

HISTORIC IDAHO CAPITOL BUILDING EXPANSION



By Robert D. Card,
RBEC, RRC, RWC, REWC, REWO

Idaho State Capitol Building. Courtesy of Idaho Capitol Commission.

HISTORY

Although Lewiston, Idaho, briefly served as Idaho's capital from the formation of Idaho Territory in 1863, the territorial legislature moved the capital to Boise in December 1864. In 1905, 15 years into statehood, the Idaho state legislature passed a bill authorizing construction of the Capitol Building.

The building was designed by John E. Tourtellotte, a Connecticut native who moved to Boise in 1890; and Charles Hummel, a German immigrant who partnered with Tourtellotte in 1903. The dome and central parts of the Capitol were built from 1905-1912, and the wings (House and Senate chambers) were constructed during

1919 and 1920. The building is 208 ft. (63 m) high, occupies an area of 201,720 sq. ft. (18,740 m²), and contains over 50,000 sq. ft. (4,600 m²) of artistically carved marble.

Four types of marble were used in the building: red from Georgia, gray from Alaska, green from Vermont, and black from Italy. Architectural inspiration included St. Peter's Basilica in Rome, St. Paul's Cathedral in London, and the U.S. Capitol in Washington, D.C. The most prominent feature of the capitol is its dome, topped by a bronze-gilded eagle nearly 6 ft. tall. As part of the exterior restoration in 2005, the eagle received a new gilding of gold leaf.

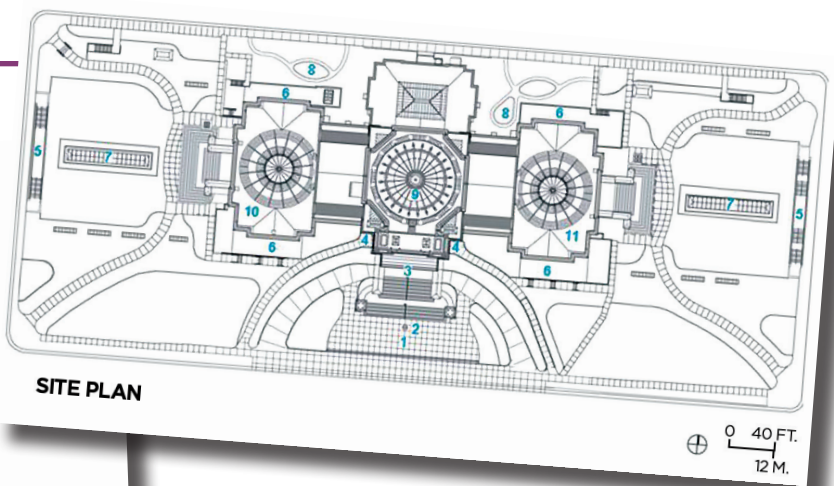
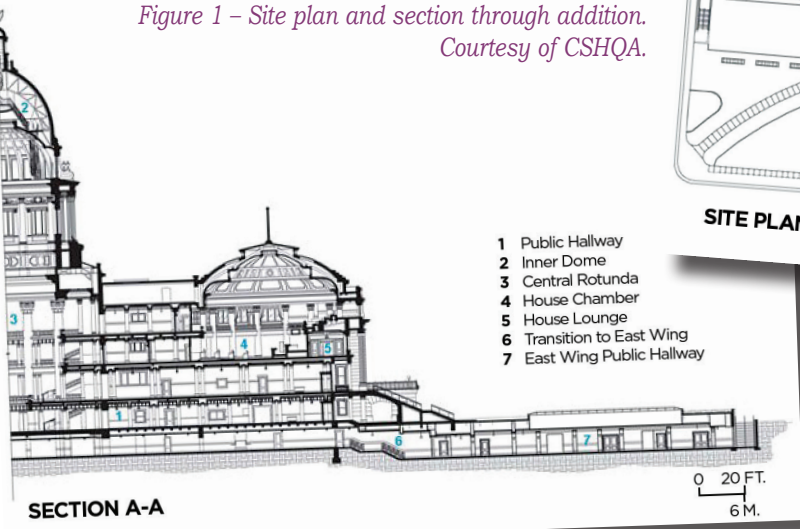
The 219 pillars in the original building are comprised of marble dust, plaster, and

scagliola—a mixture of granite, marble dust, gypsum, and glue dyed to look like marble, created by a family of artisans in Italy in an arduous 15-step process that must be restarted if a single mistake is made.

The building is clad with sandstone taken from Table Rock, near Boise. Convicts from the old Idaho Penitentiary were responsible for cutting and transporting the 10-ton sandstone blocks from the quarry.

Underground tunnels connect the Capitol Building to the Supreme Court building and other government buildings on Capitol Mall to the east. Originally intended to serve as shelters to protect the governor and other public officials, the tunnels are used daily by government employees, but

Figure 1 – Site plan and section through addition.
Courtesy of CSHQA.



- 1 Public Hallway
- 2 Inner Dome
- 3 Central Rotunda
- 4 House Chamber
- 5 House Lounge
- 6 Transition to East Wing
- 7 East Wing Public Hallway

SECTION A-A

SITE PLAN

are not accessible to the public.

A large bell directly in front of the Capitol is a scale replica of the Liberty Bell (uncracked), which pedestrians can ring.

Idaho's Capitol Building is the only one in the United States heated by a geothermal process. The system extracts geothermal water from nearly 3,000 feet (914 m) underground to supply about 90 percent of the heat required for nine buildings in the downtown Boise area, including the Capitol Building.

The original cost to construct the Capitol was \$2.1 million. Estimated replacement costs today would be over \$100 million, with many materials considered irreplaceable.

With the expansion of state government during the past century, modifications have included reconfiguration of space in order to accommodate new agencies, programs, and additional staffing, and to reflect the changing tastes of each period. There have also been advances in technology. Mechanical, electrical, and communications systems were sometimes added

without complete consideration of the whole of the building. Many components of the original architectural design have been modified repeatedly. The need for greater and more flexible space clashed with the need for protection of the historical features of the building.

In 1998, the Idaho State Legislature initiated a comprehensive, multi-year master planning and restoration effort. The Idaho State Capitol Commission was created to ensure the historic preservation of the Capitol Building and its continuing role as the functioning seat of state government.

SCOPE OF WORK

It was determined that additional space could be provided without impacting the visual aspect of the existing building by utilizing the areas below the expansive flanking lawns. The lawns adjacent to the main building would be excavated (~100,000 cubic feet [2,832 m³] of earth), and waterproof concrete shells constructed and carefully connected to the existing building below grade (Figure 1).

The Garden Wings were designed to maximize code-allowed occupancies, egress, and continuity between the wings and the Capitol Building. Conceptual design and initial construction documents were prepared in 2006 for two underground levels, located nearly 30 ft. (9.1 m) below grade, significantly below the water table, and less



Figure 2 – Connecting the addition to the main building.

project profile

than three-quarters of a mile (1.2 km) from the Boise River. Steel and concrete were used for the structure. Expanded polystyrene geofoam was incorporated to help limit overburden depth, minimizing loads on the top of the structures.

Much of the design work for the project was performed by Hummel Architects, the direct descendant of the original design firm.

The initial design required a 100-year service life for materials and assemblies. The design/build contractor initially selected spray-applied or self-adhered waterproofing. However, consistent with the 100-year design life for the structures, a multiple-ply polymer-modified asphalt membrane waterproofing system was recommended.

Shortly after he took office in January 2007, the new governor, C.L. "Butch" Otter, abruptly halted the project, then reduced it in scope and cost, resolving to decrease spending. In his FY08 budget, Governor Otter proposed that only the restoration of the existing Capitol be completed, and not the addition of the two-story underground wings. However, a compromise was negotiated to proceed with the addition of two one-story



Figure 4 –
Waterproofing
system
application.



Figure 3 –
Excavation
and material
delivery.



Figure 5 – Waterproofing
system application.

underground wings. Reduced hydraulic pressure was anticipated, but the structures remained within approximately 4 ft. of the

water table. The waterproofing system was changed from two plies to one to help lower the cost. Construction resumed in April 2007 with the reduced scope.

PROBLEMS AND CHALLENGES

The existing building needed to be protected during construction to avoid damaging its historical sandstone cladding. Columns and stairs adjacent to the work were wrapped and covered with plywood to protect them from possible damage (Figure 2).

Potentially disruptive construction activities needed to occur while the legislature was not in session, limiting the schedule. Much of the excavation was performed during the summer, while legislators were on break.

Shoring and excavating in a tight, busy, secure downtown capitol block site was a significant challenge (Figure 3). A conventional, tie-back steel soldier pile system was used, incorporated into the structural wall with Nelson studs. Excavation and backfill materials, as well as concrete and

other construction materials, needed to depart and arrive regularly through a busy downtown corridor. Specific travel routes and timing (nighttime excavation) were implemented to help reduce the impact on traffic and nearby business operations, as well as other government functions.

Nighttime excavation also permitted a faster and more efficient truck turnaround

cycle. By excavating at night and shoring during the day, the contractor was able to overlap these two phases of the construction while minimizing potential impacts from one activity on the other, and helping to reduce the potential for delays to the project as a whole.

The adjacent stormwater system was approved for use in dewatering the site during construction. Dewatering discharge



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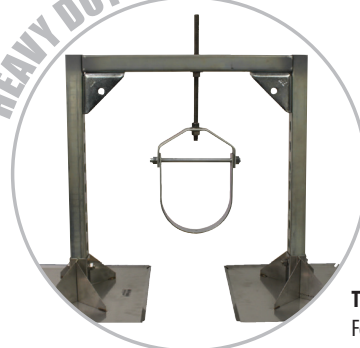


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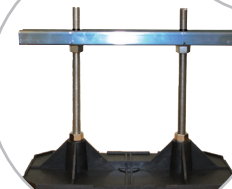
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Figure 6 – Finished project – overview. Courtesy of Google Maps.

Figure 7 – View of the capitol building from inside the addition. Courtesy of Idaho Capitol Commission.

volumes of 500 to 1,000 gpm (1,893 to 3,785 lpm) were implemented for each structure for approximately one year. The permanent dewatering system includes a passive collection and drainage system, combined with four sumps/pumps per structure as backup.

The concrete shells were waterproofed using a single ply of polymer-modified

asphalt membrane, adhered with asphalt adhesive and augmented with protection and drainage layers (Figures 4 and 5). The waterproofing system was revised from the original multiple-ply design to help reduce costs. It was determined that a single-ply system would provide adequate protection against the reduced hydrostatic pressures anticipated at the shallower depths of the single-level structure.

Most of the waterproofing work was



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performed during the late fall and winter of 2007/2008. Heated enclosures were required to keep materials at a temperature suitable for application. Transitions at exit stairwells and podium lid features required close attention to the detailing. Waterproofing transitions between the new structures and the existing building also required careful detailing to provide durable, functional seals without damaging the historic building.

Following initial backfill with native material, leaks were noted in the new space at several locations. The walls were re-excavated at the leak locations, revealing damage to the waterproofing system, likely incurred during backfilling. The waterproofing was repaired by replacing damaged materials with new and installing backfill, and interior finish installation continued with no further issues.


THE RESULTS

Placing the new structures below the landscaped lawns preserves the visual

appearance of the Capitol Building, with only skylights over the new wings and the exit stairs at the ends as a clue to their presence (Figure 6). Today, the skylights are well hidden behind strategically placed plants. A sandstone-clad clock tower was designed to enclose the kitchen exhaust stack. Many mature trees were salvaged and, combined with planters, benches, and pedestrian paths, provide continuity for the current atmosphere of the Capitol block.

The two new wings provide approximately 50,000 sq. ft. (4,645 m²) of additional meeting space for legislators, staff, and citizens, while retaining the historical look and feel of the Capitol (Figure 7). The addition also provided opportunities to move numerous functions out of the historic Capitol Building, such as large mechanical spaces, data centers, kitchens, and dining facilities.

A number of other features were included in the overall renovation of the Capitol, including renovation/restoration of windows, doors, floors, and decorative plaster;

addition of fire safety systems and HVAC equipment; and upgrades to plumbing systems. 



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