Project Refuge

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Project Refuge is an ongoing project involving the congregation of the Iglesia Cristiana El Buen Pastor in Mesa, Arizona, the City of Scottsdale, and students and faculty at Arizona State University and the University of Washington in the United States. This submission highlights the benefits and lessons learned of student contributions to real-world community-based design project.

CONTEXT

Maricopa County is one of the fastest growing metropolitan regions in the United States. It is also a region, due to extreme heat, that faces the distinct prospect of becoming uninhabitable by the end of this century. This is due to the fact that much of the recent growth in residential construction across the 2,000 square miles of suburban sprawl consists of buildings that are unsuited for an extreme desert environment. Postwar construction in the region relied on block - specifically slump block - which performs more similarly to earthen block construction and is more suitable to the region. Due to cost and a now relatively inexperienced labor force, more recent residential construction in the region is insulated wooden stick-frame wrapped in plywood and then covered with stucco or paint to mimic southwest "styles," which only contributes to the region's dependency on imported resources and mechanical systems for heating and cooling year-round. Ironically, much of the recent housing stock mimics the appearance of traditional adobe construction.

By contrast, earthen construction provides a buffer against outdoor temperature fluctuations and has the capacity to absorb, store, and radiate heat to temper indoor ambient environments. Early inhabitants, such as the Ancestral Sonoran Desert People, and later Spanish missionaries, relied on these properties to shelter from the harsh climate of the Sonoran Desert. Today, however, only a handful of historic adobe structures still stand in the city. Expanding the application of earth-based construction is often limited by complex circumstances resulting from building regulations, lack of familiarity, and the need for skilled labor. Despite these hurdles, climate change and a greater demand for healthier buildings is fostering renewed interest in the use of minimally processed and transported construction materials, with earthen construction seeing a revival. It is still mostly relegated, however, to expensive residential construction and boutique applications.

BRICK BY BRICK

The City of Scottsdale, Arizona administers a program called "Brick by Brick" that employs people experiencing homelessness to produce compressed earth blocks. The program is run by the Health and Human Services division of the city and was intended to help an at-risk population transition to more secure housing. Each weekend a crew of about seven to ten people would gather to produce blocks, be paid to do so, and then given support to find transitional housing. The blocks are produced with local soil using an Aurum 3000 block press. The soil is mixed with Portland cement and water. Measuring roughly ten inches square and four inches thick, the bricks take roughly three weeks to cure. Once cured, the compressive strength of the blocks is similar to a concrete block. They are distinct from adobe blocks in that they do not dissolve when exposed to water.

The Health and Human Services division had intended to use the compressed earth block for capital projects for the City of Scottsdale. That has not yet happened and, as a result, there is a surplus of blocks. In August of 2022, the authors of this paper, Elizabeth Golden and Marc Neveu, met with Mike Lopach and Greg Bestgen from the Health and Human Services division to learn more about the brick fabrication process and to discuss a possible collaboration between the City and our respective universities. When it was disclosed that there was not yet a plan to use the blocks at building scale, we tabled our initial idea of running a studio to develop housing typologies for the Valley using compressed earth blocks. However, in that discussion, we were introduced to another program in Mesa, Arizona that has an immediate need for housing.

IGLESIA CRISTIANA EL BUEN PASTOR

Iglesia Cristiana El Buen Pastor is a Spanish-speaking church located in Mesa, Arizona that has been providing shelter and supportive services to newly processed and released asylum seekers since 2018. Pastor Ramirez and volunteers from the

Figure 1. Students making bricks at Brick by Brick. Photo by author.

Figure 2. Existing bathrooms at the Iglesia. Photo by author.

congregation typically host 30 to 40 people each week. Asylum seekers are brought to the church from border facilities by US Immigration and Customs Enforcement. Many have been traveling for weeks with little food or shelter. Upon arrival at the church, they are offered a meal, clean clothing, a shower, and medical care. Church volunteers also assist with making connections (transportation and communication), so the asylum seekers are able to travel on to their final destinations. If the asylum seekers are unable to make travel connections the same day they arrive, the church provides shelter on-site until they can make travel connections. Shelter space is makeshift and limited. People currently sleep on cots in the church sanctuary and in classrooms. As of September 13th, 2023, the US Border Control has been releasing asylum seekers directly into southern Arizona communities due to increasing overcapacity at border facilities. A number of nonprofits have stepped up to support these “street releases” to prevent asylum seekers from being released without transportation, shelter, or resources. Iglesia Cristiana El Buen Pastor is one of these organizations providing crucial assistance to a population that is at risk of remaining unhoused in Arizona.

The church campus includes three buildings - the sanctuary, a combined kitchen and bathroom space, and a bar of offices and classrooms. The buildings surround a covered courtyard that acts as the central meeting space and dining hall for the campus. On site there is a large parking lot, a play area for children, and a makeshift soccer field. The church is adjacent to Kleinman Park, which is known for drug activity and homeless encampments. The congregation is about thirty people and supports the asylee program through donations and volunteer work as well as other programs that deliver food and clothing to those in need.

UNIVERSITY OF WASHINGTON / ARIZONA STATE UNIVERSITY

After meeting with Pastor Ramirez, we proposed to run a pair of design studios to explore the possibility of a shelter on the church site to temporarily house asylees in a shelter constructed with compressed earth blocks. The fourth-year undergraduate studios ran in the winter of 2023. In January, students from Seattle flew to Phoenix for a long weekend. While in Arizona, students made blocks, met with Pastor Ramirez and his congregation, toured the site, and then spent a day working collaboratively to develop the program, site strategies, and project priorities.

Students very quickly recognized that this was a different sort of studio than they had taken previously. For many of the students at ASU, their previous studio project was sited on Mars, for example. And while the UW students had previous exposure to a number of studio projects on “real” sites, the students noted the immediacy and limitations of a program serving people in need. One student joked at the beginning of the quarter that it was not an “Architecture with a capital

A project," which started a heated debate in the studio. After visiting the church, and being (good naturedly) made to climb "A" Mountain at ASU by their peers, they relented, but the discussion about the role of architecture and who benefits from design would continue for the remainder of the project. The pairing with students in another university was also a new experience. To further complicate the studios, one began a week earlier than the other and was a ten week quarter, not a fifteen week semester. The first few group reviews were held on Miro and were glitchy. After about six weeks, the studios completed the projects separately.

Notwithstanding the technical and scheduling issues, the students at each university developed ideas that were similar. Basic issues of safety and security were developed architecturally, but so too were bigger questions. How, for example, can architecture provide shelter to a constantly changing community from an incredibly diverse background? Given the scarcity of resources, how can indoor spaces help to define outdoor rooms? How does the new building interact with the existing church campus? What is the role of the landscape in creating livable spaces that do not overburden the budget of the church? How does one build sustainably in such a harsh environment? The tectonics of the compressed earth block was explored, as was the massing of the proposed shelters.

At the conclusion of the studio, Pastor Ramirez asked what it would take to actually build the project.

Figure 3. Student charette at ASU. Photo by author.

PROJECT REFUGE

Since the conclusion of the studio, Elizabeth Golden and Marc Neveu have designed a simplified version of the shelter, based on the studies completed in the studio. The new building will offer short-term housing as well as additional shower and restroom facilities for asylees (individuals and families). The project leverages overhead shading and vertical screens on the south and west to minimize solar heat gain, reducing the need for air conditioning; thermal mass provided by the compressed earth block also helps to maintain cooler temperatures during the hottest part of the day. Openings in the facade are positioned to support night-flush passive ventilation. Monsoon rainwater is harvested and used to irrigate native Sonoran plants and trees, increasing the amount of shade on-site and creating a cooler microclimate around the building.

We have met with the city of Mesa Planning Department as well as city Building Inspectors. The site will need to be rezoned, and pass a series of review boards. The building will be the first compressed earth block structure in Arizona and will require additional testing to get a building permit. A site survey, structural calculations, and cost estimatng are being prepared pro bono. We have recently applied for a two million dollar grant from the State of Arizona to fund the construction of the project and the related services offered by the church community.

Figure 4. Pastor Hector speaking with students. Photo by author.

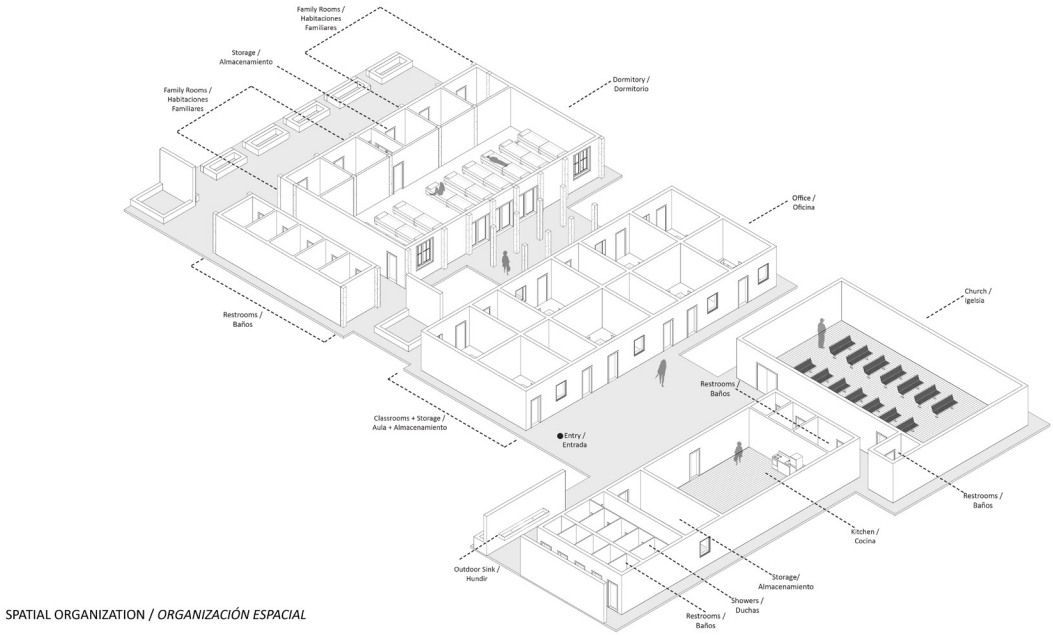

Figure 5. Project axonometric. Image by Jerry Chen and Hayoung Jung.

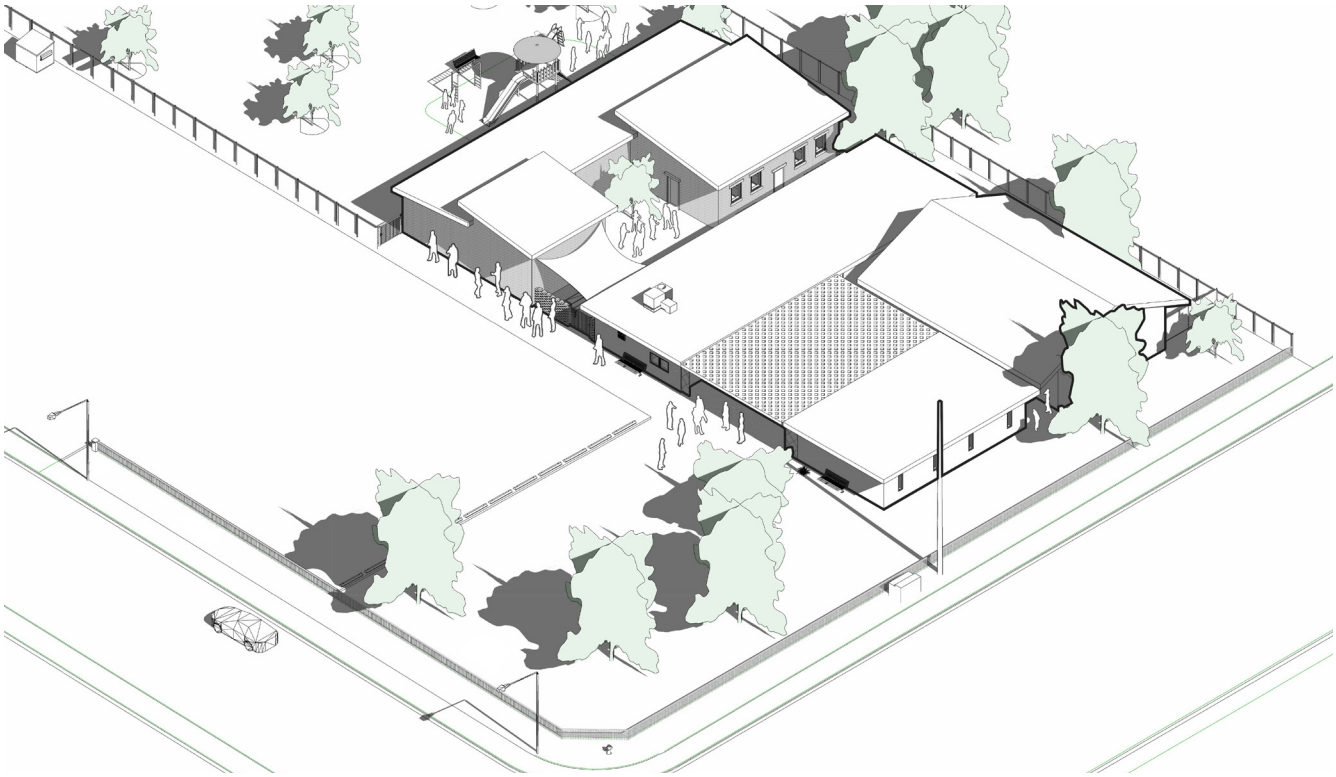

Figure 6. Project axonometric. Image by Maryisa Oliva, Eryk Ostrowski, Christian Perez, and Angel Villaba.

Figure 7. Entry to project. Image by Megan Sun and Joy Christensen.

Figure 8. Entry to project. Image by Conner Ettinger and Maiya Yeoman.

LESSONS LEARNED

The project began as a material study of compressed earth block construction in the southwest. What evolved from the first conversations could not have been predicted. For the next iteration of the studio, we plan to be much more intentional about how the students from each university work together. That may mean finding a platform other than Miro and designing the interactions more carefully. Another addition would be faculty from other but related disciplines. Sorting out the cost, the planning, and the construction with the students would be a more valuable experience than trying to do so after the studio ended. The tectonics of compressed earth blocks pose some challenges, but there could be a much deeper dive into their normative behavior to then explore what else the bricks can do. Finally, a look into the funding mechanisms and sources would be very valuable. No matter how interesting the project may be, nothing happens without funding.

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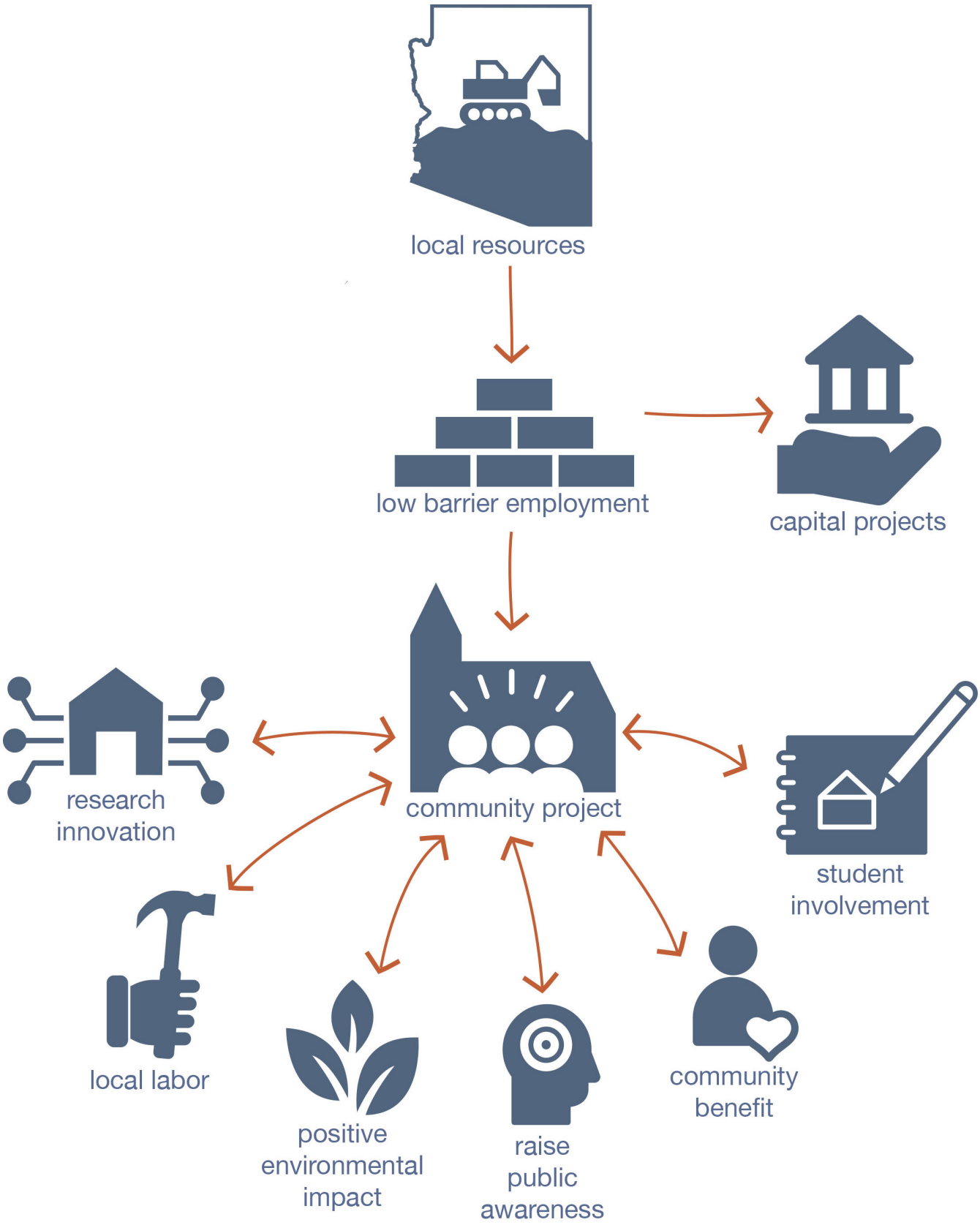

Figure 9. Project Diagram. Image by author.