**Fundamental Approach Cleans Up Water**

**Overview**
Prairie City’s primary water source originates at underground infiltration galleries adjacent to Dixie Creek. Harmful microorganisms in the water forced the City to dose the water with high levels of chlorine, which caused residents to complain about the taste and odor of the water and left the City with increased chemical and maintenance costs. When the Oregon Drinking Water Program implemented stricter surface water regulations, the City was ordered to further treat the water or risk being fined or even prohibited from using their 50-year-old water source. Anderson-Perry & Associates, Inc., worked with the City to find solutions to the water problems.

**Challenges**
- Achieve regulatory compliance
- Improve water quality
- Utilize and improve upon existing infrastructure

**Engineering Highlights**
- Minimize rate increases for system users
- Provide an easy-to-operate system

- Slow sand filter (SSF)
  - Proven, reliable, easy-to-operate water treatment method
  - Designed to fit on a constrained, 0.7-acre City-owned site
  - Implemented design features that allow the SSF to work properly in freezing winter conditions
  - Designed to allow the system to operate primarily by gravity
  - Utilized the infiltration galleries and distribution piping already in place
  - Rehabilitated an existing well, doubling its pumping capacity
  - Utilized an existing unused reservoir as a chlorine contact basin to provide sufficient chlorine contact time

**Results**
- Achieved regulatory compliance
- Utilized existing infrastructure, helping minimize system user fees
- Provided a simple, easy-to-operate treatment system
- Eliminated reservoir overflows, saving water and augmenting Dixie Creek stream flows
- Provided an environmentally friendly system by using fewer chemicals, less electricity, and less water

**City of Prairie City Water System Improvements**
Prairie City, Oregon
Fast-Track Approach Keeps Commerce, Travelers Moving

As the only access to Portland International Airport, Airport Way is a critical artery for the regional economy, supporting local commerce and tourism by keeping people and freight moving.

The challenge of the Airport Way Widening and Rehabilitation project was to quickly improve this roadway within a constrained budget without interrupting the flow of traffic, while maintaining strict safety standards. Through up-front planning, intensive integration of project elements, inclusive real-time decision making, and determination, the team delivered the design for $9 million of construction within 5 months. Integrating four projects into a single project with a one designer and contractor saved an estimated $6 million and accelerated project delivery. There were minimal impacts on the travelling public, and there were no significant delays or safety incidents during construction.

The end result was a cost-effective solution—delivered ahead of schedule and within budget—that increased the capacity and safety on this critical stretch of road.
CELILLO VILLAGE REDEVELOPMENT

Cellillo Village Redevelopment Project, Cellillo Village, Oregon
Cooper Zietz Engineers, Inc., Portland, OR.
US Army Corps of Engineers Portland District, Portland, OR.

In March 1957, the Dalles Dam began operations, flooding a small Indian fishing village established along the Columbia River 8,000 to 10,000 years ago. Though the U.S. Government relocated the villagers to the nearby floodplain in the 1950s, the village had become dilapidated, dangerous, and unsuitable for use.

In 2004, Congress approved a 5-year, $12.5 million redevelopment project that included the following elements:
- Water system, including deep potable well, water tower, and water distribution system
- Sewage system, including sewer main and sewage lagoons
- Electrical supply and distribution system
- Roadways, parking, and drainage features
- 15 new homes for permanent residents
- An 8,000 square foot longhouse for visiting Indians attending ceremonial events
- A 4,000 square foot BIA administration/classroom building

CZE selected a team of Native American firms to participate in the design phase. Our team worked closely with the Wy-Am Board and residents of Cellillo Village to generate a design that is culturally sensitive, provides a safe and attractive atmosphere for the village residents and visitors, and offers the residents a place from which to continue with their sustenance fishing and commercial practices.

Through a cooperative agreement, the Bureau of Indian Affairs enlisted the support of the Portland District, Army Corps of Engineers to manage and execute the re-development project. The Corps contracted the project to Cooper Zietz Engineers Inc., a Native American firm, as the primary designer. Native American firms conducted more than 80 percent of the design work.
Crissey Field State Park and Welcome Center

A model for sustainability

Crissey Field is the fifth state park to open since Oregon Governor Ted Kulongoski launched his “park a year” initiative in 2004. Located five miles south of Brookings, along Highway 101 and the Wiscokuck River, it is the first Southern Oregon park to be included in the program and is significant since it serves as a gateway, welcoming travelers to the state.

Though rich in natural beauty, the site presented multiple development constraints. What would be the best way to leverage these constraints into opportunities and take advantage of the site’s stunning views and natural habitat? How do you integrate a sustainable design solution while dealing with challenging issues including existing wetlands, a Tsunami inundation zone, a flood plain, an archaeological zone, endangered plant species and a surf zone, and the fact that priorities such as safety, costs, ADA access, and balancing the needs of various stakeholders had to be factored in?

The David Evans and Associates, Inc. team incorporated an elegant series of terraced plazas with accessible ramps into the site design to accommodate ADA requirements. Visitors to the Welcome Center ascend a series of wide, terraced steps and ramps as they approach the building, allowing them to stop and experience dramatic views and appreciate the stunning natural beauty of the site before reaching the Welcome Center and its dramatic backdrop - the Pacific Ocean.

Beautifully and contextually designed with a multitude of sustainable features, the Governor declared the constructed facility “Oregon’s model for sustainability.”

Project Partners: PAE Consulting Engineers, Inc., Cascadia Earth Sciences, Oregon Parks and Recreation Department, Sharon & Wilson Inc. and Archaeological Investigations Northwest Inc.

Location: Curry County, Oregon

American Council of Engineering Companies of Oregon
Degenkolb Engineers designed the seismic upgrade of historic Fire Station #1 to meet Immediate Occupancy performance objectives. Built in 1952, this non-ductile concrete building is the largest fire station in Portland and houses more than a dozen personnel responding to over 6,000 emergencies per year.

Three major deficiencies existed in the structure, being: (1) weakness in the front side of the building such that a seismic event would likely cause too much deformation and prevent the fire station’s doors from opening, (2) drill tower located behind the structure was not tied back to the building, and (3) interior concrete columns did not have ductile detailing and could fail in a brittle fashion.

Degenkolb’s upgrade scheme was developed around preserving the historic features and original look of the building and included:

- adding shotcrete to interior face of existing concrete shear walls on the east side of the building,
- creating reinforced piers to each column on the 2nd and 3rd Floors in the front side of the building,
- using composite polymer fiber wrap to enhance deformation capability of interior concrete columns, and
- bracing architectural components, mechanical and electrical equipment and their distribution system, and plumbing pipes.

With an approximate $10.7M project cost, Fire Station #1 reopened in December of 2009.
Hood View Park is a new 35-acre park that is being constructed within the City of Happy Valley by the North Clackamas Parks and Recreation District.

The park features:

- Four All-Weather Turf Fields for Softball and Baseball With Field Lighting
- Multi-Use Field for Soccer, Lacrosse and Football
- Low Impact Development Construction Utilizing Greenstreets, Water Quality Treatment Planters, and Raingardens
- Restored Wetland Habitat Buffer and Walking Trails
North Clackamas School District (NCSD) faced the challenge of building new schools throughout the county to meet the demand for more students. This included a new elementary and middle school in an undeveloped area between Sunnyside Road and OR 212. These additions would also require construction of a new public roadway and improvements to adjacent roadways. HHPR provided preparation of construction plans and specifications, utility coordination, public involvement, and right-of-way and easement survey and documentation. HHPR also provided full-time inspection for new sanitary and general oversight/inspection assistance of road construction.

Project Features:
- Rock Creek Boulevard (New Road) Half-street construction of 5-lane arterial
- SE Parklane Drive (New Road) 3-lane road between two school projects
- SE 102nd Avenue (Existing Street Improvements) - Two-thirds construction of 3-lane street
- Work Completed within a short timeline
- Green Street Stormwater Planters - First time they’ve been implemented within City of Happy Valley or Clackamas County

Harper
HHPR  Houf Peterson Righellis Inc.

American Council of Engineering Companies of Oregon
Union Street Railroad Bridge

Preserving History...

Built in 1912-1913, the Salem, Falls City, and Western Railway Willamette River Bridge connected people and goods to downtown Salem. The 722-foot, 5-span steel truss bridge included a patented vertical lift span. The 850-foot timber trestle on the west bank was substantially rebuilt in 1939-1940 and survived an extensive fire in 1975. In January 2006, the Union Street Railroad Bridge and Trestle was officially listed in the National Register of Historic Places.

Connecting Community

The City of Salem is fulfilling its vision of providing safe and enjoyable connectivity for bicyclists and pedestrians between downtown and West Salem, and to the park systems along the Willamette River. This project is a significant first step in linking three major parks that encompass 1,300 acres and 26 miles of trail.
Salmon-Safe Residential Development Certification Standards for Design and Construction

**CHALLENGE**

Provide a market based approach to recognize residential development projects for innovative site design and engineering that protects and enhances habitat quality for salmonid species with a unique, easily recognized award label.

**SOLUTION**

A new sustainable certification system for site developers, engineers and land managers that awards residential projects that demonstrate environmental stewardship by minimizing impacts of development on sensitive aquatic and upland resources via sustainable design, construction, and maintenance solutions.

**INNOVATIVE UNIQUENESS**

The Salmon-Safe Residential Certification Standards add value to qualified projects by recognizing them for using low-impact development, stream enhancement, and water conservation design and construction solutions that protect fish and wildlife habitat.

The Certification Standards efficiently guide the design team throughout the entire design and construction process. The Salmon Safe certification system can operate as a stand-alone label, or function as a plug-in to other sustainability certification systems on projects.
UNIVERSITY OF PORTLAND SHILEY HALL
PORTLAND, OREGON ★ LEED PLATINUM GOAL ★

OVERVIEW
When the century old University of Portland was gifted with the largest private donation in the University's history, campus officials honored their donor's wishes with a spectacular renovation to the largest building on campus—the School of Engineering.

The University required a building that would serve as a teaching facility, student study environment and an interactive learning space while satisfying the campus' sustainability goals.

The ambitious project initially targeted LEED Silver, but because of the team's innovative design, it surpassed this target and is now on track for LEED Platinum.

CHALLENGES
* maintaining occupant comfort in a building with multiple uses from labs to common areas
* achieving LEED Platinum Certification, with over half the points related to MEP design
* creating a facility that would be the jewel of the campus and a state-of-the-art teaching tool

SOLUTIONS
* In-slab tubing for radiant heating/cooling: In cooling mode, this well-irrigation coupled radiant cooling system is cooled using irrigation water via a heat exchanger
* “Smart” sage glass darkens with the rate of outside light and temperature, lowering heat load
* Wind cowl for natural and displacement ventilation
* Hot and cold data center aisles optimizes air flow and cooling
* Nano-optic technology evenly illuminates a room without glare
* Learning wall teaches heating/cooling effects of radiant slab

client/owner
Soderstrom Architects
Portland, Oregon

MEP engineer
Interface Engineering
Portland, Oregon

ACEC Oregon

American Council of Engineering Companies of Oregon
I-84 CHENOWETH INTERCHANGE ACCESS MANAGEMENT PLAN  The Dalles, Oregon

The I-84 Chenoweth IAMP is a step-wise plan that maximizes density while promoting long-term sustainability. The IAMP provides a framework for long-term economic prosperity in The Dalles by balancing land use, transportation, and funding to accommodate nearly five million square feet of new development while preserving existing investments.

Optimizing development potential is achieved through land use management and increased local connectivity including a new crossing of the Union Pacific Railroad. Together, these two elements eliminate the need to either limit development potential or provide $13 million of mid-term improvements to the existing interchange.

Benefits of the IAMP:

- Simplified and expedited development review process that promotes economic development and increases the competitiveness of the City in the I-84 corridor
- Certainty for the City, Wasco County, property owners, & business owners, and developers of the area’s long-term circulation and access plan
- A market demand-based plan that minimizes spending by preventing excessive, unforeseen taxes in the future
- Sustainable and balanced funding plan that shares costs between private development, the City, County, and ODOT
- Positions the City to qualify for transportation infrastructure grants
- Flexibility to refine improvements and review the plan on an on-going basis

The IAMP implemented an active, iterative stakeholder engagement process that utilized the “Tell me, Show me, Involve Me” approach. Stakeholders were educated about the project, design fundamentals and management approaches. They were then involved in a series of workshops where they applied their knowledge to develop and critique the access and circulation concepts and management strategies for transportation improvements in the vicinity of the interchange.

Kittelson & Associates, Inc.
Transportation Engineering/Planning
Portland, Oregon
In association with Angelo Planning Group and CH2M Hill

American Council of Engineering Companies of Oregon
Griffith Park: Post-Fire Erosion Control, Flood Mitigation, and Burn Area Recovery

Griffith Park:
- 4,467 Acres – The largest municipal urban park in the United States
- Over 50% undeveloped mixed chaparral, open space and trails:
  - Los Angeles' Back Yard
  - Golfing, Trail Riding
  - Movie Sets
  - The Autry Museum
  - The LA Zoo
  - Playing Fields
  - Griffith Observatory

Griffith Park's Vermont Canyon from Fire to Recovery in One Year

The Fire Recovery Planning Process
- Phase 1: Assessments, Emergency Debris Removal, Erosion Modeling, GIS Mapping, Cleanup
- Phase 2: Implement Erosion Control & Stabilization, Watershed Protection, Debris Capture
- Phase 3: Restoration, Habitat Repair, Road and Trail Improvement, Signage, Weed Control

A History Of Fires
1879 – Park Burned, Unknown Acres
1929 – 1,000 Acres Greek Theatre Burn
1933 – 39 Men Reportedly Killed

Extend of May 2007 Fire

Treatment Recommendations:
- Hydromulch where feasible and appropriate
- Install wattles in order to retard initiation of concentrated flow above roads
- Clean out existing sediment basins
- Install debris barriers as line of defense
- Reexamine road network
- Management alternatives
NATURE AT THE CENTER:  
Big Development, Small Footprint

PeaceHealth chose the scenic RiverBend site for its new Sacred Heart campus with the goal of creating an all-encompassing healing environment. In the spirit of PeaceHealth's mission, KPF created a master plan and civil and structural design for the environmentally-sensitive site that would not only minimize impacts from initial development, but ensure environmental integrity through future expansions.

SACRED HEART MEDICAL CENTER AT RIVERBEND

The hospital campus was one of Oregon's largest construction projects in 2009, according to the Daily Journal of Commerce. The building alone is roughly the size of 23 football fields, requiring two parking garages and three surface parking lots, as well as new roadways and utilities.

Springfield, Oregon

At the heart of the development stands a massive Douglas fir, untouched by the work that went on around it. More than 85 percent of the Douglas fir grove on the site, and virtually all of the riverside Maple grove were preserved.

KPF created sustainable stormwater facilities, designed to protect groundwater that supplies the City of Springfield's drinking water. The McKenzie River is buffered from the developed site by a 100-foot riparian setback, through which KPF, in close collaboration with the team landscape architect and the client, threaded a winding multi-use trail.

American Council of Engineering Companies of Oregon
RENOVATION OF PARADISE INN
MT. RAINIER NATIONAL PARK, Washington

Client: Fletcher Farr Ayotte, Portland, OR
Owner: National Park Service, Washington DC
Engineer: KPF Consulting Engineers, Portland, OR

The National Historic Landmark Paradise Inn (1916) had stood for nearly a century in defiance of recurring harsh winter conditions and high seismic activity at the 5,400-foot elevation on the slopes on Mount Rainier. After nearly 90 years of enduring this extreme environment, significant portions of this national treasure were failing and many areas were on the verge of collapse. The design snow loads at Paradise exceed 600 pounds per square foot and the glaciating action from the snow field directly uphill from the inn had pushed portions of the structure nearly 9 inches out-of-plumb.

The renovation and seismic retrofit of Paradise Inn embraced an innovative, state-of-the-art design approach that cleverly concealed structural components within the original historic fabric of the structure. Rubble foundations were replaced with reinforced concrete; rot in the original historic Alaskan yellow cedar columns and trusses was removed and the columns were repaired in-place with various epoxy treatments; and new post-tensioned concrete shear walls are now completely hidden behind the original basalt stonework of the chimneys. The inn’s entire 3-story east wing was lifted from its rubble foundation, lowered back onto new concrete footings, and then pulled back nearly 6 inches into its original upright condition.

Set in a magnificent locale that attracts two million visitors per year, Paradise Inn stands as an engineering prototype for extreme snow loads and creative structural solutions that will allow the public to enjoy the building’s historic charm for another century.
GATEWAY TO GOVERNMENT CAMP
providing safe access to Ski Bowl East for all users

With year-round recreational visitors, the mountain is always busy and Government Camp hasn’t always been the easiest to navigate—particularly for visitors to Ski Bowl East. A small, narrow bridge with limited height clearance over busy Highway 26 made it a challenge for residents and visitors. The growing number of pedestrians simply did not have a safe option to access the area. Years of investigation by state and local agencies couldn’t find a reasonable solution that didn’t severely impact either the downtown area or Ski Bowl East. Replacing the bridge seemed impossible, so the plan of creating a safe pedestrian bridge was pursued instead.

After being selected to design a pedestrian crossing, engineers at Kramer Gehlen & Associates carefully examined the existing bridge and the issues surrounding it. By carefully adjusting the elevation of the road profile, they found a way to design a safer and wider replacement bridge that solved the entire problem, not just pedestrian safety.

The option achieved unanimous approval by the active citizens group and Clackamas County and earned federal funding for construction.

Through creative engineering and collaboration with architects and artists, KGA accomplished the task of designing a “Gateway to Government Camp” with an astounding degree of success. In the spring of 2009, residents of Government Camp welcomed the opening of “a true landmark for the community.” The new overpass bridge on Multhorpe Road turned out more beautiful than residents imagined. Featuring tall stone pillars, intricate metal sculptures inlaid into the railing, and dramatic lighting, the new bridge is a stunning gateway to Mt. Hood.
OVERCOMING A MAZE OF CHALLENGES

The project team faced a number of challenges, including project siting, shallow subsurface rock, difficult pipe routing conditions and limited area for stormwater systems. Through the creative use of Low Impact Development Approaches (LDA), these challenges were turned into opportunities as essential water facilities were integrated with other park development goals.

SUSTAINABLE SOLUTIONS

Designing the reservoir with a Green Roof effectively limited stormwater runoff to predevelopment conditions. The facility also reduces energy and pumping costs and the site accommodates a future Aquifer Storage and Recovery (ASR) well, which will extend the City’s limited water supplies.

INNOVATIVE DESIGN

By modifying the reservoir’s height-to-diameter ratio, costly rock excavation and deep pipe construction were avoided. The reservoir structure was designed using prestressed concrete technology and state-of-the-art seismic protection measures. A unique internal mixing system optimizes water circulation for improved water quality. Specialized piping connections reduce the risk of earthquake damage. Reservoir roof vents are disguised as multi-purpose, educational, interpretive displays. The artistic “bull’s eye” in the center of the mythological “Minotaur Maze” symbolizes the legendary lost bull from which Bull Mountain gets its name and serves as a unique focal point for the simple but spectacular park.

PROJECT: 3.0-Million Gallon 550-foot Service Zone Reservoir No. 2, Tigard, Oregon
CLIENT/OWNER: City of Tigard, Oregon
DESIGN FIRM: Murray, Smith & Associates, Inc.; Portland, Oregon

Special Seismic Design Features
State-of-the-art Wire Wrap Concrete Prestressing
Ribbon Cutting: Elizabeth Price and Mayor Driskan
Interpretive Plaques Incorporated Into Vents

American Council of Engineering Companies of Oregon
Connecting Communities
Eugene & Springfield, Oregon

I-5 BELTLINE STRUCTURES

The functional long span steel bridges on I-5 and the sleek, multi-span CP concrete flyover ramp structure combine with the unique and recognizable cable-stay pedestrian bridge across I-5 to provide a dramatic gateway to the Eugene-Springfield area.

Interchange: 10-span, 2,084-foot-long post-tensioned box girder flyover.
- Eliminated a particularly dangerous weave area on the northbound to westbound collector-distributor road.
- Detailed staging enabled pier construction for this three-level structure while maintaining traffic mobility.

Client/Owner:
OREGON DEPARTMENT OF TRANSPORTATION
SPRINGFIELD, OREGON

Multi-modal 530-foot-long pedestrian bridge with a 183-foot-long cable-stay main span.
- The innovative design utilized balanced deck panel installations safely above on-going traffic to provide uninterrupted mobility through the site during construction.

ACEC Consulting Engineers
EUGENE, OREGON

Integrating aesthetics with site constraints
The stunning cable-stay bridge provides a distinctive community landmark and an alternative travel corridor between Eugene and Springfield.

- The new northbound and southbound structures replaced deficient bridges and added lanes in both directions.

INGENUITY • INTEGRITY • TEAMWORK • ECONOMY • EFFICIENCY • PUBLIC SERVICE

American Council of Engineering Companies of Oregon
Cedar Creek Culvert Replacement  
Sherwood, Oregon

Cedar Creek is a subwatershed within the Tualatin River Basin that passes through the heart of the City of Sherwood. SW Washington Street is the main route across Cedar Creek in Sherwood between Old Town Sherwood and the High School. The Healthy Stream Plan (a watershed plan for Tualatin Basin) identified the culvert crossing of SW Washington Street over Cedar Creek as a barrier to fish migration and too small to safely convey flood flows. A feasibility study evaluated multiple solutions, from which the City selected a single span bridge as the preferred solution. The resulting project not only restored the stream channel and improved flood conveyance, but also improved pedestrian, bicycle, and vehicular safety through the project limits, provided regional and low-impact stormwater management, and enhanced the entrance to Stella Olen Park which is home to many large community events during the summer months. The Cedar Creek bridge now provides a great benefit to the area’s fish and wildlife while also improving the experience for those visiting the adjacent Stella Olen Memorial Park.
Washougal River Utilities & Bridge
Camas, Washington

The Washougal River Utilities and Bridge project addresses two critical objectives: 1) Quickly provide critically needed water transmission capacity from wellfields on the south side of the river to customers on the north side; and 2) Completion of an important and missing link in Clark County’s Regional Trail System with an ADA compliant pedestrian corridor through 1.25 acres of habitat sensitive Washougal River Greenway.

Multiple corridor locations were examined for environmental and archaeological impacts, property needs, constructability, and costs for a 24-inch water transmission main, 24-inch sewer force main, major recreational trail, and bridge structure. The project addressed maintenance and construction access for large rigging equipment, extreme fluctuation of river levels, and the adjacent floodplain while blending into the surrounding context. High groundwater, interconnected forested wetlands, and archaeologically-significant sites exist throughout the area. The bridge was required to be set 20 feet above the river to address the 100-year backwater flood elevation of the Columbia River. The location, configuration, and bridge design was determined through an intensive alternatives analysis. The pipelines were carried over the river by a 250-foot-long steel truss placed on drilled shafts. An innovative approach to prevent exposure of the pipelines to flood and debris north of the river was implemented, which included routing the large pipes into and beneath a hollow north pier. The bridge was configured to allow future construction of a ramp structure for pedestrians on the north side of the river down to grade.

client: City of Camas

otak

Vancouver, Washington

in association with
Kramer Gehlein Associates
GeoDesign Inc.
Normandeau Associates
Archaeological Investigations NW

Pipelines fit into the profile
Pipelines entering bridge structure on south end
Blending an Historic Building with Today’s Sustainable Design to Mold the Future
Shattuck Hall, Portland State University

Originally constructed in 1915 as an elementary school, Shattuck Hall is a three-story, 66,000 SF building that now houses Portland State University’s departments of Architecture and Fine and Performing Arts. Shattuck Hall today is the result of an integrated design process that remained true to PSU’s philosophies while helping its architecture students — designers of the future — learn more about construction, architecture and sustainability. At Shattuck Hall, today’s efficient technologies enliven a historic building where designers of tomorrow learn to shape a sustainable future.

Existing Building Challenges: Designers today are well aware of the problems of climate change, but designing new buildings that consume less energy is only a small piece of the puzzle. An even greater challenge is to transform our existing building stock into sustainable buildings of the future. Success depends on identifying how existing building elements can become assets to sustainable design concepts.

Applying Contemporary Thinking and Systems: Recognizing potential in the building’s existing radial ductwork, the Shattuck Hall design team created a new dedicated outdoor air system from the “bones” of the obsolete system. The new ventilation system required no additional space, and delivers fresh air only when needed, exceeding national standards for indoor air quality. Low-profile radiant ceiling panels offered additional solutions to existing building space constraints, and provide energy efficient, comfortable heating and cooling. Occupancy sensors, daylighting, and low-flow plumbing fixtures contribute further to resource savings.

Achieving Efficiencies that Help Teach the Next Generation of Designers: On track to receive LEED Gold, Shattuck Hall’s ventilation system provides up to 30% more fresh air and uses 45% less water than national code requirements. A huge success, PSU’s faculty and students are thrilled with the building, and AIA Portland has already awarded the project with its only Sustainability Award. Exposed systems throughout help teach students about the building’s functionality, making Shattuck Hall not only a model for sustainability, but a teaching tool for tomorrow’s designers.
48% Energy Savings
50% Water Savings

The new home of multiple science departments, the Natural Sciences Building at South Puget Sound Community College encompasses classrooms, science laboratories, faculty offices and study areas. A key decision to separate the building into two wings allowed for the rare combination of a naturally ventilated classroom wing openly connected to a carefully pressurized lab wing. The classroom wing includes a unique DC exhaust fan that is powered directly by photovoltaics, while the lab wing includes a custom VAV air handling system with full heat recovery. Through a highly collaborative process, the building was designed to use 48% less energy and 50% less water than a typical lab building. The completed project is now on track to receive LEED Gold.

Design Integration: The integrated architecture/structural/mechanical design allowed for 9.5’ ceilings at interior areas and even higher ceilings at the perimeter. This created excellent conditions for optimizing daylighting in the labs, spaces that are typically lit only by electric lighting.

Easy Maintenance: VAV supply air flow valves and hydronic heating coils, typically placed above laboratory ceilings, are located in an easily accessible mechanical room. This allows for higher ceilings and a more pleasing atmosphere while facilitating maintenance and reducing disruption to laboratory activities.

Mixed-Mode Natural Ventilation: A mixed-mode natural ventilation system in the classroom wing incorporates a heat recovery unit for each classroom (A). A radiant slab heating and limited cooling system (B) is connected to a water-to-water heat pump that draws and rejects heat from the lab exhaust system.

Natural Sciences Building
South Puget Sound Community College Olympia, WA

Client: South Puget Sound Community College, Olympia, WA
Submitted by PAE Consulting Engineers, Portland, OR
TriMet’s 8.3-mile MAX Green Line Extension is comprised of two segments: the Portland Mall Revitalization Project and the Interstate 205 Light Rail Extension. This latest addition to Portland’s light rail transit (LRT) system marks a series of firsts and notable milestones:

Riders on the MAX system are now able to travel directly from Portland’s most popular transit destination, Portland State University, to the region’s fastest growing area, Clackamas County. This expansion is a key element in accommodating an anticipated 1 million new residents by 2030.

The Green Line is TriMet’s first LRT extension comprised of two significant, non-contiguous segments, integrated with existing track. As the regional transit system grows, building upon existing alignments in this fashion sets the foundation for the success of future extensions and of the entire LRT system.

For the first time since it was established in 1978, the Portland Mall—the nation’s first mall dedicated to transit—features integrated LRT, bus and auto operations. The LRT improvements enliven the Mall for retail businesses, pedestrians, cyclists and autos by renovating the streetscape and adding amenities, art, better lighting, improving ADA accessibility, and upgrading shelters.

TriMet’s commitment to sustainability resulted in several initiatives including reuse and reduction of materials, innovative stormwater management, tree preservation and reduction of vehicle emissions. On the Mall, approximately 30,000 cubic yards of concrete were reused. Along the I-205 alignment, 1,810 feet of existing sound walls were reused; new soundwalls incorporate 9,030 recycled tires.
Past Becomes Future

How does a region known for its livability prepare for an additional 1 million residents, 300,000 of which are expected within the City of Portland limits?

By looking to its past.

Portland’s Streetcar Past

Portland developed around its historic streetcar network, which began in 1872 with a horse-drawn carriage on 1st Avenue. These early streetcar lines served both as a mode of transportation and as an organizing tool for new development. The distinct urban form created by these early streetcars is still evident in today’s historic neighborhoods.

Portland’s Streetcar Future

In 2007, the City selected URS to develop the Streetcar System Concept Plan (SSCP). This landmark transit planning study marks the first comprehensive effort in the nation that seeks to build upon the success of streetcar and expand it to a citywide system.

Through the SSCP, the City has a powerful tool for accommodating growth and maintaining Portland’s livability. The SSCP plays a key role in shaping the City by promoting walkable neighborhoods, vibrant streets that encourage sustainable development, infrastructure that reduces vehicle trips, and greater accessibility that includes housing options, employment and economic development.
The Tualatin Valley Waste Recovery Project represents a new trend in waste facility design. This state-of-the-art building meets LEED Gold Certification and incorporates a number of innovative features that improve sustainability, safety, and maintenance. The entirely translucent roof, cantilevered observation gallery, unique building skin, and stormwater collection system redefine what is possible in the creation of solid waste facilities.

Observation Gallery
The recycling building features a unique observation gallery overlooking the waste sorting operations. The gallery is cantilevered over the area where waste is sorted, safely allowing a birds-eye view of operations without disrupting material flow. This observation gallery allows visitors and public tours to see some of the sustainable features of the facility and the recycling process firsthand.

Full Translucent Roof
The 68,000 square foot recycling operations area has a completely translucent roof to allow for natural illumination. During daylight hours this feature reduces electricity usage for lighting by 50%, and creates a safer work environment by increasing visibility for truck drivers.

Building Exterior
URS designed columns and supports on the outside, with flat interior walls to minimize dust accumulation and improve safety and maintenance.
There’s a Map for That.

Clean Water Services
Sanitary Sewer Master Plan Update
Washington County, Oregon

Six years of land use planning and collection system construction triggered the need for an updated sanitary sewer master plan for the 122 square mile Clean Water Services District serving a population of 500,000.

A number of effective, visually rich planning tools developed using GIS allow the utility manager to see the big picture while providing links to zero in on specific CIP project details. The accessible and visual format summarizes relevant information and unique project features affecting costs. The District has found these planning tools very effective for decision making, system analysis, and communicating with staff.

Each Pump Station Data Sheet supplements existing QM data, presents geographic themes of flow and population changes specific to the facility and depicts the current and future service area.

The master plan document provides unique “screens” to the results and conclusions. Graphical Project Cost Sheets include not only a map of the project location and the surrounding environment, but also a detailed presentation of the modeling results, basis of the estimated costs, and a narrative description of important aspects and constraints for the individual project.

Maps
Pumps
Pipes
CIP

American Council of Engineering Companies of Oregon