

Oregon HOA Uses Multifaceted Design Strategy to Build Sustainable Aquatic and Recreation Center

By Maria McDonagh-Forde

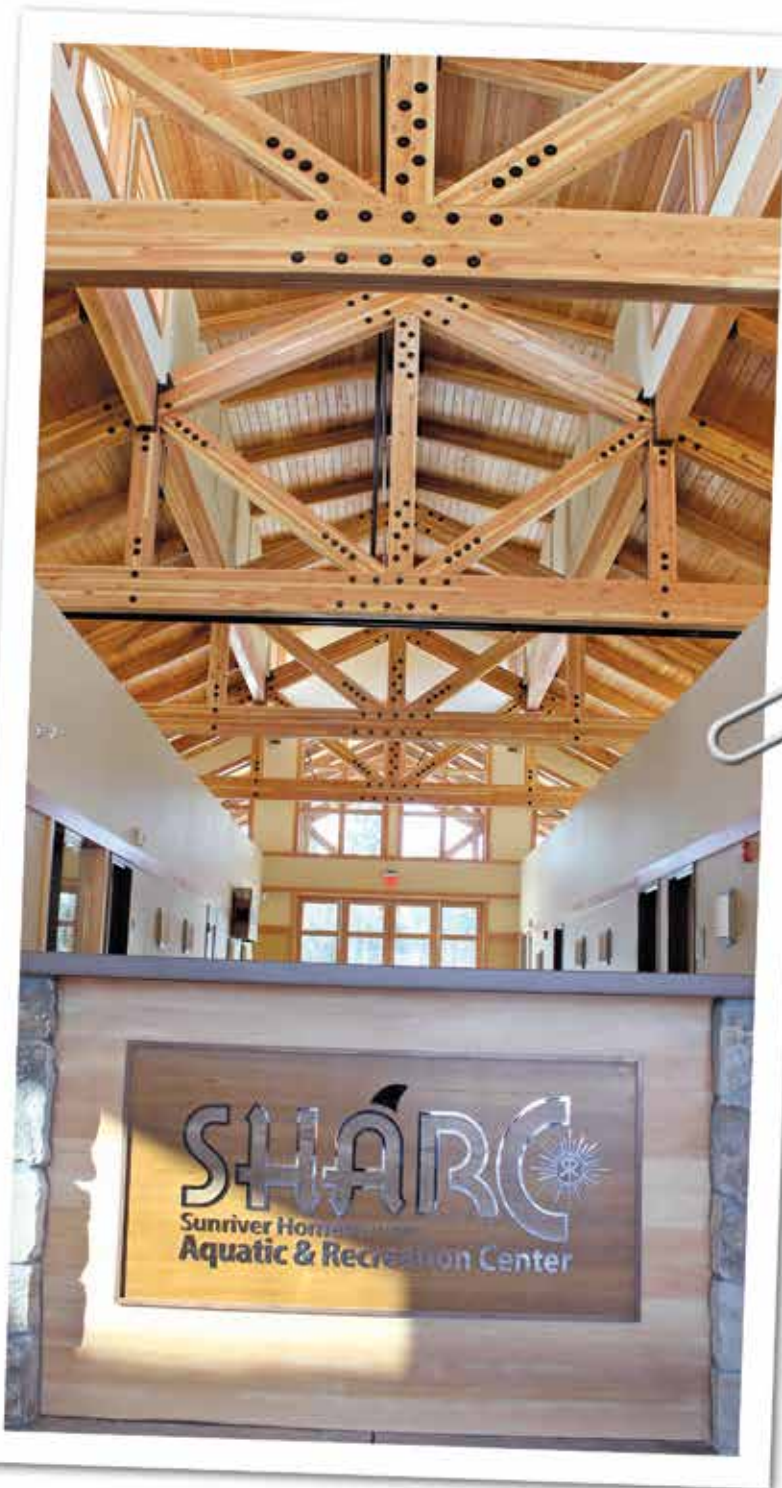
Developed more than 40 years ago from a brownfield site and surrounded by the scenic Cascade Mountains and Deschutes River, the planned residential and resort community of Sunriver, Oregon, has long been a believer in sustainability and environmental stewardship. When the Sunriver Owners' Association (SROA) made plans to replace an old amphitheater with a large aquatic and recreation center, sustainable, eco-conscious design and construction practices were a high priority.

"Sunriver's original developer founded the community on environmental preservation principles in 1968," says Hugh Palcic, assistant general manager of the SROA. "We wanted to be able to blend this large structure with its surroundings and make it as subordinate to the environment as possible to honor the philosophy on which Sunriver was built."

Seeking a holistic approach to sustainable construction, the SROA hired Group Mackenzie—a Portland, OR, architectural, engineering, and design firm—to design the new Sunriver Homeowners' Aquatic & Recreation Center (SHARC). LCG Pence Construction, LLC, of Salem, OR, was tapped to serve as general contractor. Group Mackenzie worked with the SROA to create an expansive, 33,000-sq.-ft. aquatic and recreation center design that meets requirements for LEED® Silver certification. To achieve this goal, the architects employed a variety of sustainable design strategies.

MECHANICAL AND ELECTRICAL

Group Mackenzie consulted System Design Consultants, Inc. of Portland for assistance in designing the facility's mechanical and electrical systems. System Design Consultants recommended somewhat of a zone-heating strategy, employing a variety of energy-efficient heating methods used for specific parts of the building. For example, the strategy called for air-to-air heat recovery from the humidity control system in the facility's poolroom and locker rooms. A condensing-style water heater was installed for heating domestic water, and a condensing-style boiler was used to power radiant slab snow melting around the perimeter of the building. Radiant slab heating was also used in some of the center's rooms.



The standout component of the strategy, however, is a large indirect-circulation solar water-heating system for heating the pool water. In this system, pumps circulate an antifreeze heat-transfer fluid through flat-plate solar collectors on the roof. The antifreeze fluid transfers the heat gained to

the pool water through a heat exchanger located in the pool mechanical room. This kind of system is popular in climates that are prone to freezing temperatures in the winter, such as Sunriver's.

In addition to heating systems, System Design Consultants added several energy-

efficient lighting strategies to the design, such as motion sensor-controlled lighting, daylighting sensors in offices, and light dimmer controls in the banquet hall.

ON THE ROOF

Though the solar water heating system was a key component in the center's heating system strategy, working around it presented a challenge for some contractors. LCG Pence Construction hired AM-1 Roofing, Inc., of Bend, OR, to install a roof and insulation package around the solar collectors. There were 260 penetrations made to install the solar collectors, and the ten-person roofing crew had to work around them and install flashing to protect them from the exterior moisture.

"We had to keep the penetrations dry at all times because we were installing a closed, nonventilated roof system; and if we got moisture in there at any time, we would have had a terrible time getting it out," says Thomas Hunziker, owner of AM-1 Roofing. "We had to seal the pipes temporarily with mastic and then build two-piece pipe boots from TPO and coated metal to flash over 100 penetrations for the solar system. We were unable to use conventional pipe boots because the stanchions would not allow us to slide them on."

With the solar collectors protected, things ran more smoothly. The crew installed a vapor barrier over the roof deck and then two layers of 3.1-in. R-19 polyisocyanurate (iso) board and oriented strand board (OSB) sheathing. Working on a 5/12 pitch at elevations of 15 to 20 ft., the crew installed CertainTeed's WinterGuard™ waterproofing underlayment and 600 squares of the manufacturer's Landmark™ Premium designer shingles in Maximum Definition Weathered Wood. The components of this roof assembly provided extra thermal resistance in a key area, as roofs in Sunriver, a popular ski destination, often hold several feet of snow throughout the winter season.





EXTERIOR AESTHETICS

Group Mackenzie was tasked with finding high-performance exterior cladding and roofing styles and colors that complemented the wooded alpine surroundings. The architects chose to clad the building with fiber cement siding, which offers the look of wood but is longer-lasting and usually made with recycled content. The CertainTeed Landmark Premium asphalt architectural shingles chosen also create the classic look of wood shakes but stand up better and longer against harsh climates. In addition, the shingles contain a richer mixture of surface granules, resulting in a more vibrant appearance and depth of color. The colors chosen for each were an excellent fit for the building and blended well with the surroundings.

The exterior color scheme was a huge hit with the SROA, which consists of 4,200 homeowners. "As community managers, we know we've made the right color choices when the members of our community come to us and say they want to know all the colors we used because they're doing a remodel of their own home and want to use them," Palcic says. "We've had a few homeowners do exactly that, so I think we did a good job."

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INTERIOR BUILDING MATERIALS

To create the high thermal resistance needed for the harsh winters in the Cascades, Group Mackenzie designed an innovative, heavily insulated double-stud exterior wall assembly. The section closest to the exterior was built with 2x6 metal studs and filled with 6 in. of R-21 fiberglass batt insulation, following 8-in. exposure fiber cement siding, housewrap, and OSB sheathing. Following this is a 2-in. gap and then the second wall assembly. The second assembly was built from 2x4 metal studs and filled with 4 in. of R-13 fiberglass batt insulation that is faced with a vapor barrier. The assembly was completed with 5/8-in. gypsum board.


“Due to the mountain climate, it gets pretty cold in the winter in Sunriver, so a high-performance insulation strategy was essential,” says Dave Robinson, project architect for Group Mackenzie. “We’re confident that this unique double-stud wall assembly will provide the thermal resistance needed to minimize heat loss throughout the long, cold winter seasons.”

Group Mackenzie also specified windows with high-performance glazing to filter excess heat from ultraviolet rays, as well as materials, sealants, and finishes with low-volatile organic compound (VOC) content to enhance indoor air quality.

ENVIRONMENTAL STEWARDSHIP

The building and design team worked hard to minimize the project’s impact on the surrounding environment by decreasing construction waste and striving not to disturb trees and plants. Most of the trees that were removed for the project were reduced to wood chips onsite and hauled away for use as fuel. As a gesture to the community, a large mantel made for the center’s communal fireplace was milled from one of the larger trees that had to be removed. The site was also landscaped with native plants that tolerate the area’s dry summers.

Sunriver was developed from land once occupied by World War II-era U.S. Army training facility Camp Abbot. The excavations unearthed large pieces of buried concrete left from former Camp Abbot structures and also revealed low-level asbestos content

in the soil. The old construction debris was pulverized to form the base of the center’s parking lot, and the asbestos was mitigated in accordance with the Oregon Department of Environmental Quality (DEQ). The mitigation involved the encapsulation of 5½ acres of asbestos-contaminated soil with a 2-ft.-thick layer of clean soil. 

CONCLUSION

All told, the project ran smoothly, and the facility opened last April to a throng of happy visitors. Since opening, the center has won an award from the Oregon DEQ for being one of the best Oregon brownfield site cleanups of 2012. There has been a sharp increase in visitors over the SROA’s former outdoor pool, as well as a significant decrease in utility bills.

“We’ve noticed huge utility savings compared to our old pool,” Palcic says. “To date, the utility bills are about one-third less than what we even anticipated they would be. We’re thrilled.”

Maria McDonagh-Forde is director of marketing communications for CertainTeed Roofing.

What LURKS Beneath the Blue Tarp

By Aaron Nelson, RRC, RRO

Photo 1 - Visqueen over blue tarp.



Quite often in the normal course of our work, we will see the infamous “blue tarp.” I’m nearly always interested in what is under the tarp and why the tarp is there. Is it a temporary measure until weather breaks?

Is there remedial work occurring? Or is there something more interesting lurking beneath? Our company recently investigated a residence where there was a deteriorated tarp over a deteriorated tarp over yet another deteriorated tarp, followed by yet another deteriorated tarp over the tired shingles. Seeing these types of conditions reminds me to always look under the tarp.

I was called by an insurance client to investigate the source of moisture intrusion on a residence. The owner had filed a claim indicating that wind damage had allowed moisture to enter the attic space, which had become evident by dripping into the interior of the residence.

Upon arrival, my colleague and I noticed that the entire roof area was covered by

polyethylene with lath mechanically attached through the shingles to the substrate. We contacted the client to verify that he would like us to remove the covering to investigate the condition of the shingles. Once we had the okay, we proceeded with the investigation. The homeowners indicated that there had never been any moisture intrusion in the residence prior to a wind event some weeks prior to our visit.

We toured the residence to visually observe where the intrusion had occurred. There were numerous locations indicating an abundance of moisture invasion. The drywall was sagging; paint blistering and stains from water were prevalent. (We noted, incidentally, that the kitchen cabinets had a tapered trim that matched the sagging of the roof.) As we walked through the residence, we were more and more convinced that this was not the result of a single wind event, but more the result of long-term intrusion.

Walking around the residence looking for the best access to the roof, we noticed

locations where water had been directed to door heads, exposed soffits where rafter tails and soffit materials were degraded, improper drainage, and missing sheet-metal flashings.

This brings us to the tarp. Seeing so much evidence prior to viewing the actual roof can lead to conclusions that may be unfounded. Topical observation of the roof covering is essential to provide an accurate report for the client. We cautiously climbed onto the roof and observed the Visqueen to determine the best course for removing it (a roofing contractor had been hired to re-cover the roof with new Visqueen). We elected to remove the covering from the main body of the residence atop the location of the reported damage. (The residence has T-shaped ridges with valleys in the “armpits” of the T.) Upon its removal, an interesting sight awaited us.

We observed a tired three-tab roof. A portion of the roof had been replaced with newer three-tab shingles near the



Photo 2 - Interior hallway damage.



Photo 3 - The exposed roof.

ridge. Additionally, a portion of the shingles in the valley had been replaced with laminate shingles. The substrate undulated visibly in multiple locations and just flat-out looked scary. We examined each section individually in an attempt to provide accurate descriptions of each area.

As the three-tab section near the ridge was above the area where the homeowners had indicated the bulk of the moisture damage was, we addressed it first. The substrate sloped to the perimeters at 2:12. The shingles had roughly the correct exposure; however, the offset was not in accordance with the manufacturer's requirements. Additionally, there was no underlayment on top of the new plywood substrate. There were generally two fasteners per shingle (one located near each end), and the fasteners were located at the top of the shingle (in

lieu of above the slots near the seal-down strip). The seal-down strip was not active, allowing for the shingles to be easily lifted up and the underlying substrate observed. This area was clearly identified utilizing historic satellite imagery as having a blue tarp installed, followed by a later photo showing the shingle installation in process in this area. The new shingles extended atop the existing ones and were held in place by fasteners located at the uppermost portion of the shingle. Again, the seal-down strip was not active, and no other means of sealing the new to old was implemented.

At the valley, underlying substrate was replaced and laminate shingles were integrated into the existing three-tab shingles. On the up-slope side of the repair area, the laminate shingles were tucked under the existing three-tab shingles, allowing overexposure of the laminate shingles. On one side of the valley, the laminate was placed on top of the existing three-tab and sealant was applied. For exposed fasteners, sealant was also topically applied. A woven valley had been attempted with the laminate shingles; however, it consisted of just weav-

ing enough of the shingle to provide an overlap, in lieu of extending well beyond the valley line. The laminate shingles terminated in a straight line, roughly one inch beyond the new wood substrate. This provided an environment in which pressing on the three-tab shingles adjacent to the laminate shingles allowed one to actually see into the attic space.

There were multiple other items on this roof that continued to confirm that the removal of the tarp provided a much-needed insight into the construction of the roof covering, such as a roof vent that was stripped in with roll roofing used as shingles, mechanically attached to the sub-



Photo 4 - Valley condition.



Photo 5 - Pressing next to the laminate shingle exposed the interior of the attic to view.




Photo 6 - Improper nailing of new three-tab shingles.



Photo 7 - No underlayment under the new three-tab shingles.

strate; a skylight lacking adequate curb height (or a cricket) with a copious amount of sealant applied, plugging the weep holes in the frame; penetration flashings degraded such that one could visibly see into the attic space; and fasteners that were exposed with the remnants of old blue tarp still clinging in place.

This project reinforces the fact that removal of the ubiquitous blue tarp is just the beginning of an accurate condition survey. 

Aaron Nelson, RRC, RRO

Aaron Nelson, RRC, RRO, began fabricating and installing sheet metal flashings associated with roofing right out of high school. He advanced into the office of a large commercial roofing contractor and then into roof consulting, and has installed, estimated, managed, and consulted on projects across the U.S. He is currently president of Roofing Technical Services, Stanwood, WA.

