

NATURAL Selection

BY THOMAS M. CORCORAN, S.E., P.E.



Photos on this spread: Lara Swimmer Photography



Limited space and maximum daylighting were key drivers in the material selection for a Seattle high school in a wooded area.



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CLASS HAS BEEN IN SESSION at Seattle's Ingraham High School since 1959. That inaugural year saw an enrollment of 1,000 students in a sprawling school that took advantage of 28 acres in a lush, Pacific Northwest landscape.

As enrollment grew over the years (it's currently at 1,200), portable structures became necessary to provide additional classrooms. In 2007, voters approved a capital bond to fund school building projects for Seattle Public Schools, including a new building addition for the school. The district selected Integrus for the architectural and structural design of the new \$9.8 million, 21,200-sq.-ft classroom addition and site amenities.

This classroom addition extends the organizational scheme of the existing building with the inclusion of a new courtyard, while also taking advantage of the falling site topography. Constrained by a mature stand of trees in this area, a new courtyard compresses to form a covered atrium space framed with galvanized wide-flange steel and channel shapes. The addition provides a much needed secondary entry plaza for the school with an open stair, enabling communication between the existing levels and the two new floor levels. This stair embraces a tiered seating area as it rises from the entry level, creating a forum-like space designed for both casual interaction and formal presentations.



- ▲ The atrium provides abundant natural daylight and encourages a positive social environment.
- ◀ Steel roof framing supports the skylights with the existing school on the left and new addition to the right.
- ◀ **Opposite page:** Ingraham High School's west elevation is flanked by trees that help separate the school from neighbors while also filtering the sunlight.
- ▼ The new southwest entrance to the school provides better access to the building and highlights the exposed steel frame.

Easy on the Eyes

Steel was the logical choice for the addition—not only for ease of construction but also because it best met the architectural requirements. The decision to expose the structural framing early in the design process allowed it to become the driving force in developing the building's expression, including the use of roof framing to reinforce the visual connection from the interior to the exterior. The galvanized finish of the structural components carries through to other architectural work, including guard rails, handrails and stair components. Hollow structural sections (HSS) support the continuous skylights above the atrium, providing a free flow of daylight to learning spaces below.

The new courtyard atrium space is used for social gathering and break-out space for adjacent classrooms. The space is flooded with natural light from overhead skylights. Interior glazing between classrooms and corridors maximizes daylighting and visual continuity between these spaces, and strategically placed wide-flanged steel columns allow uninterrupted natural light into the existing building from the new atrium.

A north-south seismic joint separates the new addition from the existing building. The wide-flange steel roof framing members are located at the tops of exterior special reinforced concrete shear walls and serve as both drag struts for the lateral load resisting system and part of the building enclosure. The shear walls are continuous from the ground floor to the roof and architectural form liners were used at permanently exposed to view areas, reinforcing the



established architectural vocabulary. Flexibility is provided with roof perimeter bent steel channels to allow the roof edge to vary as it accommodates the locations of existing significant trees. The same rigor applied to the roof framing is brought to bear on the second-floor classroom framing, with composite wide-flange steel beams supporting concrete over metal deck bearing on wide-flanged columns.

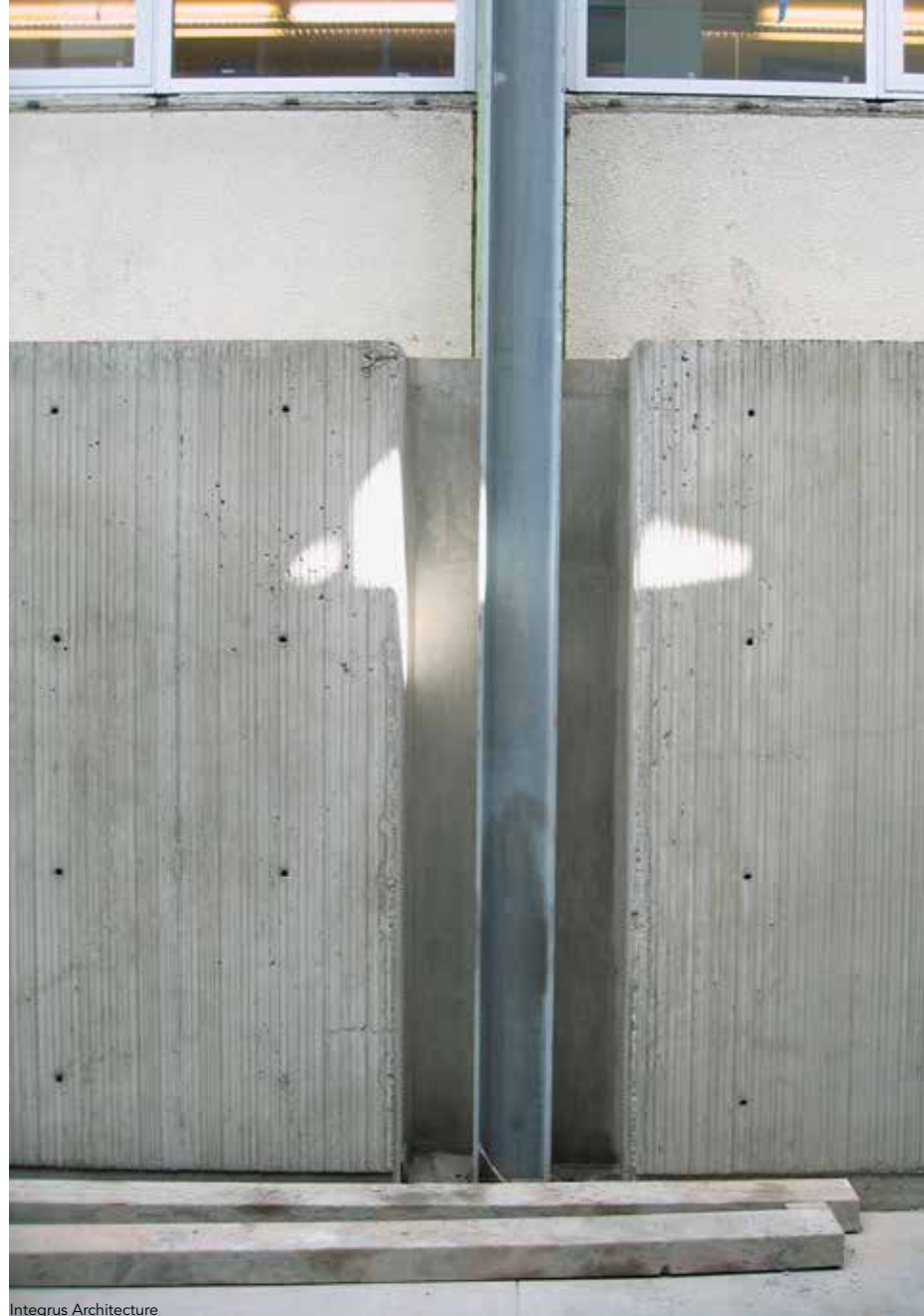
The new addition creates a secondary entry plaza framed with galvanized wide-flange columns, and galvanized cantilevered wide-flange roof beams shelter the new plaza from the elements while providing rain protection and sun shading for the entry and forum space. This plaza can be reached from either the street or the south parking area via new ADA-compliant covered walkways, and canopies over these walkways are designed to match the appearance of the new addition—also using exposed galvanized cantilevered wide-flange columns and beams. The canopy roofs are combinations of flat roof/exposed metal deck and skylights, in keeping with the roof expression of the new addition.

Driven by Nature

A careful analysis of the existing site, its natural features and changing patterns of student pedestrian traffic drove the design. The front door to the existing school is oriented to the north. With the district's elimination of school buses, many students now rely on public transportation, with stops located south and west of the site. The new addition creates a secondary entry plaza to accommodate this shift in pedestrian circulation. In addition, plan layouts were evaluated for their impact on existing trees. Through an intense mapping process, the final building footprint was fine-tuned to maximize the number of large trees saved and provide optimum pedestrian accessibility.

Improvements to the north and east entries include new canopies, paving and landscaping. Canopies are framed with galvanized steel sections to match the appearance of the new addition. At the existing north entry, a low masonry wall and glass canopy provides a new sheltered area adjacent to the drop-off/pick-up zone. Parking and other paved areas were reconfigured and upgraded across the site, with new landscaping completing the improvements.

- ▶ Galvanized steel columns support the roof framing.



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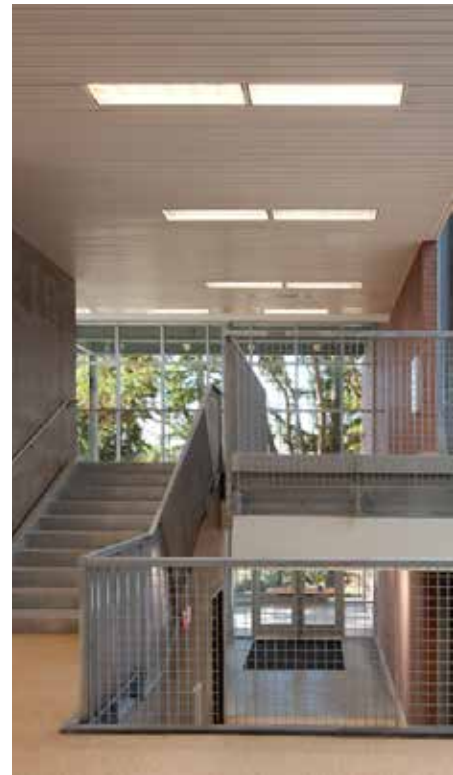
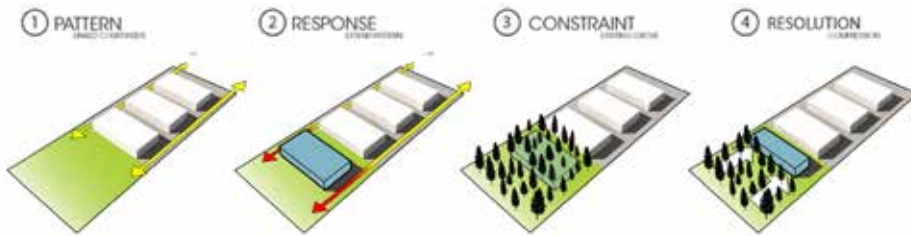
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- ▲ The new two-story atrium during construction.
- ◀ Within the school, exposed steel and concrete are highlighted.
- ▼ The new atrium serves as a transitional space between the new classrooms and the existing high school.



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► The site scheme increases classroom space with minimal expansion into the urban woods.



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▲ Galvanized steel-framed cantilevered canopies highlight the new addition.





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- ◀ Steel provides inspiration for architectural elements throughout the building.
- ▼ Creative use of bent steel channels along the roof perimeter allowed the preservation of additional trees.



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- ◀ The terraced seating is used for presentations, group gatherings and informal interactions throughout the day.

The new addition improves the sense of physical and spatial order on the campus by extending and reinterpreting the existing pattern of courtyards. The reinterpreted courtyard has become an interior, daylit learning space. Material choices reinforce this understanding with simplicity in massing and a restrained material palette. This attitude is further reflected in the choice of interior materials, emphasizing outdoor connections and the experience of natural light.

The District's goal to add classroom space was especially challenging on a limited wooded site, which restricted opportunities for expansion. In addition, the need for maximizing light in a shaded environment lent itself to a vertical extension of the new addition. Coupled with the need for rain protection and daylighting, the use of an expressive steel structure proved to be the best option for supporting the educational vision and environmental goals of Ingraham High School. ■

Owner

Seattle Public Schools

General Contractor

Bayley Construction, Mercer Island, Wash.

Architect and Structural Engineer

Integrus Architecture, Seattle