FORTERRA

BOISE PLAZA PARKING STRUCTURE

CS 2

CASE STUDY

GROUNDED IN STRENGTH.

Forterra Structural & Specialty Products

Streamlined, Multi-story Parking Deck Matches Style of Existing Historic Office

Project Description

A structured, precast parking garage with multiple levels of parking is unusual in Idaho, where space is usually not at a premium—unless the surrounding space is wanted for extensive redevelopment.

The Boise Plaza parking garage is adjacent to the five-story Boise Plaza office building, built in 1971 for Boise Cascade. With 330,000 square feet, it is the largest office building in the state. A prime goal in building the structured parking garage was to allow existing surface parking lots on the 4.5 acres surrounding the office facility to be used for new development. A redevelopment plan, by owner/developer Rafanelli & Nahas, includes over 400,000 square feet of retail, hotel, office, restaurant, entertainment, and residential facilities. The original office building has received extensive renovation, including the incorporation of energy-efficient lighting and plumbing fixtures and a variety of other sustainable strategies. In 2011, the building received LEED Gold Certification.

The 282,987-square-foot parking structure, shown here, features eight levels of parking, seven covered levels and an open top level. It houses 946 standard parking stalls and 19 handicap stalls, and includes a 15-foot by 30-foot bicycle storage area. Typical clear height on each floor measures 7 feet, 10 inches. The structure tops out at 80 feet; 92 feet including the two stair towers. A single elevator was installed.

Traffic circulation consists of a series of spiral ramps on one side of the building and flat turns on the other. To accommodate daylight, the lighting system is automatically controlled to dim progressively. Bike storage spaces and bus benches are provided. Wide urban sidewalks, historic street lights, benches and Class II trees set in grates are installed on all street frontages.

Project Type:	Parking Structure
Location:	Boise, Idaho
Owner:	Raffanelli & Nahas, Boise, Idaho
Architect:	ZGA Architects & Planners, Boise, Idaho
Structural Engineer:	KPFF Consulting Engineers, Boise, Idaho
General Contractor:	Wensel Construction, Nampa, Idaho
Precaster:	Forterra Structural & Specialty Products, Mountain Region, Boise, Idaho facility
Precast Products:	Double-tees, columns, inverted tee beams, lite walls, shear walls, spandrels, and stair tower walls

Forterra Structural & Specialty Products provided a variety of precast components for the parking deck, including double-tees, columns, beams, lite walls, shear walls, spandrels, and stair tower walls:

- 382 double-tees (22,353 lineal feet or 220,278 square feet). These measure 28 inches by 10 feet wide with a maximum length of 60 feet.
- 42 columns (1,605 lineal feet, spliced using NMB splice sleeves). These measure 30 inches by 30 inches with a maximum length of 41 feet, 6 inches.
- 28 inverted tee beams (630 lineal feet). These have a maximum length of 30 feet.
- 42 lite walls (1,260 lineal feet or 16,485 square feet). These are 10 inches thick and have a maximum length of 30 feet.
- 16 interior shear walls (551 lineal feet or 5,648 square feet). These measure 14 inches thick.
- 141 spandrels (4,127 lineal feet or 29,502 square feet). These measure 10 inches thick by 6 feet, 6 inches tall. The non-load bearing spandrels have a maximum span length of 60 feet. Load bearing spandrels have a maximumspan length of 30 feet.
- 42 exterior shear walls (1,113 lineal feet or 10,600 square feet). These measure 12 inches thick.
- 21 stair tower walls (633 lineal feet or 5,611 square feet). These measure 10 inches thick.

All precast components were locally produced.

"Building materials," says Thomas Zabala, AIA, principal at ZGA Architects & Planners, "were selected for their durability, maintenance and sustainability. The decision to go with a precast garage rather than a post-tensioned garage came down to the availability of resources, cost, durability and the speed of construction. We knew we would be going into a winter cycle in construction and there was a good, reputable [precast] supplier in the area."

Building fast on a tight site.

Designed by Skidmore, Ownings and Merrill in the late 1960s in a then-contemporary style, Boise Plaza office is a concrete structure sheathed in metal. "The 20-foot-high first floor is recessed and encased in glass so that you can see through to surrounding properties," explains Zabala. "Within is a glass atrium box that goes from grade all the way to the top of the building. Upper floor exteriors consist of horizontal bands with ribbon windows."

There were fewer subcontractors on the site. Basically, we shipped and erected."

For the garage, the owner wanted to respect the architectural design of the original building. Accordingly, precast elements were used on the parking deck to reflect the horizontal banding of the office. "The predominantly horizontal façade is broken up with a mix of vertical elements, stair/elevator towers and a varied material palette," adds Zabala.

An exterior paint color similar to the office building color was used on the garage, interspersed with other colors to break up the mass of the structure. Spandrels are a mix of olive green, lighter shades of green and beige. Honed masonry units are used as a band at the base of the building and on some of the stair tower elements. The project, the architect maintains, now looks like a main office building and a parking garage that were built at the same point in time.

Located in a downtown metropolitan area, the garage occupies half of a city block. The other half is occupied by a commercial bus facility. As a result, the contractor, Wensel Construction, was limited to the physical footprint of the site to stage, mobilize, and build the structure. Another challenge was the Boise winter, says contractor Steve Wensel. "We started the project the first of June. There was 250,000 square feet of 3-inch concrete topping we had to pour on top of all the double-tees. We felt we had to have that done no later than the first of December."

To handle these challenges, Wensel, structural engineers KPFF, and Forterra worked together to develop an erection sequence that allowed the contractor to pour the toppings right behind the precast installation. "Forterra would erect the building in stages from one end to the other and we would pour the topping following them," explains Wensel. "That called for a lot of coordination between the erection people, pump trucks, finishing crews, providing access for personnel and handling safety issues." Materials had to be scheduled to arrive on an as-needed basis.

To provide a continuous look to the columns from the ground to the top of the garage, the precast spandrels were recessed back 3 inches from the face of the columns. "To handle seismic loads," Wensel adds, "we had three big double-H-shaped shear footings with precast shear walls. As those shear walls went up, we grouted the angular spaces around them. The toppings had reinforcing mesh and connections into the precast walls that developed the diaphragm across the plain of the floors."

"The project went up quick," recalls Roland Wright, sales representative for Forterra's Boise, Idaho, facility. It was a somewhat restricted site. There wasn't a lot of room. [With precast] we didn't have all the forms and trades that go with cast-in-place.

Forterra had a very aggressive erection schedule and had a superintendent on the job full time to coordinate deliveries, says Wensel. "It was set up to start erection on the first of September and be completely finished not later than the middle of November. They hit that schedule with a week to spare." Precast erection took just 65 days.

"Forterra was involved very early in the process," continues Wensel. "They were actually selected four or five months before we started construction. That was real important as a rise in steel prices was underway and we wanted to get the prefabrication started so that we could have a no-fault start on the first of June. An early selection of them [Forterra] was really helpful in getting the project done on time."

PCI CERTIFIED PLANT

PCI QUALIFIED ERECTOR

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