

Affordable Design

The U.S. Department of Housing and Urban Development sponsors or cosponsors three annual competitions for innovation in affordable design: The Innovation in Affordable Housing Student Design and Planning Competition; the American Institute of Architects – HUD Secretary’s Housing Community Design Awards; and the HUD Secretary’s Opportunity & Empowerment Award, co-sponsored with the American Planning Association. This Cityscape department reports on the competitions and their winners. Each competition seeks to identify and develop new, forward-looking planning and design solutions for expanding or preserving affordable housing. Professional jurors determine the outcome of these competitions.

2021 Innovation in Affordable Housing Student Design and Planning Competition: Fresno County Housing Authority, Firebaugh, California

Alaina Stern

U.S. Department of Housing and Urban Development

The Jury:

Rob Hazelton (Head Juror)—CEO, Dominion Due Diligence Group

Stephen D. Bender—AIA, Principal, bndr, llc; Acting Program Director, University of Florida CityLab-Orlando

Michael Eriksen—West Shell Assoc. Professor of Real Estate, University of Cincinnati (UC); Academic Director, UC Real Estate Center

Karl Schoettler—Principal, Collins & Schoettler

Kia Weatherspoon—NCIDQ, ASID, President + Design Advocate, Determined By Design

Alternative Jury Member: Jaime Bordenave—Founder and President, The Communities Group

Winning Team—Pratt Institute & New York University:

Sabyasachi Das

Pankti Mehta

Nella Schools

Browne Sebright

Kats Tamanaha

Runner-Up Team—University of Michigan & Harvard University:

Andrew Darvin

Avanti Krovi

Christopher Prinsen

Alexander Sulek

Katherine Wheeler

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Introduction

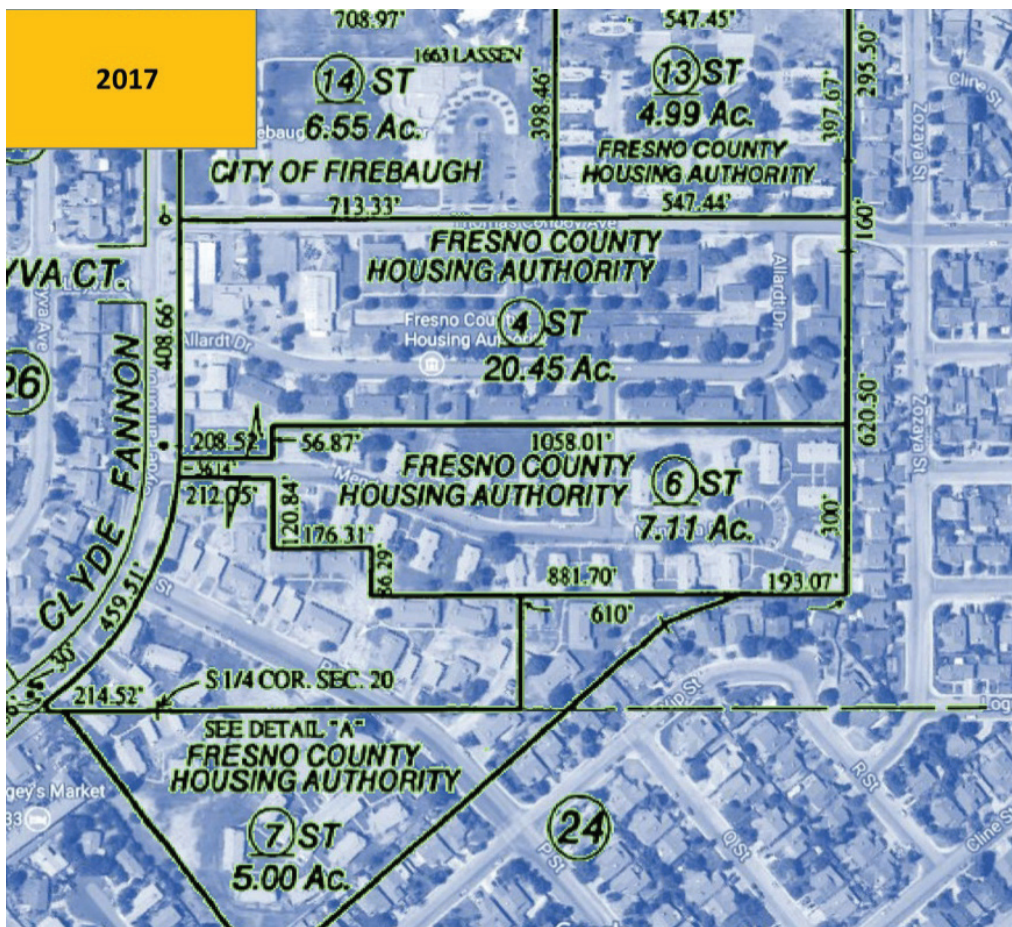
The eighth annual U.S. Department of Housing and Urban Development (HUD) Innovation in Affordable Housing (IAH) Student Design and Planning Competition challenged multidisciplinary graduate student teams to respond to an existing affordable housing design and planning issue. Teams are composed of graduate students in architecture, planning and policy, finance, business, and other disciplines. The competition challenges students to address social, economic, and environmental issues in responding to a specific housing development problem identified by a partnering public housing agency (PHA).

The overarching goal of the competition is to advance innovation in the design of affordable housing. The competitors' plans and designs must address the issues outlined by the partnering PHA. The designs should identify improvements that could be implemented at the site, and the plans must promote durability, reduce energy consumption, increase the quality of housing, and enhance the social and economic vitality of the surrounding community.

For the 2021 challenge, HUD partnered with the Fresno Housing Authority (FHA) in California. This year was the first year that HUD partnered with a rural site and provided the student teams with unique considerations and that added a layer of complexity. Teams were challenged to find innovative solutions to create a single, cohesive community from five contiguous properties in the city of Firebaugh (exhibit 1). The students were asked to redesign more than 210 units of workforce housing for farm laborers, migrant workers, senior citizens, and low-income families.

Exhibit 1

Fresno Housing's five contiguous properties, in the city of Firebaugh



Source: Fresno Housing

The Honorable Freddy Valdez, mayor of Firebaugh, describes the city of Firebaugh as a small, rural, working-class town based on agriculture, whose residents want to build more “walking and biking connections” and look forward to their community’s “transformation.” Michael Duarte, FHA’s chief real estate officer, also aspires to resolve challenges related to the lack of connectedness and encouraged teams to focus proposals around connecting residents of the city of Firebaugh with the larger Fresno community. Firebaugh, with its near-zero vacancy rate, has a severe housing shortage; therefore, students also had to consider implications for developing a feasible, affordable housing plan to include additional units for workers in Firebaugh’s agricultural industry.

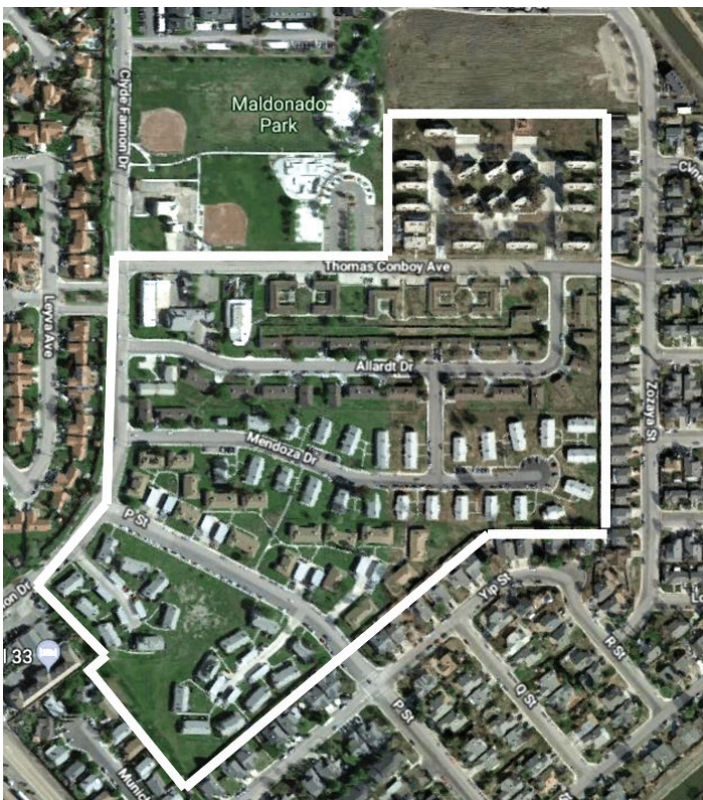
FHA has provided affordable housing to low-income individuals (including seniors, veterans, farmworkers, individuals with disabilities, and more) through various programs, services, and developments since 1940. The housing authority provides stable, quality, public, and affordable housing to more than 11,000 residents (including 5,500 children) and assists nearly 50,000

residents (including 24,000 children) among their housing profile (including public housing and housing choice voucher sites). Fresno Housing hopes to complete a vision that stitches the properties together, creating a fluid, walkable community. It sees “sensitivity to place” as an important part of design for all projects. This practice ensures that its properties include special features, such as architectural adornment, art in public spaces, community gardens, gathering areas, and other elements that enhance not only the sites themselves but the neighborhoods of which they are a part.

This year’s project site is a development with five contiguous properties, currently separated from each other by fencing and other barriers that prevent resident interaction and community living (exhibit 2). These barriers not only are physically unappealing but also contribute to the larger disconnectedness of the entire community. Current residents indicated that an ideal design plan would remove these barriers, add green space and recreational elements, and improve the infrastructure necessary to support a car-centric, rural community. The housing authority challenged teams to particularly consider innovative ways of incorporating and boosting resident engagement and to positively affect their quality of life, housing, and community.

Exhibit 2

Aerial view and site map outlining Fresno Housing’s five properties in the city of Firebaugh, California



Source: Fresno Housing

The competition is designed in two phases. In phase I, a jury of five practitioners (a planner, builder, real estate finance specialist, design expert, and architect) evaluated the first-round proposals submitted electronically by 28 graduate student teams. The jury deliberated on the 10 highest scoring teams to select the four finalist teams to move on to phase II of the competition. In phase II, the four teams further refined their proposals—addressing complex issues, incorporating more detail, improving their design plans, and conducting additional analyses on the financing needed to create viable housing, following a virtual site visit to Firebaugh, California.

The virtual site visit enabled the finalists to expand on their original proposals and submit a revised final project. A student commented that “the site visit was fantastic; I liked working with a mentor and the students in the other disciplines.” Another student remarked, “I really enjoyed that it was multidisciplinary; it was a fantastic experience to work with students from other programs/majors. School assignments don’t require that, and I loved the experience of collaborating (again, many school design assignments are individual) and of creating a project that was greater in scope than any one of us could do. I loved the experience of working on a project that actually exists and knowing that the client’s needs and the residents are real, so design considerations matter. I really appreciated how seriously the competition is handled. It did not feel like an unimportant engagement with students but a celebrated opportunity.”

Several weeks after the site visit, the four finalist teams presented their proposals, on April 14, 2021, at the virtual Presentation and Awards Ceremony. At that event, the finalist teams presented revised project plans to the panel of jurors and an audience. Audience members included staff of Fresno Housing, city officials, local community members, and HUD staff and leadership. The event was streamed live for public viewing. Each student team delivered a 20-minute presentation addressing how their plans respond to the economic, social, and environmental challenges of the development site. The students then had 10 minutes to field questions from jurors. Following the presentations, the jury selected the Pratt Institute and New York University team as the winner; the University of Michigan and Harvard University team was the runner-up.

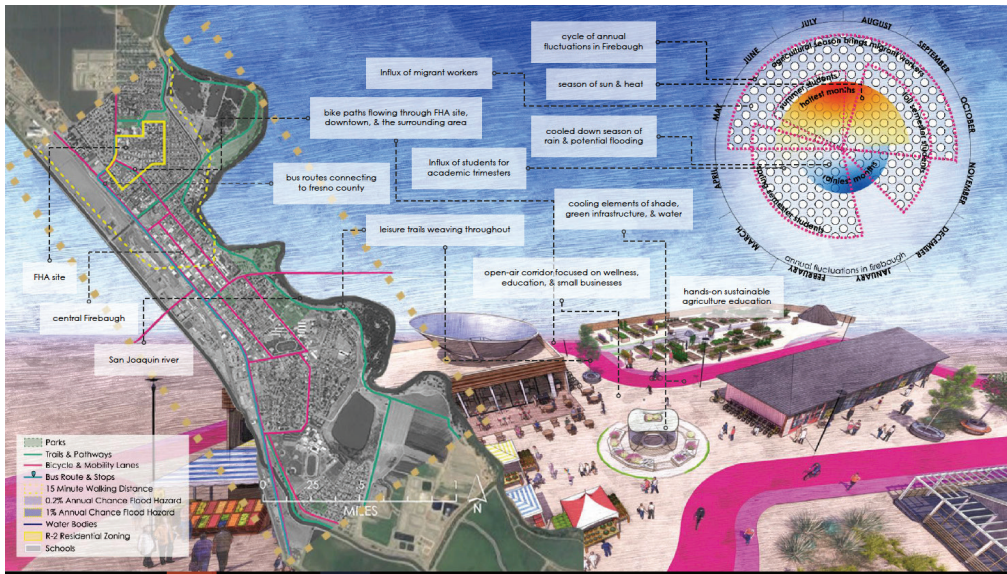
The competition jurors praised the winning team for their comprehensive financial package and their attention to innovation and environmental sustainability. All four finalist teams were addressed by Jenn Jones, chief of staff for HUD’s Office of the Secretary, who noted that “the students here today have made a case for new and forward-thinking strategies that help to expand affordable housing opportunities for all families through innovative design.” Jones congratulated all four finalist teams and commended the students for their hard work on behalf of Secretary Fudge. “We need your ideas, we need your creativity, and we need your energy if we are going to be able to meet the affordable housing challenges that we are seeing today. The Secretary and I are excited to see what you do next,” said Jones.

The Winning Team: Pratt Institute and New York University

Sabyasachi Das, Pankti Mehta, Nella Schools, Browne Sebright, Kats Tamanaha

Exhibit 3

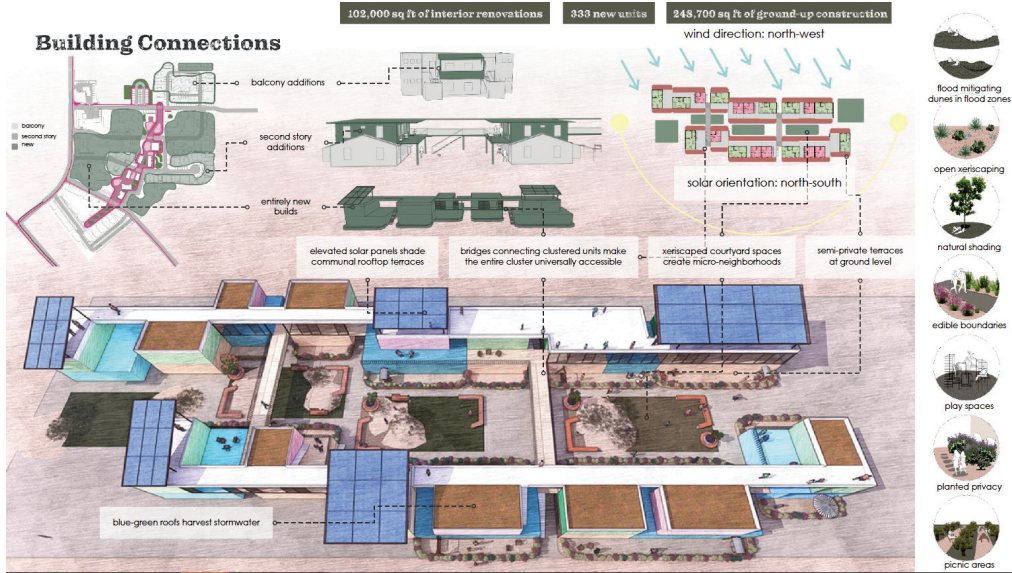
A Breathable Connected Community



The award-winning site plan from Pratt Institute and New York University, called *A Breathable Connected Community*, was inspired by the fluctuating rhythm of the city (exhibit 3). The plan would renovate 90 units and create an additional 351 new units, for a total of 441 units; 351 of those units will be affordable, at 50 percent or less than the area median income (AMI). The remaining 15 percent would be market-rate rentals. The total development cost for the project is a little over \$67 million.

Exhibit 4

A Breathable Connected Community's Building and Design Features



The team's design included three scales of buildings, ranging from minor upgrades to full rebuilds, using architectural features to create a second scale of microcommunity for buildings by shifting circulation and leisure outside—encouraging interaction between residents and facilitating time outdoors. The buildings are accessible through central courtyards and open-air hallways, allowing each unit to have an allotment of semiprivate outdoor space at their front door that is spacious enough to bring furniture into and enjoy as personal terraces. By linking units together, the design ensures that each new second-floor apartment is Americans with Disabilities Act (ADA)-accessible without requiring an excessive number of elevators. The design also allows for linked installation of maintenance and support systems. As with other farming communities, Firebaugh sees a seasonal influx of migrant workers during the summer months. The team proposed creating a new type of unit: a five-bedroom communal living unit with a shared common living and kitchen space and two bathrooms. The unit is designed to help create social connections and cultivate small microcommunities for the well-being of the workers.

Exhibit 5

Neighborhood Features, Community Amenities, and Sustainable Practices



The design focuses on sustainability by creating self-sustaining energy, water, and waste systems. Whether newly constructed or with minor renovations, each of the buildings will have solar shade canopies that are designed to provide enough energy generation to sustain buildings' energy needs. Along with front porches for each unit, the buildings feature a network of landscaped courtyards and rooftop terraces with solar shade canopies. The movable, permeable shading systems capture solar energy while allowing for dappled natural light and a cool breeze to fill these communal spaces. "Blue roof" designs collect the seasonal rainfall and store it underground to be used to irrigate the landscape. The design addresses environmental disparity by diminishing air pollution sources and integrating fresh air and physical fitness access, both of which are proven to increase lung capacity and mitigate the symptoms of asthma.

In addition, the design proposes integrating circular energy and waste systems into the site while minimizing water use, with potential for future extension into the larger community. The site will be electrified, with heating and cooling provided by electric heat pumps. Daily energy needs are met through rooftop solar panels, which will provide enough energy to meet 60 percent of the needs for the entire Firebaugh site. A proposed composting hub and biogas generator will be included to sustainably recycle 100 percent of the site's organic waste by providing onsite composting and biogas generation, which can be used for cooking in local restaurants and the solar kitchen.

To enhance the connectivity of the area, the community includes courtyards and a space with equipment for programmed activities, such as chess tables, jungle gyms, picnic tables, and soft landscapes for playing games, resting, or reading a book. The landscape is xeriscaped¹ to use as little water and to keep maintenance as low as possible. Activities that take longer periods of time, such

¹ Xeriscaping is landscaping or gardening that reduces or eliminates the need for irrigation or uses water-conserving techniques (drought-tolerant plants, mulch, etc.).

as reading or playing chess, are shaded either with the modular systems featured throughout the buildings or with native trees and at junction points with narrow pathways. Mid-sized, drought-tolerant trees such as fig, olive, or chaste will be planted to maintain visual privacy for interior units. Courtyards are featured in the flood zone area and are designed for flood mitigation.²

The community's common space and courtyards will be incorporated using three zones. The first zone will be for public uses, such as a health clinic, bodega, drugstore, barbershop, coffee shop, and rentable venue space that doubles as an indoor sports court. The second zone will be a citywide attraction and is connected to the site's agricultural history, with a large community garden plaza and outdoor dining area. The third zone features a new two-story building with a solar disk and roof deck that houses an entirely solar-powered community kitchen for affordable, innovative cooking, creating a community connected to others living close by and the larger city of Firebaugh.

Finally, the plan was unique because the team decided to use the current plans for La Joya Commons established by the housing authority, thus keeping the total construction costs manageable. Head Juror, Rob Hazelton, commented that "a combination of structure reuse and rebuild creates a realistic and feasible approach to the needs of the Firebaugh community while providing interconnectivity of multiple sites and demographics." The team's design incorporates breathability and permeability. The plan creates interconnected communities on three scales: the residences, the Fresno Housing Authority site, and the city of Firebaugh as a whole. Kia Weatherspoon, one of the jurors, praised the plan, saying, "It was small language tweaks and how they build a connection. And even the use of the building on top, to me, they could have played it safe, but they still did something very, very dynamic with this accessible walkway throughout that gave you a third space outside of just the traditional gardens and community areas and vegetation. I did love that they refreshed the interiors and the unit mix."

The Runner-Up Team: University of Michigan and Harvard University

Andrew Darvin, Avanti Krovi, Christopher Prinsen, Alexander Sulek, Katherine Wheeler

The University of Michigan and Harvard University's Tachi Creciente site was selected as the runner-up. Their development plan included 414 units across five properties, offering a mixture of affordable housing for farmworkers, seniors, and families (exhibit 6). The total cost of the development would equal \$98.9 million over 6.5 years. Named after the local tachi clay soil, Tachi Creciente will create an integrated, green, and service-enriched community by promoting social cohesion, health, digital inclusion, educational achievement, and workforce development. The plan incorporates innovative cross-sector partnership models, financing mechanisms, sustainable features, and design components that complement the local context.

² Small protective dunes are created by removing earth in the flood zone and aggregating it in mounds, diverting floodwater away from buildings.

Exhibit 6

Tachi Creciente Community Plan and Proposed Site Map



The plan will establish several community amenities, including a green corridor, the “AgTech Exposition and Education Center,” new Fresno Housing Authority offices, media center, fitness center, art center, computer lab, flexible green space, a system of scattered Wi-Fi mesh networks, and more. The team placed a specific focus on digital literacy, identifying that the agricultural industry routinely uses sophisticated technologies to help them become more profitable, efficient, safe, and sustainable. The development allows for the expansion of digital inclusion and digital literacy to improve access to job pipelines in a region seeking to become the leader in agricultural technology (AgTech), and the plan aims to meet community needs for robust educational and workforce development opportunities in Firebaugh.

Exhibit 7

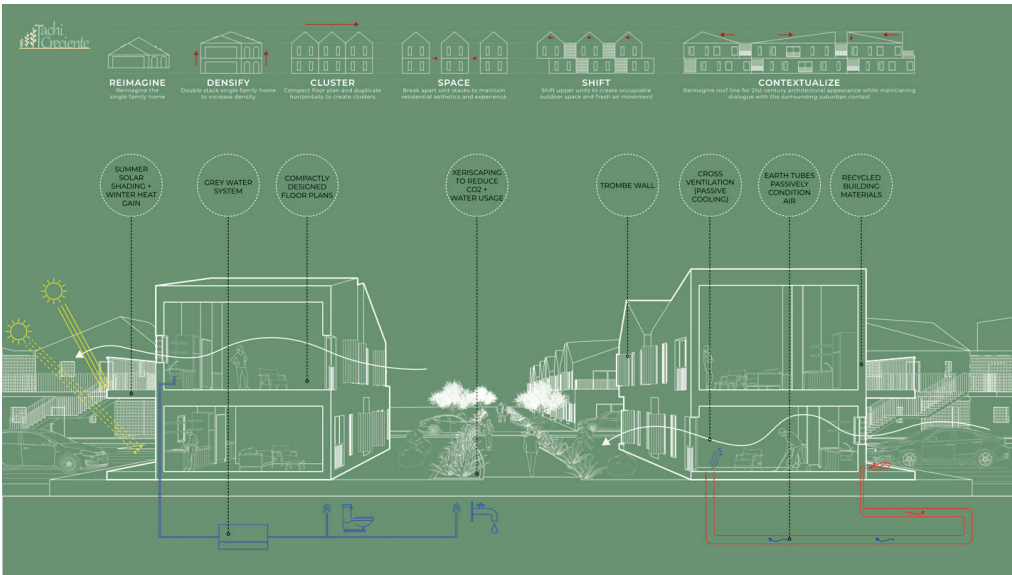
Migrant, Senior, and Multifamily Housing Unit Typologies



Tachi Creciente embraces three housing typologies: migrant, senior, and multifamily units. All units feature outdoor living spaces and are intentionally designed to rethink single-family home typology while maintaining the residential feel, at a density that adheres to Firebaugh's growth strategy (exhibit 7). All housing units will incorporate the following five architectural design features: (1) the single-family home is stacked to increase density; (2) the floor plan is compacted and duplicated horizontally to create clusters; (3) the units are spaced slightly apart to maintain residential aesthetics and experience; (4) the upper-level units are shifted to create occupiable terraces and fresh air movement; and (5) the roofline is reimagined for 21st-century architectural appearance while maintaining dialogue with the surrounding suburban context holistically. The five design features allow the development to maximize spatial efficiency, improve housing density, and, most importantly, create a better sense of place (exhibit 8).

Exhibit 8

Architecture and Design Features



Tachi Creciente emphasized providing affordable housing and building a sustainable community. The team proposed housing that is integrated with social and economic opportunities, such as a walkable and bikeable green corridor, and incorporated sustainable design practices for climate-smart communities. Those practices focused on reducing carbon emissions and resource consumption while enhancing local air quality. For example, the green corridor will use xeriscaping, a low-water landscaping method, to reduce carbon emissions. In addition, community centers are topped with solar panels to harness renewable energy. Overall energy consumption is minimized by the use of exterior circulation as a shading mechanism to block sun rays during the cooling season and allow sunlight to filter in through windows. During the heating season, temperature controls are passively managed through cross-ventilation features in earth tubes. The earth tubes take the outdoor air, filter it, and condition it underground to comfortable temperatures. Concerns around water scarcity were addressed by implementing a gray-water system that treats and reuses water from sanitary functions to be used as a toilet and garden water supply.

The team's financial plan leverages a range of financing, including rental assistance demonstration (RAD), Section 18 demolition and disposition funds, and various state and local resources. The plan estimates that the incorporation of energy-efficient community amenities will generate \$5.2 million in net cash flow over 10 years for the FHA. The team proposed a cost-savings program, powered in part by solar energy and leveraging a state subsidy program incentivizing solar in multifamily affordable housing. The utility cost savings for these properties are estimated to generate an additional \$1.1 million and avoid more than 3,600 metric tons in net carbon emissions. Head Juror, Rob Hazelton, noted that he "like[d] the RAD/SAC [Special Applications Center] blend" and that the team was "the only ones that understood that complex financing scheme."

Thoughts from the Jury

Rob Hazelton (Head Juror), Stephen D. Bender, Jaime Bordenave, Michael Eriksen, Karl Schoettler, and Kia Weatherspoon

The jury for the 2021 IAH Student Design and Planning Competition faced the difficult task of deciding which of the four outstanding finalist team site plans best exemplified an innovative design. The members were asked specifically to consider how well the student teams successfully and convincingly addressed the following critical elements:

- Is the proposed design reasonable and feasible in its design and planning, demonstrating knowledge and understanding of building codes and zoning?
- Is the proposed design resilient and environmentally responsive to the local climate?
- Does the proposed design demonstrate knowledge and understanding of codes and zoning?
- Is the proposed solution affordable (cost effective to construct and operate)?
- Does the design innovate in a way that integrates the design into the neighborhood and community?
- Does the design promote social responsiveness, such as creating a sense of neighborhood or cohesive community, facilitating access to employment and services, addressing accessibility, and demonstrating the opportunity for social networking, ownership, and comfort?
- Is the approach innovative in all aspects of the solution (for example, planning, design, construction, environmental concerns, and durability)?
- Does the proposal recommend innovative strategies in addressing the needs of migrant farmworkers, seniors, and families?
- Were innovative approaches employed to integrate the design into the neighborhood and community?

The jurors found that two of the four team proposals addressed nearly all the items discussed previously clearly and with forethought. Jurors narrowed down the four finalist projects, then narrowed their choice further between the Pratt Institute and New York University team and the University of Michigan and Harvard team. The jurors noted that this year's decision was both difficult and very close, but the deciding factor was that the winning team cleverly incorporated the reuse of existing structures at La Joya Commons, thereby saving on development budgeting, which set the Pratt Institute and New York University team apart as the clear winner.

Jury members identified several elements of the winning plan that not only met all the criteria but also took other innovative approaches. Rob Hazelton, Head Juror and the CEO of Dominion Due Diligence Group, noted that the winning team from the Pratt Institute and New York University “is the only team that reused La Joya Commons, which the housing authority has already invested about \$1.4 million into [for] redevelopment efforts, plans, designs, and approvals. They actually

reuse that plan. I appreciate that. They really thought about reuse and rebuild very purposefully. Their financial plan was also very purposeful. I believe this was the most innovative design we were presented with; it was a breathable full-blown community.” The jury decided that the Pratt Institute and New York University site plan uniquely addressed the intergenerational and agricultural needs of the community and paid special attention to environmental sustainability.

Mr. Michael Duarte, Chief Real Estate Officer at Fresno Housing, also commended the students’ hard work and contribution to finding innovative solutions to affordable housing challenges in the rural community of Firebaugh: “Our team was impressed with each of the final four presentations and offers our congratulations to the Pratt Institute/New York University team who innovatively incorporated feedback from residents and local experts into their final project. We look forward to reviewing the proposal in greater detail and working with the Firebaugh community to determine if this inclusive vision can be implemented.”

Acknowledgments and Honorable Mentions

The U.S. Department of Housing and Urban Development (HUD) thanks the award-winning students from the Pratt Institute and New York University Team and the University of Michigan and Harvard Team for sharing their thoughts and for all the hard work they put into their submissions for this year’s competition. We also thank the remaining two finalist teams who participated this year—from Columbia University and University of Michigan—Ann Arbor.

Columbia University—*Nueva Vista*’s design centered around fostering community interaction, both within and outside the neighborhood. The site plan included adding a new playground and a community center with daycare services, athletic facilities, and services for seniors. Uniquely, this team’s housing unit typologies consisted of bar housing, senior housing, and fourplexes—all designed for modular construction.

University of Michigan—*Colectivo Camino de Tule*, named after the reed native to the Central Valley of California, highlighted the area’s rich natural features, its unique climate, and the community’s connections to agriculture. The design incorporated a network of public spaces throughout the site to foster the development of social capital, provide important community amenities, create areas for interaction, and foster a cohesive neighborhood identity.

HUD would like to acknowledge and commend all 28 student teams who participated in the 2021 IAH Student Design and Planning Competition. Although only four teams are selected as finalists, six additional teams submitted plans were considered outstanding and ranked among the top ten proposals by the jurors. Those student teams are as follows, in chronological order by assigned team number:

Northwestern University and Harvard University (*team: KSMGSD*)—*Canopy Commons* features a central multiuse path network that meanders through gardens and public spaces while providing opportunities for community enrichment. The proposal limits

environmental impact, preserving and rehabilitating many units while incorporating a palette of native plantings to the public space, thereby reducing irrigation infrastructure and costs.

University of California Berkeley (*team*: Gold)—*Pueblo Unido* is designed to maximize connectivity, doing so through layout, architecture, and programming conceptualized to integrate populations within the site and with the larger Firebaugh community. The plan features a central plaza featuring two community and education centers, central office space, two recreation areas, and a central promenade.

University of Southern California—*Firebaugh First* aims to recharge the land and community members and is guided by values of sustainability and resident empowerment. The proposal focuses on rejuvenating Firebaugh through affordable and dignified public housing, amenities, sustainable infrastructure, to create an active and sustainable community.

Ball State and University of California Los Angeles (*team*: A Better Tomorrow)—*Boca del Sol* is a place that invites the community to interact with their neighbors using a dramatic shift of scale between types of housing in this design to create little neighborhoods.

Stanford University—*Trellis Parkis* was designed around three core values: community resilience, practical sustainability, and scalable affordability. The community includes many strategies for increasing social benefits, such as central walkways to knit together the various sites, affordable digital access for residents, financial awareness courses, and other programs.

University of Miami and University of South Carolina (*team*: MAPSE)—*Paseo Verde* creates an environment to help families from a diversity of locations build a community by expanding access to sidewalks and walkways, limiting vehicles to a few roads and centralized parking areas. Instead of fences to separate apartments and houses, trees and plants are used to mark property boundaries and dividers between units.

HUD greatly appreciates the 2021 Innovative Affordable Housing jury members' dedication and hours devoted to the award selection process. Finally, HUD thanks Schatz Publishing Group, LLC for planning and logistics efforts under the constraints of the COVID-19 pandemic. Their hard work and flexibility made this year's competition a success.

Author

Alaina Stern is in the Affordable Housing Research and Technology Division of the U.S. Department of Housing and Urban Development.

Postscript

The competition is thoroughly documented on the Web.

To learn more about the award: <https://www.huduser.gov/portal/challenge/home.html>.

To read about the 2021 design guidelines: https://www.huduser.gov/portal/sites/default/files/pdf/IAH_2021_Planning_Design_Criteria.pdf.