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Red Rocks Rising: An award-winning visionary prototype for single-stair multifamily housing

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The Single-Stair Challenge

In the United States, building codes require two staircases for buildings exceeding three stories, a mandate intended to enhance safety by providing multiple escape routes in an emergency. However, in practice, this often results in unnecessary redundancy—one stair sits largely unused while taking up valuable buildable area. For smaller infill lots, this requirement can be the difference between developing much-needed urban housing or leaving a site underutilized. Additionally, two-stair layouts limit natural cross-ventilation, reduce daylight access, and restrict unit design flexibility — all while the housing market faces a severe shortage of affordable multifamily units.

Some cities, like Seattle, have recognized this challenge and updated building codes to allow six-story residential buildings with a single stair, provided fire safety measures meet or exceed current code performance standards. Nationally, many cities are working to adjust local regulations to unlock similar housing opportunities. The need for regulatory change inspired Page to enter the 'Denver Single Stair Housing Challenge', an international design competition hosted by BUILDNER. Our entry, **Red Rocks Rising (inspired by the Red Rocks of Colorado), received Third Place in the Denver Single Stair Housing Challenge** (See jurors feedback and submission information here). The design reexamines life safety, zoning, and building codes through a fresh lens, challenging outdated regulations to create more efficient, desirable urban housing.

Resiliency versus redundancy

Through extensive design charrettes with architects, fire protection engineers, firefighters, building scientists, and multifamily housing experts, this prototype emerged as a way to rethink code

limitations while prioritizing life safety. The most critical shift? Flipping the traditional fire-rated stairwell inside out to create an exterior stair. By doing this, fresh air naturally carries away toxic smoke during a fire, eliminating the claustrophobic entrapment of enclosed stairwells and significantly reducing the risk of smoke inhalation—the leading cause of fire-related deaths. Unlike traditional enclosed stairs, which can become dangerous chimneys for smoke and heat, an open-air stair creates a reliable, passive evacuation route.

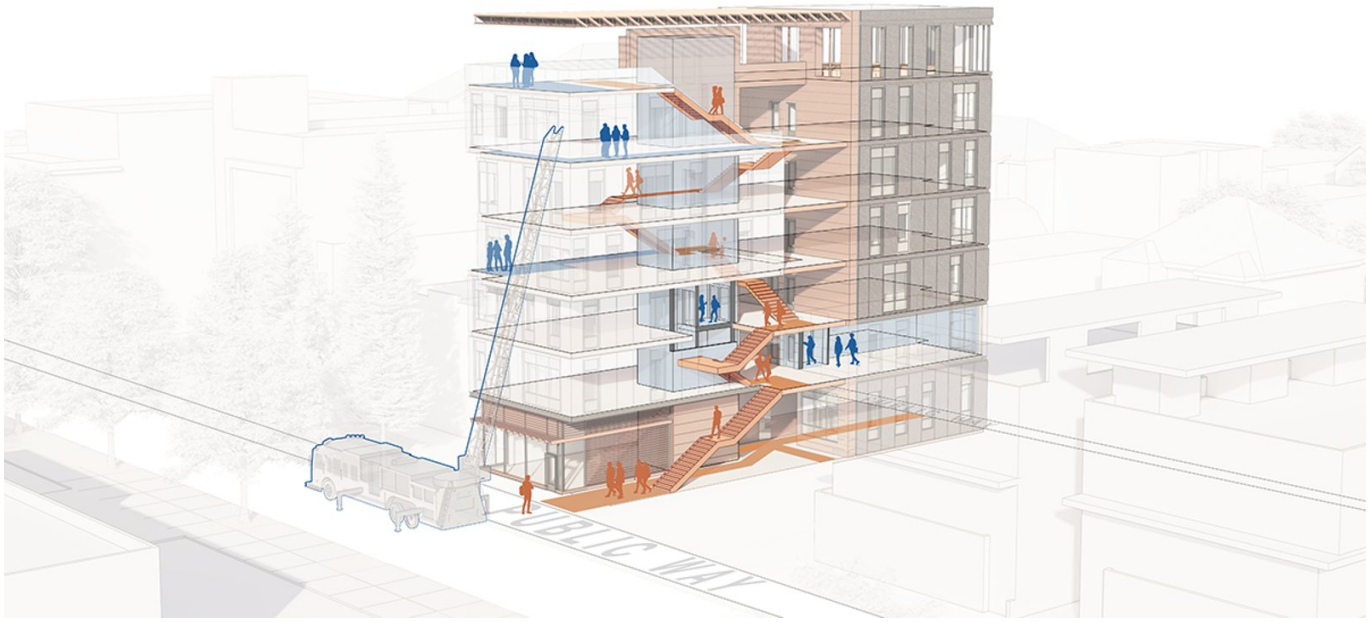
The design carefully calibrates building massing to fit within the surrounding neighborhood context, where adjacent structures range from two to six stories. By shifting the building's form, the design not only humanizes its scale but also enhances building performance, incorporating multiple safe areas of refuge at exterior landings directly accessible by fire trucks along the public way.

This approach also improves overall safety by increasing visibility and awareness—residents can see and be seen, hear and be heard—fostering a more secure environment. The added transparency encourages more frequent use of the stair over the elevator, reinforcing its role as an everyday circulation route rather than just an emergency escape. Thoughtfully integrated canopies, drainage systems, and slip-resistant materials ensure the stair remains safe and functional in all weather conditions.

A compartmentalized fire-resistive construction strategy further enhances safety by separating units with an open-air central zone, providing an exit from each unit directly to the exterior. This approach limits fire spread, giving occupants more time to evacuate while reinforcing the building's overall resilience. Fire-resistive construction and Class A fire-rated materials ensure that the building's assembly does not contribute to fire growth, addressing the risks posed by modern, highly flammable, cheap materials, such as OSB (oriented strand board), commonly used in construction today.

An occupant evacuation elevator (OEE) with a pressurized vestibule on each level provides an additional means of egress, particularly for those with mobility challenges. This system can also be utilized for firefighter access, improving emergency response times. While initial costs may be higher than traditional elevators, the long-term benefits—improved efficiency, reduced maintenance, and enhanced safety—justify the investment.

For firefighters, the open-air stair and multiple areas of refuge located along the public way provide clear visibility and unobstructed access to every floor, avoiding the heat and smoke buildup common in traditional stairwells. This enhances operational safety and response times during emergencies.

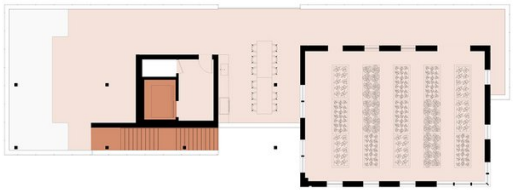


Prioritizing safe evacuation, the open-air stair ensures a smoke-free escape, while a compartmentalized layout slows fire spread. An occupant evacuation elevator (OEE) and street-accessible areas of refuge improve rescue time for residents and first responders.

Vertical neighborhoods: Designing for connection and inclusivity

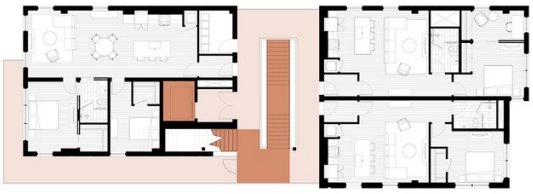
Red Rocks Rising transforms multifamily housing into a dynamic vertical neighborhood. The design includes four adaptable unit types, accommodating diverse lifestyles—from grandparents living near family to remote workers needing dedicated office spaces. A central, open-air canyon in warm red tones creates a communal neighborhood at each level along its journey to the roof, offering residents protected outdoor space while maintaining privacy.

Level 4



Roof

Level 3



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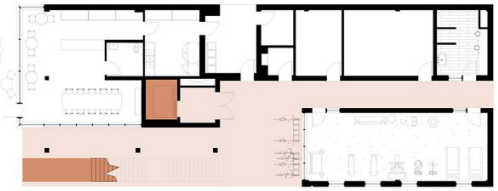
Level 2

Level 5



Level 1

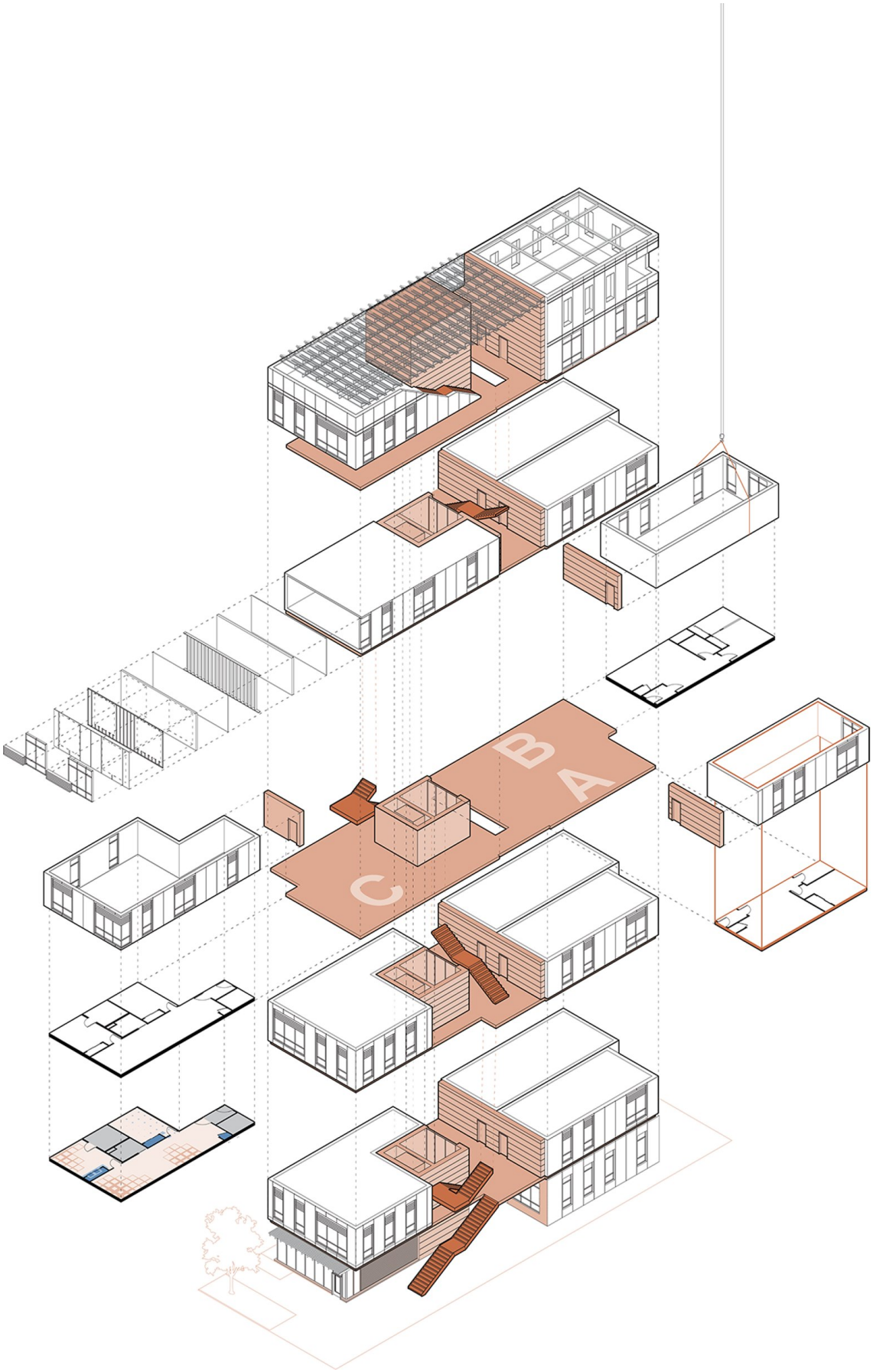
The staircase progression creates a series of vertical neighborhoods, shaping a dynamic journey through the central canyon and culminating in a shared rooftop deck with panoramic views of the Denver skyline.

Situated in a mixed-use district, the project integrates residential units with thoughtfully designed

amenities. The ground floor enlivens the streetscape with a fitness center, bike storage, and an inviting ice cream shop with outdoor seating—an ideal gathering spot for neighbors, families, and students from the nearby middle school. Along Emerson Street, the design respects the established green corridor setback, weaving lush landscaping into the site. The green roof extends this approach, supporting watershed management, improving air quality, and providing residents with garden plots for fresh produce. Even the ice cream shop incorporates rooftop harvests, experimenting with fresh herbs and berries to create seasonal flavors, adding a playful sustainability element to the project.

Above the ground floor, the central stair and canyon transform safe movement into an enjoyable experience. Designed landings encourage residents to pause, interact, and enjoy views, fostering an organic sense of community. At the top, the shared rooftop deck offers panoramic views of the Denver skyline—becoming a space for gathering, relaxation, and reflection. The future of multifamily housing lies in the synergies between affordability, sustainability and building performance. This is where modular construction and climate-conscious design intersect.

The intersection of modular construction and climate action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A modular system meets Passive House design—each unit is precision-crafted off-site, assembled like a plug-and-play kit, seamlessly connecting to the structural framework and stair system.

Red Rocks Rising employs Passive House design to achieve exceptional energy efficiency and comfort. Airtight construction, super-insulated walls, balanced ventilation, and elimination of thermal bridging minimize energy loss while ensuring superior indoor air quality. Operable egress windows throughout the building further enhance performance, allowing for natural cross-ventilation to reduce reliance on mechanical systems while also serving as an additional means of escape in an emergency. This approach exceeds Denver's 80x50 Climate Action Goals, setting a new precedent for sustainable multifamily housing.

Modular construction further advances sustainability and affordability. Each unit is crafted off-site in a controlled factory environment, where it is rigorously tested to ensure every seam is sealed. This meticulous process not only prevents inefficiencies but also addresses imperfections before the units are transported to the site. Once on-site, the modular units are assembled like a plug-and-play kit of parts, connecting seamlessly to a unique structural framework and stair system. This method not only ensures higher-quality construction, reduces waste and construction time, but also creates flexible housing solutions adaptable to various urban infill sites.

Beyond efficiency, Passive House principles enhance fire safety. The airtight, insulated envelopes compartmentalize each unit, slowing fire and smoke spread while providing additional evacuation time. Unlike standard double-loaded corridor buildings, where many apartments have only one window wall, **Red Rocks Rising** prioritizes natural cross-ventilation, reducing dependence on mechanical systems. This ensures better air quality and provides passive cooling, enhancing livability even during power outages.

Natural daylight reaches over 75% of the building's interior spaces, far exceeding the average of 50% for conventional apartment designs. Each unit has multiple window walls, maximizing daylight, reducing reliance on artificial lighting, and simultaneously providing stunning views of the city.

The building's energy performance is equally impressive. **Red Rocks Rising** surpasses ASHRAE 2004 and 2022 standards, achieving lower Energy Use Intensity (EUI) and reduced peak heating and cooling loads. Triple-glazed windows, energy recovery ventilators, and all-electric systems minimize environmental impact while lowering operating costs for residents. These strategies are key to making high-performance housing more accessible and cost-effective. The future of housing depends on advancing these innovations to create healthier, more adaptable living environments for residents.

Rethinking urban housing for the future

By reimagining fire safety, energy performance, and design flexibility, **Red Rocks Rising** offers a replicable model for cities seeking to create more affordable missing middle housing. With single-stair housing gaining traction across the U.S., projects like this push the conversation forward, proving that safe, efficient, and desirable multifamily housing is possible—without unnecessary redundancy.

Looking ahead, we are excited to continue refining this award-winning prototype and engage with cities interested in single-stair reform. By working collaboratively with policymakers, fire protection experts, and housing advocates, we aim to advance the conversation around innovative, safe, and sustainable housing solutions for urban communities.