

SUNSET GARDENS

A PROJECT PROFILE

Rafters and insulation with notches for free flow of air through attic.

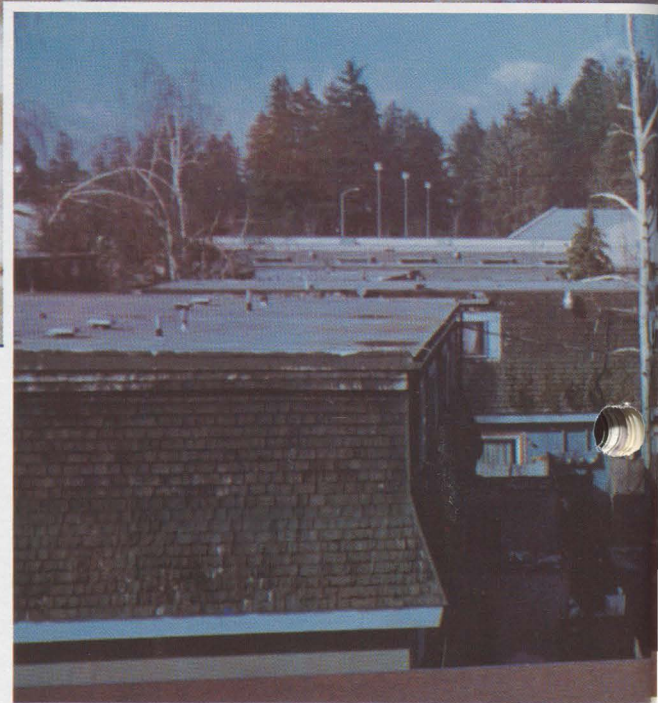
Roofing solutions, low-income housing, and energy efficiency came together at the Sunset Gardens Apartments in Hillsboro, Oregon.

Columbia Housing Corp., a sponsor of institutional investments in multi-family housing, purchased Sunset Gardens, a 106-unit apartment building complex, in 1997. At the time, it was in a state of extreme disrepair. The roof was falling in due to rot of the wood deck, which was prevalent throughout the attic space. The windows were far from airtight, mold lined the walls, and in some apartments, farm animals shared living quarters with residents.

When Columbia Housing Corporation contacted Interstate Roofing Inc., of Portland, Oregon, to rehabilitate the Sunset Gardens' low-slope roof system, Interstate developed a solution that met its needs.

Interstate's challenge was to develop a roof system that met heightened energy efficiency requirements and one which was well ventilated. Columbia Housing Corporation worked with Portland General Electric (PGE) to help fund the improvements at the complex. "Since Columbia was working with PGE for funding, the construction had to meet their energy-efficiency criteria," stated Jay Reid, estimator for Interstate Roofing.

"The roof was actually concave when we began. We needed to raise the roof and develop a system that would allow ventilation of the attic while also raising the R-value of the insulation," stated Jason Rennaker, general manager of construction for Columbia Housing Construction Services, an affiliate of



Columbia Housing Corporation.

Interstate Roofing began the work of designing a new roofing system with several goals in mind. Of primary concern was the need for an increased R-value while maintaining unrestricted ventilation which ultimately called for a deeper attic space. "Along with the insulation R-factor we also needed to fix several broken vent and dryer exhaust pipes that were blowing directly into the attic," continued Rennaker.

The firm of Miller Consulting Engineers was called in to inspect the roof system and noted the following: "After opening up portions of the roof system, it became clear how the condensation has been accumulating. The space between the existing rafters was filled with insulation resulting in no air movement. Without the benefit of air movement, it is understandable why condensation is occurring. It was also noted that the plywood on one of the units had delaminated due to this condensation."

Interstate's team developed several options for Columbia's consideration. The first two alternatives were 1) to leave the roof

SUCCESS IN ENERGY EFFICIENCY AND LOW-INCOME HOUSING

BY MICHAEL J. MAWDSLEY



Sunset Gardens complex with Interstate work trailer.

in place and recover with a single-ply system, or 2) build a pitched roof and complete it using steep-slope products. The first option of installing a low-sloped roof was discarded due to the ventilation problem in a compact roof assembly. "We told them it was an option but not their best. Rafters usually run with the shorter side of the roof. In this case, however, they ran the length of the building, from end to end. Because of that, we could not use the existing soffits for ventilation as they provided no access to the attic space," explained Reid.

The second option of designing a full steep slope system was discarded after Columbia viewed a computer-generated program that showed how the building would look with a pitched roof. "We didn't want to change the design of the building with a pitched system. The curb appeal was also important to us," stated Rennaker.

That was when Interstate proposed a pitched roof that would rise by only twelve inches. The system would include full ventilation and use a torch-applied roofing material. "It was what we

were looking for, allowing us to increase the R-value and keep the basic architectural design of the building," said Rennaker.

With PGE's financial backing a must, the energy efficient design required an increased R-value. "By raising the R-value to 34, Columbia Housing was able to receive energy dollars from PGE to help with construction. In turn, PGE had to approve every step of the process. When they saw the proposal, they loved it. They are recommending that we use the design on future projects," noted Reid.

Interstate Roofing began with a complete tear-off down to the rafters. Once that was completed, they added cross rafters using 2x4 framing elements. These lifted the entire roof 12", providing enough room to upgrade the insulation to R-34. Interstate then built a tapered roof structure that rose from 1" around the edges to 12" in the center. "We basically made a sloped hipped system out of a low sloped roof assembly. It allowed us to double the insulation R-value from 17 to 34," explained Reid.

"In this part of the country, attic dry rot resulting from con-



New rafters leading to center ridge vent.

condensation is common, especially under low-sloped roof systems. We changed the system to provide a constant means of ventilation. In twenty years, the attic will be in the same shape it is now because of this system," stated Mike Satran, president of Interstate Roofing. "When our team designed this roofing system, we realized it was something completely new. If this type of roofing has been used before, we have not seen it."

The final challenge was the amount of insulation required for the R-34 energy efficiency rating. The added insulation necessitated the installation of the 2x4s to provide sufficient

space for air flow. "A lot of roofing systems have the insulation up against the soffits or vents. Unfortunately, this prevents the ventilation from working as it should," said Reid. "The cool air needs to be able to come in through the lower vents and the hot air needs to exit through the upper vents. If insulation is blocking the air flow in these passages, condensation and rot will move in."

To prevent the vents from getting blocked by insulation, Interstate installed two square feet of uninsulated space around each soffit vent opening. The same concept



(above) Ridge vent and finished roof.



(left) End view of ridge vent, venting pipes, and torchdown roof.

was applied to the ridge vent. Wood framing was used to ensure the airspace remained unobstructed. "Once the project was completed, insulation could move, settle and/or shift as it needed. To ensure the airspace around the vents remained uncompromised, protective framing was installed," noted Reid.

Throughout the construction phase, Interstate also extended and repaired all the

venting pipes and exhaust systems. "There was exhaust from bathrooms, kitchens, and laundry dryers blowing into the attic which moistened the insulation and caused it to lose its R-value," said Rennaker. After Interstate raised the existing roof framing and extended all the venting and exhaust pipes, new cellulosic insulation was installed.

The new rafters were then covered with 1/2" CDX decking, applied using clips. The base sheet was nailed down and fire-rated, granulated Bitec Modified Bitumen was torch-applied. "Part of the reason we wanted to create a sloped deck was to stop any potential ponding. Ponding voids the manufacturer's warranty when using torchdown systems," commented Jay Reid.

Sloping up one-half inch per foot from both sides provided excellent drainage and created a ridge area where Interstate built a 6" high curb. The curb was capped with metal in such a way as to provide effective ventilation for the attic space. To ensure sufficient airflow throughout the system, all of the new rafters were notched 3" wide and 1-1/2" deep near the top and bottom. "We put the notches as close to the top of the ridge as possible. The notches provide airflow through each section," said Reid. "Fire stops were an issue of great importance, given the increased airflow throughout the system. These consisted of fire rated sheet rock that separated every 3200 square feet of living space as called for in the building code. Consequently, each section needed its own vents."

Each fire stop area was vented using continuous ridge vent and a continuous, screened, 2.0" soffit vent. "We started out with a one-piece ridge vent but found that two pieces were stronger," stated Reid. "We basically built the bottom section of the vent and then the cap."

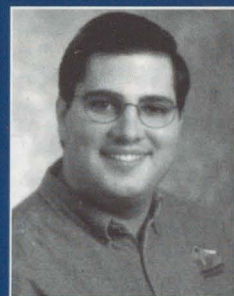
Each of the buildings took about a day and a half to roof as

Interstate had crews performing several phases simultaneously to beat the unpredictable Northwest weather. At \$5.25 per foot, the cost of the roofing project was in line with what Columbia wanted to spend. In fact, they would have liked to copy the design on two other buildings but were unable to do so because of architectural constraints. Still, according to Rennaker, Columbia plans on using the system whenever they can in the future.

The teamwork of Columbia Housing Corporation, Portland General Electric, St. Vincent de Paul, Community Action Organization and Interstate Roofing, Inc., has succeeded in providing quality low-income housing for many families who will be warm and dry this winter. ■

ABOUT THE AUTHOR

Michael J. Mawdsley is Corporate Safety Officer for Interstate Roofing, Inc. Mawdsley first started with Interstate in 1988 and, after receiving a bachelor's degree in Business and Communication from the University of Portland, became its Corporate Safety Officer in 1997. Mawdsley has volunteered with the American Red Cross for the past 11 years and currently serves the organization as a member of the National Board of Governors.



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