rebuilt to provide dependable service into the future. As a result of the rehabilitation, the runway will continue providing vital commercial service for the next 40 years.

Because the South Runway is the only runway at PDX that can accommodate aircraft landings in low visibility conditions, the Port of Portland had an extremely narrow window between the foggy spring and fall to close the runway for rehabilitation. It was imperative that the Port return the runway to service before the onset of foggy conditions in October 2011. From the start of planning, the project team focused on minimizing the challenges to successfully completing the runway rehabilitation and reopening on schedule. The challenges included accomplishing the extensive amount of work within the six-month maximum allowable closure of the runway; maintaining aircraft operations during construction; coordinating the major construction activities in and around the busy airfield; and avoiding impacts on existing critical airport communications and navigational infrastructure within the project site. The HNTB design team and Port staff worked together to develop a project design and a construction management plan that effectively addressed and mitigated all challenges. The completed runway returned to service on schedule.

CLIENT/OWNER: Port of Portland, Portland, OR
ENTERING FIRM: HNTB Corporation, Bellevue, WA

American Council of Engineering Companies of Oregon

Ongoing Pavement Construction With Temporary 5,000-Foot Length of Runway in Use

Completed 11,000-Foot Runway Returned to Service Six Months After Start of Project

5,000-Foot Temporary Runway Opened for Use Just Four Months After Start of Demolition

Completed South Runway
Photo: Courtesy of Port of Portland (2011)
Martin Luther King Jr. and Grand Avenue Viaduct
Portland, Oregon

Client: Oregon Department of Transportation
Owner: City of Portland, Bureau of Transportation

Bridge Finishes Design: Lloyd D. Lindley, ASLA

During 1906 an elevated 30-foot-wide non-street along the gorge’s edge was added. The current bridge was constructed in the early 1920s, and it was later converted to a two-lane highway. In 1995, the Oregon Department of Transportation (ODOT) began a comprehensive upgrade and modernization of the bridge. The new bridge features wider lanes, improved safety features, and enhanced aesthetics. The project was completed in 2012, and it has received numerous awards for its design and construction. The bridge is a testament to the engineering excellence of the 20th century. The new bridge features wider lanes, improved safety features, and enhanced aesthetics. The project was completed in 2012, and it has received numerous awards for its design and construction. The bridge is a testament to the engineering excellence of the 20th century.
SW Burnham Street Improvements; Tigard, Oregon

With a strong emphasis on green and sustainable redevelopment, the SW Burnham Street Improvement project was selected as the catalyst for Tigard’s revitalized downtown. Burnham Street, a critical connection to the downtown core, was in very poor condition with failing pavement, intermittent segments of sidewalk, cluttered overhead utilities, a dozen underground conduits, and public water, sanitary sewer, and storm sewer in need of repair.

The scope of work was tremendous and complex for the reconstruction of this 2,050-foot-long roadway. The design included full street reconstruction with wide, pedestrian-friendly sidewalks; curb extensions and stamped crosswalks; aesthetically pleasing and innovative water quality facilities; attractive gateway monumentation; cutting edge LED street illumination; and undergrounding of all utilities. The project was completed within schedule and under budget and is celebrated by the community as a major step towards redevelopment of its downtown.

An aggressive and creative public outreach campaign was pursued during the construction of the project, which included a continuously updated website, social media, public events, and weekly “coffee talks” with the contractor and the project manager. Completion of the project was celebrated with a street fair complete with sidewalk chalk art and a dog parade.

The streetscape was designed to accommodate public events.

Multiple modes of transportation were integrated into the project.

Success of the project hinged on maintaining close relations with project neighbors and the community.

An aggressive and creative public outreach campaign was pursued during the construction of the project, which included a continuously updated website, social media, public events, and weekly “coffee talks” with the contractor and the project manager. Completion of the project was celebrated with a street fair complete with sidewalk chalk art and a dog parade.

The streetscape was designed to accommodate public events.

Multiple modes of transportation were integrated into the project.
Connecting Communities
LTD Gateway EmX Bus Rapid Transit Extension
Springfield and Eugene, Oregon

Owner
Lane Transit District
Eugene, Oregon

Consultant
Parsons Brinckerhoff
Portland, Oregon

Opened for service on schedule and under budget, the Lane Transit District’s (LTD) $41 million Gateway EmX Bus Rapid Transit (BRT) Extension provides a significant long-term transportation improvement for Eugene-Springfield while demonstrating the cutting edge in BRT system implementation.

The extension connects downtown Eugene, downtown Springfield and the University of Oregon with the rapidly growing area around the Gateway Mall in Springfield and PeaceHealth’s RiverBend Hospital Campus. The 5.9-mile extension includes four miles of exclusive transit lanes and 14 new stations. The design team developed a corridor solution that “right-sized” transit improvements based on brand identity, passenger volumes and traffic congestion levels. This project establishes a template example that other cities look to for planning their own systems.

The Gateway EmX BRT Extension is the second phase of LTD’s BRT network and the first project in the nation to successfully secure a Small Starts Project Construction Grant Agreement.

American Council of Engineering Companies of Oregon
For nearly two decades, traffic on OR 99W east of Hwy 217 was notoriously bad with traffic backed up from its intersections with Hall Blvd and Greenburg/Main St, for over a mile in both directions. These backups caused major delays and safety issues in the corridor. The project was a collective success with three public agencies (City of Tigard, Washington County and ODOT) working together towards one common goal. WHPacific and these agencies managed the project to a successful completion which resulted in a savings in design and construction costs and kept the complex project on schedule.

The project also achieved the following:
- Reduced traffic congestion and accident rates at two key intersections and OR 99W
- Utility relocation to reduce clutter of overhead utilities
- Business access relocation to provide safe and efficient travel movements
- Staged night construction to maintain traffic, avoid delays and improve safety
- Stormwater treatment with infiltration planters for water quality
- Improved pedestrian, bicycle and transit access
- Project completed in one construction season, despite adverse weather conditions
- Over 300 private sector jobs created from over 30 separate companies

The result is an attractive and dramatic improvement for area commuters. The project has paid for itself in less than a year with the reduction in travel time, crash rates and reduced vehicle emissions. This savings is valued at over $1M per month, which has already exceeded the $12M budget. The net effect is that within 20 years, this project will have returned the investment 30 times over.
DALLESPORT
COLUMBIA RIVER
TREATY FISHING ACCESS SITE
Dallesport, Washington

This design-build project included both in-water and onshore work, as well as dune stabilization and contaminated soils cleanup, in a location of challenging and variable terrain and subgrade.

Project challenges included:
- Blasting and excavation of in-situ basalt rock
- Limited project area characterized by sandy soils underlain with shallow basalt
- Rigorous schedule for project design and permitting for completion of marine construction within the 2010 in-water work window

The project team worked closely and, by staging the in-water portions of design and construction, were able to complete blasting and boat facilities within the in-water work window. Blasted basalt material was used throughout the site to limit access, provide vehicle safety, and create a natural and attractive setting throughout the project. Natural plantings and basalt “sand fences” were also used in the dune stabilization and remediated areas.

Amenities included:
- Floating dock, concrete boat ramp & boat basin
- Group shelter
- Standard & ADA accessible restroom & shower facilities
- Potable water & sanitary sewer systems
- Fish cleaning station
- Campground facilities and parking areas

The Dallesport Columbia River Treaty Fishing Access Site is located approximately 3 miles downstream of the Dalles Dam in Dallesport, Washington. This site is the 31st, and final, site developed by USACE along the Columbia River as part of a commitment by the federal government to the Nez Perce, Umatilla, Warm Springs and Yakima tribes. This commitment reestablishes tribal fishing access on the Columbia River as compensation for inundation of tribal fishing sites resulting from construction of the Bonneville Dam.

Engineer
COOPER ZIETZ ENGINEERS
PORTLAND, OR

Owner
USACE PORTLAND DISTRICT
PORTLAND, OR

American Council of Engineering Companies of Oregon
NOAA Marine Operations Center - Pacific

Owner: Port of Newport, Oregon
Engineers: KPFF Consulting Engineers & GRI

Newport, Oregon - NOAA’s West Coast homeport was a highly visible and widely publicized public project. With its projection to bring over 400 million dollars in revenue to the state over the next 20 years, the Port of Newport, Oregon senators, the governor, and city commissioners were deeply invested in the facility’s success.

KPFF and GRI responded to the substantial challenges of an in-movable 22-month deadline, abbreviated 15-week in-water work timeline, and considerable environmental regulations by reassessing current engineering systems and construction methodologies. Solutions included an all-precast superstructure to speed in-water construction, which was a significant feat that will allow engineers to reevaluate prevailing methodologies, especially as marine environmental regulations become increasingly stringent. The innovative application of a stepped pile section and the customized approach to reinforce these members also opens up new engineering perspectives.

Lastly, the thoughtful response to protect native species via glass-beaded, reflective paint and careful geometry of the 1,300 ft-long pier demonstrate the team’s ingenuity and commitment to the project’s success.
challenge.

Hidden beneath Oswego Lake and its flat, muddy bottom, a dramatic potholed bedrock channel was revealed by geotechnical explorations. Conventional anchor types were unusable in the super-soft organic sediments. The sinuous sewer required versatile ground anchors to accommodate steep cliffs and deep bedrock scour holes sculpted by the catastrophic Missoula Floods.

innovation.

Drilled ground anchors, typically used in rock slopes and tie-back walls, were designed for precise placement, extremely variable depths, and barge-based construction. GIS modeling provided a sophisticated design approach by extrapolating data from 1960s piles, geophysics, and limited borings. Specialty equipment set 37,500 feet of anchors that reliably matched GIS-predicted overburden estimates.

solution.

S&W helped conceive, design, and oversee construction of the only buoyant pipe system in the world executed at this level of precision — setting a new benchmark. Safely submerged below boaters and swimmers, LOIS was built on time and under budget, with minimal “down time” for residents.
Summers Creek Bridge

Client: Cowlitz County, WA
Location: Cowlitz County, WA
Engineer: BergerABAM with GRI and West Consultants, Inc., Portland, Oregon

During a 2009 significant winter storm, an upstream culvert under a private road became blocked. When the roadway prism no longer functioned as a levee, it ruptured, sending water and debris hurtling towards Kalama River Road. The flow was well in excess of the 100-year event, and the culvert under Kalama River Road didn't stand a chance.

Kalama River Road At Summers Creek
During consultation, the reviewing agencies were concerned about whether the bridge could convey flood flows and accommodate stream meanders. The washout had eliminated the evidence of prior stream conditions and estimated flows, left sediment and a substantial debris flow behind, and raised the stream bed.

Concrete Girders/Bridge Foundation
The new bridge opened in fall 2010 and consists of 99-foot, single-span W35DG precast decked bulb-T girders placed on shallow piers and spread footings.

New Summers Creek Bridge
The single-span decked girder bridge structure designed by BergerABAM was the most economical solution that met hydraulic and permitting requirements; it also allowed the use of more economical spread footing foundations and eliminated the need for piling.

Summers Creek Flood Damage
When flooding in the aftermath of a 2009 winter storm destroyed a culvert at Summers Creek on Kalama River Road, Cowlitz County asked BergerABAM to provide engineering and permitting services for a replacement structure.

Temporary Bridge
The challenges included the timeframe required for Federal Emergency Management Agency funding, the continuing expense to the County of renting a temporary bridge to keep traffic moving, and permitting in the absence of the ordinary high water mark indicators washed out by the flood.
Walker Creek Fish Passage Enhancements

Restoring fish passage to a stream that had been inaccessible to Coho salmon, steelhead and cutthroat trout since the 1960s

The Walker Creek Fish Passage Enhancements project is one of 49 projects listed in the Portland Water Bureau’s (PWB’s) Bull Run Water Supply Habitat Conservation Plan, which was developed to protect and improve aquatic habitat while continuing to manage the Bull Run watershed as a water supply for more than 500,000 Oregon residents.

This project replaced an existing 58-inch diameter culvert with a new 18-foot wide, 120-foot long, open-bottom, fish-friendly culvert immediately beneath the PWB’s existing 52-inch and 66-inch diameter water supply conduits No. 2 and No. 4. A new stream bed was constructed within the culvert to replicate the upstream channel and return the creek to its historical condition as a fish-bearing stream.

A unique complexity of this project was the presence of the PWB’s existing primary water supply conduits. The designs included special criteria for excavation shoring and conduit support systems to ensure an uninterrupted supply of water to the City of Portland during construction.

This project presented challenges at several levels including extensive permitting requirements, protection of water quality, extensive excavations around existing water supply conduits, and a constrained in-water work schedule. These challenges were effectively overcome to make this project a success. Within weeks following project completion, salmon were observed in Walker Creek for the first time in 50 years!
Category K: Energy
Choloma Hydroelectric Project

6 intakes were constructed on 6 streams allowing for all flow to be collected in a 6 km long HDPE collector pipeline.

Upper reservoir storage tank (20,000 cubic meters, 200 ft diameter, 35 ft tall). This tank is reported by the manufacturer to be the largest steel water tank in Central America.

2-jet pelton turbine-generator rated at 9.7 MW.

The new HDPE Collector Pipeline River Crossing.

A 6 km long HDPE collector pipeline (24” to 48” diameter) running across the slope following the existing gravel road.

Plant started-up and produced first power on October 5, 2011.

Project Location: Choloma, Guatemala
Client: Grupo Secacao
Entering Firm: McMillen
General Contractor: Cosana
Total Project Construction Budget: $25,000,000