BUILDING WITH CONCRETE

April 28, 2016 • Seattle Daily Journal of Commerce
BELLEVUE YOUTH THEATRE

Location: Bellevue
Owner/developer: City of Bellevue
Team: Pease Construction, general and concrete contractor; Becker Architects, architect; CT Engineering, structural engineer; Stoneway Concrete, ready-mix supplier; Oldcastle Precast, precast concrete

Designing and constructing a 12,000-square-foot, dome-shaped theater into a hillside not only presents challenges, but also demands good math skills. Meeting those challenges resulted in an environmental sculpture that is seamlessly integrated into the Bellevue’s Crossroads Park.

The roof system consists of precast concrete beams, hollow-core planks with a poured-in-place concrete topping, and a concrete exhaust dome hub. The entire precast concrete roof system was cast off site, trucked to the site and then lifted into place over the span of a couple of weeks.

Each beam had to be manufactured within exacting tolerances, and every angle had to be precise in order to put this complex puzzle together and bring the project to fruition. The resulting structure looked much like a mini-King-dome once all the beams were in place.

The precast concrete roof system with a poured-in-place concrete topping slab had a definite cost benefit to the owner.

Precast 8-inch hollow-core planks were easily cut at an angle, so there was no waste, because the opposing plank angles all matched on each row of planks.

The exposed concrete walls, visible to the public, were cast in place with Symons 3/8-inch stripped random form liners. All other bearing/retaining walls were cast with a smooth surface.

The theater’s “living roof” consists of a 3-inch, cast-in-place concrete topping slab, 18 inches of soil, and grass. The roof membrane has a leak-detection system capable of sending text messages alerting personnel to leaks, including the location to within a foot of the leak.

Overall, the precast beams fit together like a glove. Using precast for constructing the theater saved months on the overall schedule.

The project has received a LEED gold certification.

Washington Aggregates and Concrete Association

2016 Excellence in Concrete Construction Award Winners

<table>
<thead>
<tr>
<th>Category</th>
<th>Location</th>
<th>Project Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast-in-place structures</td>
<td>Bellevue</td>
<td>Bellevue Youth Theatre</td>
</tr>
<tr>
<td>Special applications: Technical merit</td>
<td>Bellevue</td>
<td>Bellevue Youth Theatre</td>
</tr>
<tr>
<td>Tilt-up structures</td>
<td>Spokane Valley</td>
<td>Next IT at Pinecroft</td>
</tr>
<tr>
<td>Cast-in-place structures: High-rise</td>
<td>Seattle</td>
<td>Premiere on Pine</td>
</tr>
<tr>
<td>Public works: Bridges</td>
<td>Redmond</td>
<td>Chief Joseph Dam wood truss bridge replacement Bridgeport</td>
</tr>
<tr>
<td>Public works: Infrastructure</td>
<td>Redmond</td>
<td>Overlake Village south detention vault</td>
</tr>
<tr>
<td>Public works: Transportation</td>
<td>Redmond</td>
<td>SR 520 Eastside Transit and HOV Project Bellevue</td>
</tr>
</tbody>
</table>

Residential decorative concrete
- Holdridge residence Bellevue
- Architectural concrete
- Bainbridge Island Museum of Art Bainbridge Island
- Artistic and decorative concrete
- SERA Campus Tacoma
- Pervious concrete
- Northeast Neighborhood Street Improvements Puyallup
- Concrete paving
- Spokane International Airport taxiway reconfiguration Spokane
- Sustainable merit
- Point Defiance Regional Stormwater Treatment Facility Tacoma

ON THE COVER
The Bellevue Youth Theatre was the grand award winner at the Washington Aggregates and Concrete Association’s annual Excellence in Concrete Awards. The project also won the cast-in-place structures and special applications technical merit categories.

PHOTOS COURTESY OF WACA
WACA AWARDS

TILT-UP STRUCTURES

NEXT IT AT PINECROFT

Location: Spokane Valley
Owner/developer: Pinecroft LLC
Team: Divcon, general contractor; Conco, concrete contractor; MMEC, architect; DCI Engineers, structural engineer; Central Pre-Mix Concrete Co., ready-mix supplier

This 44,000-square-foot tilt-up structure is the new headquarters for a tech company based in Spokane. The tenant wanted a building that was flexible, comfortable and energy efficient.

Tilt-up was selected because of its economy, efficiency and architectural qualities. To meet the energy efficiency requirements, insulated sandwich panels were used. This provided an architectural canvas of concrete for both the interior and exterior.

The exterior tilt-up panels incorporate multiple textures and colors without the need for paint. Integral color was used in all of the exterior wythes. Thin brick was used as a unifying element with the rest of the business campus. The majority of the exterior is a combination of smooth and sandblasted concrete. This creates a banded effect with subtle variations in color and texture adding to the rich look of the exterior.

Real pine and cedar boards were used to create a board-form finish between the windows and at the entry. This helped to give this building its own identity among its neighbors.

The exterior board form is carried into the lobby and common area of the building, presenting special challenges.

The tilt-up panel needed to have board form on all sides, which was accomplished by creating real wood stamps that were applied to the panels while in their plastic state. Sand from conveyor trucks was placed on top of the “stamps” to keep the board form in firm contact with the concrete until it could hydrate. The result is a four-sided, board-form finish on an integrally colored insulated sandwich panel.

The remainder of the interior surfaces was left as smooth-troweled gray concrete. The architect incorporated this finish into the color and finish palette.

CAST-IN-PLACE STRUCTURES: HIGH-RISE

PREMIERE ON PINE

Location: Seattle
Owner/developer: Holland Partner Group
Team: Holland Construction, general contractor; Conco, concrete contractor; Weber Thompson, architect; Cary Kopczynski & Co., structural engineer; Stoneway Concrete, ready-mix supplier

Premiere on Pine recently joined Seattle’s skyline as one of the tallest residential towers in the city. The 42-story, 490,000-square-foot structure has 386 apartments, a rooftop lounge with an outdoor terrace, a restaurant, and five levels of parking above grade and five more below.

Premiere on Pine’s slender curtainwall facade is decorated with burnt orange vertical metal panels and two massive LED backlit glass art walls.

Construction started in August 2012 and finished in early 2015. A small site and floor plan posed significant design and construction challenges. The team responded with an efficient system that maximized floor space on a small site.

Premiere on Pine’s structure consists of cast-in-place concrete with post-tensioned floor slabs and a shear wall core for seismic and wind resistance. The gravity system utilizes long-span, 7.5-inch-thick post-tensioned flat plate slabs with 12-foot perimeter cantilevers at two sides of the building, which resulted in fewer columns, optimized slab bending moments, and reduced floor-to-floor height with thinner slabs.

Post-tensioned 7.5-inch-thick flat plate slabs were used at all levels, including the subterranean parking levels, which created flexible interior space with open layouts. At subterranean levels, shotcrete perimeter basement walls followed construction of the slabs. This allowed slab shortening to occur prior to shotcrete wall construction.

Premiere on Pine is the first building in the Northwest to have a specified concrete strength of 15,000 pounds per square inch, reflective of steady advances in concrete materials technology. The effective use of ultra-high-strength concrete and rebar resulted in smaller structural elements than would have otherwise been required, which increased the building’s net rentable square footage.

WE DELIVER!

SIMPSON StrongTie
CALL 800-GLC-GRAY

gray lumber company
A Century of Performance + Integrity
Phone 253.752.7000 • graylumber.com • Fax 253.759.7560
CHIEF JOSEPH DAM WOOD TRUSS BRIDGE REPLACEMENT

Location: Bridgeport  
Owner/developer: Douglas County  
Team: Cascade Bridge LLC, general and concrete contractor; Douglas County, structural engineer; Godbey Red-E-Mix, ready-mix supplier

The Chief Joseph Dam Bridge was built in 1958, was long past its prime and needed to be replaced. The historic two-lane structure had a Howe wood truss system and served an important role in providing access to the Chief Joseph Dam.

The bridge was rehabilitated in 2003 with new approach spans and a fiber-reinforced polymer deck system. The new 32-foot-wide deck widened the original bridge by 6 feet, including new curbs and safety railings. But engineers later discovered damage to the truss system. In 2010, the bridge was channeled down to one lane to reduce loads and keep it in service.

The county decided to dismantle and replace the wood bridge with a new 240-foot, single-span structure. The new structure used post-tensioned spliced I-girders with a cast-in-place concrete deck.

The project received funding support from the Federal Highway Administration’s Bridge Program and the state County Road Administration Board.

Not only did the county get a new bridge to last another 75 years, but the new two-lane, pre-stressed concrete girder bridge is now the longest pre-stressed concrete girder bridge in the state.

OVERLAKE VILLAGE SOUTH DETENTION VAULT

Location: Redmond  
Owner/developer: City of Redmond  
Team: Goodfellow Bros., general contractor; Franklin Pacific Construction, concrete contractor; Otak, architect; HDR Engineering, structural engineer; CalPortland, ready-mix supplier

Overlake Village is home to the largest stormwater detention vault in Washington following the completion of the south detention vault last year.

The 6.5 million-gallon vault is 533 feet long and 123 feet wide — bigger than a football field — and has an average clear height of 17 feet.

The structural system is made of cast-in-place concrete floor foundation slab, concrete perimeter and separation walls, columns, beams, precast hollow-core slabs, and CIP topping slab.

Several construction alternatives were evaluated by the design team and the client. The city of Redmond decided on two cast-in-place concrete rectangular cells for many reasons, including leakage and seismic design.

The substructure is buried approximately 4 feet below grade, beneath a parking lot that will later be converted to a plaza.

Some of the major challenges for the project included the constrained site, permanent structural support system, concrete shrinkage and leakage control, and settlements and differential settlements during and after construction.
SR 520 Eastside Transit and HOV Project

**Location:** State Route 520 corridor between Medina and Bellevue  
**Owner/Developer:** Washington State Department of Transportation  
**Team:** Eastside Corridor Constructors, general and concrete contractor; Cadman, ready-mix supplier

The Eastside Corridor and HOV Project widened 2.5 miles of the state Route 520 corridor from west of Evergreen Point Road to east of 108th Avenue Northeast in Bellevue. Eastside Corridor Constructors, a joint venture of Granite Construction Co. and PCL Construction Services, completed the work under a $306.3 million contract.

The project involved construction of new shoulders, noise walls, transit facilities, general-purpose ramps, direct-access ramps for buses and carpools at 108th Avenue Northeast, and a bicycle and pedestrian path. Landscaped lids were constructed over SR 520 at Evergreen Point Road, 84th Avenue Northeast and 92nd Avenue Northeast.

ECC began work on the design-build project in early 2011 and finished in mid-2015. In all, more than 84,000 cubic yards of concrete were used.

Holdridge Residence

**Location:** Bellevue  
**Owner/Developer:** Stuart Holdridge  
**Team:** Absolutely Fine Concrete, concrete contractor; Stoneway Concrete, ready-mix supplier

A project to improve the driveway and front yard of a home in Bellevue’s Somerset neighborhood was designed by the owner. The work included installation of terraced landscaping that steps down from the street. The retaining walls were composed of large, smooth-faced, board-formed panels. By using waterproof concrete the owner will not have to worry about water coming through the walls. Installing good drainage behind the walls ensures the landscaping on the low side will always get the appropriate amount of water. The walls can last a very long time if engineered correctly.

The concrete driveway was designed to look like real stone, though it cost only about half as much. Its colors included slate gray with a medium gray release, and a natural gray with a light gray release. Resealing the concrete every three years will keep it looking brand new for life.

The job had a moisture problem, so No. 4 rebar was installed 1 foot on center to ensure that even if there were an underground creek beneath the job the concrete would serve as a bridge.

The Concrete Driveway was designed to look like stone.
BAINBRIDGE ISLAND
MUSEUM OF ART

Location: Bainbridge Island
Owner/developer: Bainbridge Island Museum of Art
Team: PHC Construction, general contractor; Moncrieff Construction, concrete contractor; Coates Design Architects, architect; ARW Engineers, structural engineer; Hard Rock, ready-mix supplier

The 20,000-square-foot Bainbridge Island Museum of Art plays on the juxtaposition of concrete and glass. A concrete “box” that gives the building mass and structure is broken on the south side with a 28-foot-tall curved glass facade. The main concrete structure provides a sense of protection to the artwork while the large curving glass wall communicates motion and an invitation to enter the building.

Upon arrival at BIMA, museum visitors pass under a solid concrete lintel and are then drawn upstairs to the main gallery. Guests are lured by daylight streaming through the curved glass facade, punctuated by the impact of the lightness of glass and the weight of the concrete.

The formed concrete is intentionally left exposed to provide robust visual texture next to the smooth white walls of the interiors, allowing light to wash the walls, highlighting this unique quality of the cast concrete.

The concrete also serves a utilitarian purpose. The thermal massing of the concrete used in the buildings walls, foundation and floor support the energy efficiency of the geothermal heating. ICF was utilized along the east wall, which abuts a state highway, for its acoustical properties. In addition, ICF was selected to help maintain budget restrictions and pace of construction.

SERA CAMPUS

Location: Tacoma
Owner/developer: Metropolitan Park District of Tacoma
Team: Veterans Northwest Construction, general contractor; Belarde Co. and Turnstone Construction, concrete contractor; Bruce Dees & Associates and Land Expressions, architects; AHBL, structural engineer; Holroyd Co., ready-mix supplier

The South End Recreation Area Playground and Sprayground has helped revitalize the park’s South Puget Sound neighborhood. The park opened in June 2014 and includes over 15,000 square feet of hand-seeded blue glass to create a sparkling water effect.

Belarde Co. was the decorative concrete contractor. The use of recycled blue glass provides a durable and safe texture for the sprayground surface. The designer, Bruce Dees & Associates, incorporated the existing topography to create a unique appearance that highlights the decorative concrete surface.

Belarde Co. worked closely with the landscape architect to create the flowing wave design. The major difficulties and challenges included the layout and weather.

With over 9,000 lineal feet of construction, the layout was extremely critical to maintain all standard concrete jointing, doweling and expansion joint practices. Most of the work was performed during record-setting rainfall and freezing temperatures. Weather protection was extremely difficult for the general contractor.

The project also included an enormous amount of underground utilities. Belarde Co. had to use nonstandard forming techniques to complete the project without damaging the utilities.

Montana’s Premier Fly Fishing Lodge

- Spacious, private accommodations and first class dining on the banks of the Ruby River
- Guided float trips on the Big Hole, Beaverhead, Jefferson, Madison Rivers
- Over 10 miles of private water on the Ruby

1-800-278-RUBY   www.RubySpringsLodge.com
Pervious Concrete

North Neighborhood Streets Improvements

Location: Puyallup
Owner/developer: City of Puyallup
Team: Miles Resources, general contractor; Wilson Concrete Construction, concrete contractor; KPG, structural engineer; Miles Sand & Gravel, ready-mix supplier

The project helped advance the practice of pervious concrete installation for roads. “Standard” pervious concrete installations require that the concrete be placed quickly after mixing, quickly screeded, compacted and finished, and then covered with plastic for a full seven days. The pervious concrete was placed using the latest in Leica wireless technology by a slipform paver. This project had complex cross- and long-slope transitions at each phase end. The delivered concrete maintained correct slump and air entrainment. Also, the aggregates were of such quality that little to no deleterious materials were found at the surface.

Concrete Paving

Spokane International Airport Taxiway Reconfiguration

Location: Spokane
Owner/developer: Spokane International Airport
Team: Acme Concrete Paving, general and concrete contractor; Century West Engineering Corp., architect; Taylor Engineering, structural engineer; Central Pre-Mix Concrete Co. (doing business as Oldcastle Materials), ready-mix supplier

The taxiway project was completed five days early. The delivered concrete was completed within specification. Concrete paving on this project was that it was bid competitively, porous asphalt vs. pervious concrete. And pervious concrete won on an initial cost basis by $10,000. In total, this project resulted in the transformation of 28,900 square feet of impervious surfaces to pervious. The change is projected to keep 687,600 gallons of stormwater from entering the storm system annually.
The Point Defiance Regional Stormwater Treatment Facility is designed to improve the quality of stormwater flowing into Commencement Bay. The city of Tacoma worked with Metro Parks Tacoma to provide treatment for a large section of the North Tacoma watershed that was discharging untreated into Puget Sound. Metro Parks Tacoma is redeveloping this area of Point Defiance using green infrastructure and integrating stormwater management as an amenity and educational demonstration. This is part of Metro Parks’ Waterfront Phase 1 improvement plan for the park.

The $4.64 million stormwater treatment project is a 5,500-square-foot bioretention facility designed to capture the worst pollutants before they wash into Puget Sound. It is the largest facility of this kind in the area and incorporates numerous innovative approaches.

The treatment facility consists of a series of cascading precast concrete pools, distribution channels (troughs), and weirs designed to evenly distribute the water into the treatment cells with treatment media and an underdrain system that discharges into a swale and, ultimately, Puget Sound. This project will treat up to 6 million gallons of dirty water every day. This treatment will reduce the load of fine particulate matter that is discharged into Commencement Bay.

Tacoma’s new stormwater treatment facility consists of a series of precast concrete pools, troughs and weirs.

POINT DEFIANCE REGIONAL STORMWATER TREATMENT FACILITY

Location: Tacoma
Owner/Developer: City of Tacoma
Team: Ceccanti, general contractor; Oldcastle Precast, concrete contractor; Parametrix, architect; DCI Engineers, structural engineer

The Point Defiance Regional Stormwater Treatment Facility is designed to improve the quality of stormwater flowing into Commencement Bay. The city of Tacoma worked with Metro Parks Tacoma to provide treatment for a large section of the North Tacoma watershed that was discharging untreated into Puget Sound. Metro Parks Tacoma is redeveloping this area of Point Defiance using green infrastructure and integrating stormwater management as an amenity and educational demonstration. This is part of Metro Parks’ Waterfront Phase 1 improvement plan for the park.

The $4.64 million stormwater treatment project is a 5,500-square-foot bioretention facility designed to capture the worst pollutants before they wash into Puget Sound. It is the largest facility of this kind in the area and incorporates numerous innovative approaches.

The treatment facility consists of a series of cascading precast concrete pools, distribution channels (troughs), and weirs designed to evenly distribute the water into the treatment cells with treatment media and an underdrain system that discharges into a swale and, ultimately, Puget Sound. This project will treat up to 6 million gallons of dirty water every day. This treatment will reduce the load of fine particulate matter that is discharged into Commencement Bay.

Tacoma’s new stormwater treatment facility consists of a series of precast concrete pools, troughs and weirs.