

Case Study: Ash Creek Intermediate School



New Ash Creek school gets the most value for funds spent

As superintendent of Central School District 13J in Monmouth-Independence, Forrest Bell knows he has a responsibility to get the most value for the district's money. When Ash Creek Intermediate School opened in September, it was evident that the district's construction dollars were well spent. They got a high performance school for a very reasonable cost.

"We weren't seeking a showpiece. We wanted a functional and flexible space that will serve us well for 100 years."

*– Forrest Bell,
Superintendent of
Central School District*

"We weren't seeking a showpiece," Bell said. "We wanted a functional and flexible space that will serve us well for 100 years. We wanted a building that gets us the most value for our dollar and gives our kids an advantage."

And, that is exactly what a high performance school is. It is a school building that uses energy and resources efficiently, is easy and inexpensive to maintain, and provides a comfortable, stimulating and healthy environment for students and staff. Best of all, a high performance school does not cost more to build than a conventional school.

"People don't realize how expensive it is to operate an inefficient school facility," Bell said. He knows. Monmouth Elementary, a similar-size building built in the 1960s, had electric bills amounting to \$78,000 last year. Ash Creek's bill is expected to be half of that figure.

Ash Creek was built 30 percent more efficient than the Oregon building code standard that is considered one of the better codes in the nation.

Ash Creek is a prototype," said Bell. "We want people to recognize that the features in this building are ones they should expect and demand."

Voters in the Central School District passed the construction bond for Ash Creek in 1998. Although, population growth had remained flat, the elementary and junior high schools in the district had been overcrowded for 10 years. Ash Creek, a 58,000



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square-foot-building with 400 fifth and sixth grade students, was created to relieve that pressure.

BOORA Architects of Portland won the design bid over 30 other firms because they bid the lowest cost building. Heinz Rudolf, an architect with BOORA and an advocate of energy-efficient sustainable buildings, oversaw the project.

“Ash Creek is a fabulous building because it is designed for sustainability and energy efficiency and will respond to the educational needs of the kids,” Rudolf said. “The school is their home away from home and sets the tone for youngsters that will last a lifetime.”

Daylighting

One of the most visible features of the building is the amount of natural light inside the building.

“Some school districts can’t afford to turn their lights on in their older buildings and the classrooms are very dark,” said Rudolf. “At Ash Creek, we used nature as our ally.”

“The light level is the first thing that parents comment on,” said Ash Creek Principal Barb Welander. “They really like how light and open the school is.”

“Natural light is the highest quality light source for visual tasks, as it enhances the color and appearance of objects,” said School Energy Analyst Greg Churchill with the Oregon Office of Energy. “A high performance school uses as much natural light as possible, especially in classrooms, while avoiding excessive heat loss, heat gain, and glare.”

Churchill notes one study that indicates that daylighting enhanced Seattle student performances by 15 percent on reading tests and 12 percent on math tests. The study accounts for over 50 variables and is considered 99 percent accurate in its conclusions on the correlation between natural daylighting and student performance. (See the Office of Energy Web site: www.energy.state.or.us/school/Daylight.pdf to view the study.) Classrooms stay cooler and more comfortable when artificial lights are turned off. And, there is less energy used.



Clerestories in the 18-foot high hallway provide natural daylighting with uniform light levels within the hall.

Ash Creek Intermediate School

1360 N. 16th Street
Monmouth, OR

Central School District 13J
Principal: Barbara Welander
Superintendent: Forrest Bell

Architect: Heinz Rudolf, BOORA
Construction Company: Woodburn Construction Company

Cost: \$124 per square foot
(includes extensive site work)
58,000 square feet
403 students in grades 5 and 6
15 acres

Ash Creek introduces natural light into the building in several ways:

- 1 The one-story school is oriented north and south to obtain maximum, controlled, balanced daylight.
- 2 Clerestories, windows placed high on one side of a wall, bring light into the 18-foot high hallways and into the media center.
- 3 The media center has insulated skylights that diffuse the natural light.
- 4 The gym has windows placed high to bring in light.
- 5 Classrooms have light tubes that are much smaller in diameter than a skylight and made of reflective material to bring direct sunlight and ambient light through the ceiling and into the room. A diffuser spreads the light evenly.

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- ⑥ The school added light “shelves” to the design to bring more light into the classrooms. Light shelves are built on the outside and the inside of the windows. These approximately three-foot reflective projections are located about a third of the way down the window. They reflect the sunlight to the white ceiling which “bounces” the light deeper into the room. The shelves also shade the lower window and reduce heat gains into the room caused by the sun.
- ⑦ The classrooms have energy-efficient T5 fluorescent lights. They have sensors that automatically turn them off when there is sufficient natural lighting or when the room is unoccupied. Dimming ballasts allow the T5s to be used more efficiently when needed while producing acceptable light levels.
- ⑧ Windows on the east and west sides of the building have translucent glass to prevent glare and heat gain within the building.
- ⑨ Light-colored banners are arranged in interior common areas to deflect light into the building. They also enhance the acoustics of the area.



Classroom view shows how the outside light “bounces” into the room off the light shelves inside the room.

Superintendent Bell was convinced of the value of daylighting when he visited the Seattle Lighting Lab and saw the modeling analysis of Ash Creek. The lab had modeled simulations of the building for the school location, site orientation and design on clear, overcast and rainy days.

“Even on the darkest winter day, the light lab modeling showed there was adequate, good quality light,” Bell said.

Student teacher Kathy Child from Western Oregon University has noticed the natural light is more than adequate for reading and classroom work. And, she adds it just “feels better.”

Principal Welander says its too early to make conclusions about student performance and the use of natural lighting. She said, however, the staff has commented that there aren’t as many behavior problems as expected in the first few weeks of school.

Ventilation

Ash Creek classrooms have operable windows and ceiling roof vents on the inside corner of the rooms to provide cross ventilation. Bell noted that he was in the building during the summer when the thermometer hit over a 100 degrees and the building was still quite comfortable. By using natural ventilation, only a few areas in the school actually require air conditioning.

Natural ventilation can be easily controlled. It connects students and staff to the outside and saves energy, maintenance and has lower initial costs.

Efficient and attractive flat wall-unit hydronic radiators warm the fresh air, if necessary. There are no fans with the units which saves a considerable amount of energy.

Easy to Maintain, Resource Friendly

Light-colored linoleum floors are easy to maintain. Some walls are accented with rough-cut cedar, but most are light-colored to enhance the light level.

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Other earth-friendly features of Ash Creek:

- ❶ They encourage kids to ride their bikes to school. There is covered parking for 30 bicycles and road improvements so kids can ride their bikes safely to school property.
- ❷ They used water conserving plumbing fixtures throughout the school.
- ❸ They used durable materials such as aluminum-clad windows and concrete. Little paint is used on the outside to reduce maintenance costs.
- ❹ They used materials produced locally saving on transportation costs and fuel use.
- ❺ They used paints, wood stains and sealers with low or no-volatile organic compounds (VOCs) as much as possible. This reduced emissions of noxious odors and produced healthier air quality.
- ❻ The gym floor is made with a lower-than-premium grade of lumber that doesn't affect its use or appearance. This cost less and saved premium timber from being cut.



The clerestory and spun fiberglass skylight provide ample light in the media center.

Built for the Future

Careful planning went into the design of Ash Creek so it would meet future needs without adding more space. For example, the cafeteria is designed to serve primarily as the dining area. However, it has a stage so it can serve as an auditorium. It has sinks so it can be used for large science or art classes. And, it can serve as a general meeting space.

The music room has a stage for performances, but can also be used a meeting room.

The Central School District recently received an Energy Award for School Design of a High Performance School from the Oregon Office of Energy. In making the presentation, Office of Energy Director Michael Grainey said that the Central School District's high performance intermediate school is an asset to the community, enhances teaching and learning, reduces operating costs and protects the environment.

The Oregon Office of Energy produced an energy analysis for Ash Creek Intermediate School during the design phase. More information on high performance schools and case studies are available on the Office of Energy Web site at www.energy.state.or.us/school/highperform.htm

Superintendent Bell is pleased that the taxpayers' money was well spent and the school can serve students and the community for years to come.

Greg Churchill

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