Homes for the People:

How to Design Quality Housing for the 1.6 Billion People Who Need It

Fig. 1. Shigeru Ban, residents outside their home, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

I have a home, here in America. My 300 ft^2 apartment above a garage in Birmingham, Alabama keeps me safe and healthy, allows me to be an active member of my community, and grants me the opportunity to make meaningful contributions to society. Durable construction protects me from the elements, a sensible layout accommodates all the amenities needed for daily life, and a good location provides access to commercial centers where I can work and shop on a daily basis. These attributes seem like basic requirements for any home, but the reality is that over 1.6 billion people in our world today live

without these necessities. Unfortunately, that number is expected to rise. This problem is known as the global housing crisis, and it is this very problem that I am seeking to resolve through my research on affordable housing (Garemo, 2014).

The study of affordable housing encompasses a wide variety of topics. One issue is housing policy and the political, social, and economic factors that affect the affordability of a home. Another matter is the design and construction of the home, factors directly under the influence of the architect. My research focuses on these issues. How can a home meet the needs of its residents and community while also maintaining low construction costs? How can affordable housing escape the negative connotations associated with failed projects from the past? Beyond providing basic necessities, how can affordable housing provide desirable and inspiring places in which to live? With these questions in mind, I selected as case studies four projects from around the world that represent innovative approaches to affordable housing: Villa Verde by ELEMENTAL in Constitución, Chile; Post-Tsunami Housing by Shigeru Ban in Kirinda, Sri Lanka; Buchheimer Weg by ASTOC Architects and Planners in Cologne, Germany; and Social Housing in Sa Pobla by RIPOLLTIZON Architects in Mallorca, Spain.

Researching these four projects over the course of the year included two and a half months of travel during the summer to visit each project, meet with the architects, interview residents, and observe the communities. Documentation of each neighborhood was carried out primarily through diagrams, sketches, mappings, and photographs taken while on site. Interviews with architects,

residents, and other community members provided valuable insight on each project, and audio recordings of these conversations will allow each one to be revisited. A stop at the Venice Biennale during the Urban Age Conference gave me the chance to hear Alejandro Aravena, curator of this year's exhibition, speak about his work with incremental housing and the great need for quality affordable homes. This year's theme, *Reporting from the Front*, showcased how architecture can respond to the challenges of today's world, highlighting issues such as scarcity, inequality, sustainability, and community — issues highly relevant to the study of affordable housing.

Upon returning from my on-site investigation, I began the process of cataloguing and analyzing the collected data. As I sorted through my findings for each project, an overarching theme emerged. The most successful projects paid attention not only to the design of individual homes, but also to the design of the entire neighborhood. While visiting these four projects, I realized that the way homes are arranged within each complex can either create or inhibit community. I observed how a project's location in relation to the surrounding context can have a profound impact on residents' everyday life. I also came to understand how providing active public spaces is a key determinant for the success of an affordable housing project. These and other realizations helped me identify seven key areas of consideration when designing affordable housing:

1. Siting
2. Neighborhood Layout
3. Public Space
4. Thresholds
5. Private Space
6. Details
7. Purpose

I will use these seven characteristics as the lens through which to analyze each of the four projects selected for research. It is my hope that through this analysis, architects will have a better understanding of how to provide quality affordable housing for those who need it.

Villa Verde

Fig. 1. ELEMENTAL, front elevations, Villa Verde, Constitución, Chile, 2010.

The first project selected for research is Villa Verde, a neighborhood of affordable homes in Constitución, Chile. These homes were designed by the Santiago-based firm, ELEMENTAL, whose founder, Alejandro Aravena, recently won the Pritzker Prize. Villa Verde is part of an ongoing study for a new type of housing designed to grow with residents' needs. This approach, known as 'incremental design,' reduces initial purchasing costs for the homeowner by providing only the most necessary parts of a house, while leaving the rest to be completed according to the owner's needs and budget. ELEMENTAL refers to this method as providing "half of a good house." The framework for

the entire home is constructed, but only the most important half—including the kitchen, bathroom, and two bedrooms—is completed. For some residents, no additional construction is necessary. Those who need more space and can afford its construction will find room to add a separate living/dining area and two extra bedrooms. This approach not only makes owning a home more affordable, but also grants residents the possibility to customize the final product and strengthen their sense of ownership (ELEMENTAL, 2016).

At Villa Verde, this approach has produced promising results. As of May 2016, six years after the project's completion in 2010, 85% of residents have built out the second half of their house, effectively completing the home. On any fair-weathered Sunday afternoon, you will likely find residents out working on their homes—pouring a concrete floor, installing a window, or planting a new tree in the front yard. This activity brings life and a sense of optimism to the community, announcing a brighter future.

Villa Verde demonstrates that incremental design can be a successful approach to providing affordable housing. However, a closer look reveals other issues in the neighborhood, such as an isolated location and a lack of meaningful public space. An analysis that utilizes the framework discussed previously helps us learn from the project's successes and failures.

Siting

Fig. 2. ELEMENTAL, aerial view of project in context, Villa Verde, Constitución, Chile, 2010.

The community of Villa Verde is located on a hill, three kilometers from the center of town. Land that was once occupied by forest is now the site of 466 homes with more construction on the way. The road leading to Villa Verde winds up the hillside, leaving town and passing through the quiet residential area of Villa Copihue before terminating at Villa Verde. This relatively remote location is both an asset and a liability for the residents of Villa Verde.

During interviews, residents mentioned the peace and quiet as their favorite thing about living at Villa Verde. Its position at the end of the road in a residential area means few outsiders wander through the neighborhood. Fewer strangers mean a greater sense of safety and security for residents, a key concern in establishing a healthy living environment. All residents who were surveyed reported

feeling safe in their neighborhood, and many children could be found playing outside, unaccompanied by an adult.

In addition to the sense of tranquility, another benefit to Villa Verde's siting is its natural scenery. The neighborhood is surrounded by forested hills, and just a few hundred yards to the west, steep cliffs drop to the Pacific Ocean. Trails to the shoreline give residents easy access to the beach, and homes along the main road take in sweeping views of the town below. Ocean access, scenic views, and

Fig. 3. ELEMENTAL, natural scenery, Villa Verde, Constitución, Chile, 2010.

fresh air are some of the benefits to Villa Verde's remote location. However, these amenities come with a cost.

When asked about the economics of living at Villa Verde, residents praised the affordable price tag of their incremental homes, which were designed to be purchased for the equivalent of $25,000 USD, although many residents pay less thanks to government subsidies. However, residents also complained about the long distance required to travel to town for shopping and daily errands. For residents who do not own a vehicle, a distance of three kilometers and over 400 feet of elevation change make walking to and from town difficult, even more so if carrying groceries or other necessities. This dilemma has led residents to rely on *collectivas*—or shared taxis—for daily transportation. A ride to town costs approximately 1500 pesos, or

$2.25 per person. A return trip costs 3000 pesos. This expense adds up, and for residents like Carmen, is one of the drawbacks to living at Villa Verde. She remembers living in town, where she could easily walk to the store and pay a reasonable price for everyday items. At Villa Verde, her options are not as economical. However, thanks to her entrepreneurial neighbors, there are alternatives.

Fig. 4. ELEMENTAL, Carmen, Villa Verde, Constitución, Chile, 2010.

With no commercial centers nearby, some residents recognized the need for convenient access to commonly used items and opened up small shops in the second half of their homes. Seven such stores have opened in Villa Verde. Although these neighborhood shops offer a more

Fig. 5. ELEMENTAL, neighborhood stores, Villa Verde, Constitución, Chile, 2010.

convenient option than traveling to town, their prices are considerably higher. Carmen reports paying 500 pesos for a kilogram of sugar in town while paying 800 to 900 pesos at the stores in Villa Verde. With limited mobility, residents of Villa Verde can do little to overcome the obstacles of an isolated location. This example demonstrates the importance of considering not only the affordability of the home, but also the economics of residents' daily lives when siting affordable housing.

Neighborhood Layout

Fig. 6. ELEMENTAL, site plan, Villa Verde, Constitución, Chile, 2010.

Villa Verde is organized along two parallel streets running the length of the neighborhood. Río Maule is the main road into Villa

Verde while Río Loncomilla receives a lower volume of traffic. When considering how to layout hundreds of homes at Villa Verde, ELEMENTAL wanted to ensure the scale of the neighborhood would not inhibit resident's ability to create meaningful community. Their solution was to break down the neighborhood into smaller groupings of 12-20 homes arranged along side streets branching off the main roads. Typically, a row of eight homes lines either side of these tertiary streets, capped by three homes aligned perpendicular to the others. Additionally, groupings of four homes front onto Río Maule and Río Loncomilla, in some cases along only one side of the street and in others along both.

Benefits to this layout include an efficient use of space and reduced construction costs by allowing adjacent homes to share walls. Common dividing walls also make the homes sturdier than if they stood alone. Arranging the homes into smaller groupings has proved effective in creating a neighborly atmosphere in which residents feel free to interact outside the home. On the side roads, children often use the street as their own play areas while parents look on from the house. Residents who

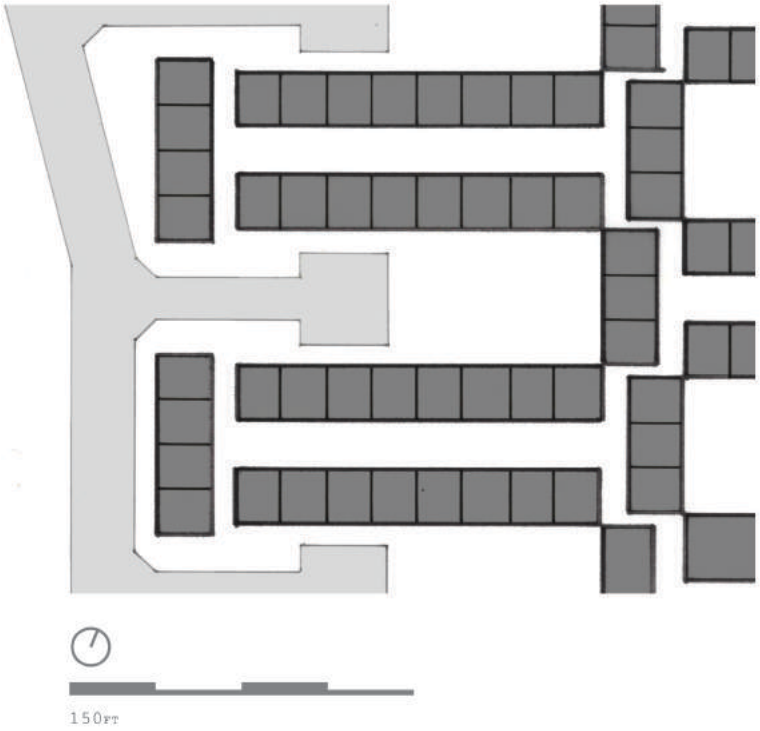

Fig. 7. ELEMENTAL, housing cluster, Villa Verde, Constitución, Chile, 2010.

were interviewed reported knowing their neighbors, although they did not necessarily get along. Still, it is not uncommon to see residents walking between houses, visiting friends in the neighborhood. Such success in the areas of community and efficiency is not unique to Villa Verde. Many affordable housing developments are laid out in a similar manner for the same reasons. However, these efficiency-driven layouts are not without their downfalls.

Villa Verde's layout falls short in the areas of variety and hierarchy. When walking through the neighborhood, it can be difficult to differentiate between the many side streets branching off of Río Maule and Río Loncomilla. Each side road is nearly identical to the next, and as the homes are very similar, it is easy to become disoriented. Additionally, the repetitive nature of both the houses and the layout makes traversing through the twenty-one acre site a dull and monotonous experience. Introducing some variety or breaking the pattern occasionally would add interest and value to the neighborhood, and incorporating recognizable landmarks would help with wayfinding (Lynch, 1960). Often, affordable housing projects can be easily identified by their repetitive and uninspiring layouts. A good opportunity to add a sense of quality to the project is in giving more attention to the arrangement of homes within the neighborhood.

Fig. 8. ELEMENTAL, elevations along Rio Loncomilla looking east, Villa Verde, Constitución, Chile, 2010.

Another missed opportunity at Villa Verde is the lack of a focal point. The rows of houses continue, one after another, without ever

arriving at a destination. Providing something as simple as an open space that could serve as a ‘town square’ would not only give the neighborhood a visual focus, it would also provide the community with a valuable gathering space. Good public space, noticeably absent from Villa Verde, is crucial to the creation of a thriving social housing project.

Public Space

Quality public space provides a wealth of benefits to its community. Parks, plazas, and green spaces make an area more livable, giving users the chance to enjoy nature, good company, or a nice place to sit. They help promote healthy lifestyles and strong communities. Public space also increases nearby property and land values (Carmona, 2014). For these and other reasons, well-designed public spaces should be included in any housing project.

Fig. 9. ELEMENTAL, public space, Villa Verde, Constitución, Chile, 2010.

At Villa Verde, quality public space is difficult to find. The original intention of the designers was to provide a small square at the end of each side street to serve this purpose. Unfortunately, these approximately 2600 ft^2 yards have been taken over by residents looking for a more convenient parking spot—one directly in front of their home rather than in the spaces provided 100 feet away. Vehicular traffic has turned most of these yards into sparse plots of dirt ringed by narrow sidewalks and a few scattered benches. Other shared spaces at Villa

Fig. 10. ELEMENTAL, communal yard, Villa Verde, Constitución, Chile, 2010.

Verde have not fared much better.

A small playground sits on some leftover space along Río Maule. The equipment is still in good condition, but without a ground covering, the dirt beneath turns to mud after a rain, and the playground is of little use. Across the street and up a steep embankment lies another play area for younger users. This is one of the nicest examples of public space in the neighborhood and is frequently used by Villa Verde's younger residents. Unfortunately, its small size and inaccessible location prevent it from becoming anything more than a play area for kids. Down the hill and across the street is another shared space—a paved and enclosed multipurpose court that serves as the neighborhood's soccer arena. It receives frequent use and is a welcome addition to the neighborhood. Finally, there are three small community centers spread across Villa Verde. One is used as a daycare center, while the others are reserved for community meetings and events.

Fig. 11. ELEMENTAL, unused playground, Villa Verde, Constitución, Chile, 2010.

Fig. 12. ELEMENTAL, isolated playground, Villa Verde, Constitución, Chile, 2010.

Clearly, efforts were made to provide the citizens of Villa Verde with common spaces, the most successful of which are used by the

neighborhood's younger population. What is missing is a larger space that could help bring all of Villa Verde's residents together. A central green space featuring a large lawn, sitting areas, a playground, and an adjacent basketball/soccer court would do more for this community than the fragmented offerings currently in place.

Fig. 13. ELEMENTAL, multipurpose court, Villa Verde, Constitución, Chile, 2010.

Thresholds

Fig. 14. ELEMENTAL, front yards, Villa Verde, Constitución, Chile, 2010.

Providing transitional spaces between public and private spheres is an important consideration for affordable housing (Wietzorrek, 2014). In a typical neighborhood, there are many indicators of the gradation between the public and private realms. Consider the journey from the edge of the neighborhood to the front door. First, there is the turn onto the smaller residential street. Then there is the journey from the car to the home: along the sidewalk, through the gate, across the yard, up the steps, onto the porch, and in through the front door. These markers signify to the resident that they are leaving the world of the collective and entering into their own private retreat. Designers of public housing should strive to include

comfortable transitions that balance the needs of the community with the needs of the individual.

At Villa Verde, after parking on the street, there is approximately twenty feet between residents standing on the sidewalk and their front door. This twenty-foot buffer affords homeowners a measure of privacy and prevents pedestrians from being able to glance into windows as they pass by. It also gives owners a space outside their home to use as they see fit. Some homeowners have turned this space into a garden, while others have used this area to house a fenced-in parking area. The twenty-foot separation is an appropriate

Fig. 15. ELEMENTAL, uses for the front yard, Villa Verde, Constitución, Chile, 2010.

distance, giving homeowners enough usable space without sacrificing too much of the public sphere. For some residents, however, twenty feet of space is not enough of a perceived barrier: 165 homeowners have constructed a fence between their yard and the sidewalk. In many cases these fences are merely decorative elements, providing no real security. Still, over 35% of the population felt the need to further differentiate their space from that of the community. This development is testament to the importance of providing thresholds that ease the transition from the street to the front door.

Private Space

Beyond the front door lies the private realm of the house, the one space where individuals have complete ownership. It is here that residents return at the end of the day, seeking a chance to rest and unwind. The most important things a home can provide are shelter from the elements, access to water and sanitation facilities, and adequate living space. The role of the architect is to ensure these necessities are provided in an effective manner (Wolfrum, 2014).

At Villa Verde, all of these requirements have been met. Protection from the elements is accomplished through sturdy wood frame structures supported on concrete foundations, clad with 6mm fiber cement board on the exterior and 10mm gypsum board on the interior. The roof is clad in steel with a thin coating of zinc and aluminum to avoid corrosion. When turned over to the owners, each home has a full bathroom complete with a toilet, sink, and shower, as well as a kitchen with an oven, stove, and sink. A third sink attached to the rear of the house provides an area for residents to do their laundry. A solar heating unit located on the roof provides hot water, and a backup system utilizes natural gas. The kitchen, bathroom, and two upstairs bedrooms amount to 600 ft^2 of living space that can be potentially expanded to approximately 900 ft^2.

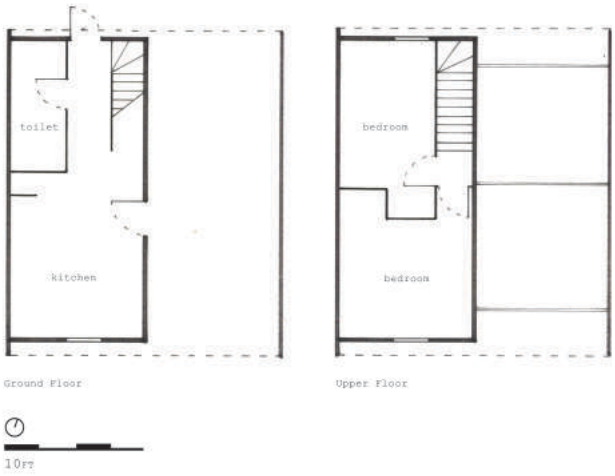

Fig. 16. ELEMENTAL, unit plan, Villa Verde, Constitución, Chile, 2010.

Allowing the opportunity for expansion while still providing a complete home is one of the most successful innovations at Villa Verde. From speaking with residents, I discovered multiple conditions of adaptation. Luis and his family of four expanded their home before even moving in, adding a large living room to the ground floor and an additional bedroom upstairs. Carla and her family made similar additions, including a wine bar in the living room that her younger sister was eager to show off. Every resident I spoke with was excited about showing me their home. They were proud of their work and felt a real sense of ownership over the final product. For residents like Maria, who lives alone, the original 600 ft^2 provides plenty of living space. She has decided not to add on, although when I visited she was having a concrete floor poured in the open void so she could make better use of the covered area. Many residents carry out their own construction. Luis did all his own work, and Carla's father completed theirs. Neighbors often pitch in, as was

Fig. 17. ELEMENTAL, Luis and his living room, Villa Verde, Constitución, Chile, 2010.

Fig. 18. ELEMENTAL, Maria's new slab, Villa Verde, Constitución, Chile, 2010.

the case at Carmen's house where her son helped finish the interior and her neighbors poured the slab. In addition to providing more affordable, customizable homes, incremental design at Villa Verde is empowering residents and strengthening the community.

Fig. 19. ELEMENTAL, interior conditions, Villa Verde, Constitución, Chile, 2010.

Details

After so much care goes into selecting the right location and designing the proper layout, following through with quality details is crucial. Inattention to the landscaping or poor maintenance and upkeep is an easy way to ruin an otherwise well-designed project. Small interventions can go a long way in establishing a sense of quality and imbuing a neighborhood with the dignity its residents deserve.

A solid network of sidewalks, leading from neighboring Villa Copihue all the way to residents' front doors, ties Villa Verde together. Streetlights illuminate residents' paths at night, and saplings lining the sidewalks will one day provide shade during the summer months. These are welcome inclusions. Still, there is more that can be done. The neighborhood suffers from a feeling of temporariness that unsettles some residents and leaves community members questioning its legitimacy. Ms. Pia, a teacher at the nearby Colegio Bosques de Gaia, expressed her initial doubts, complaining that each home looked as if one could "bend it and break it." The decision to use non-traditional materials for the homes' construction

Fig. 20. ELEMENTAL, neighborhood sidewalks, Villa Verde, Constitución, Chile, 2010.

Fig. 21. ELEMENTAL, unfinished construction, Villa Verde, Constitución, Chile, 2010.

has led to negative perceptions of the durability of the neighborhood. These perceptions are reinforced by the fact that Villa Verde lacks established landscaping that would help ground buildings currently floating in seas of dirt. The site was previously filled with dense

Fig. 22. ELEMENTAL, houses on dirt, Villa Verde, Constitución, Chile, 2010.

forest. Many trees required clearing for construction, but saving some existing trees would have helped give the neighborhood a greater sense of permanence and belonging. Additionally, simple interventions such as adding mulch to the playgrounds would communicate to residents that they are valued and their needs are important.

Purpose

Meeting the needs of the residents should be the designer's primary consideration. More important than getting the project published in a magazine or receiving awards and recognition is whether the project served its purpose by providing quality affordable homes to those who need them.

Thanks to the work of ELEMENTAL, the people of Villa Verde have affordable, durable homes that can be adapted to suit their individual needs. Their neighborhood, while missing a central public space, is thoughtfully laid out and encourages healthy community. The neighborhood's site on the hill has its benefits, although a location closer to the center of town would have made living at Villa Verde more economical. Enhancements could be made to existing public spaces in order to add value to the neighborhood. Despite these oversights, however, the designers at ELEMENTAL have given residents of Villa Verde quality homes in a safe community, making life more livable.

Fig. 23. ELEMENTAL, entry to neighborhood via Rio Maule, Villa Verde, Constitución, Chile, 2010.

Post-Tsunami Housing

Fig. 1. Shigeru Ban, residents preparing for a visitor, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

The second project studied is a neighborhood of post-tsunami homes located along the southeast coast of Sri Lanka in the Muslim fishing village of Kirinda. Much of the town was destroyed in the 2004 tsunami, and numerous aid organizations helped the community to rebuild. Businessman Phillip Bay commissioned Shigeru Ban, another Pritzker Prize-winning architect, to design one hundred homes in the center of town. Traveling from his Tokyo office, Ban met with villagers during the design phase of the project in order to gain a better understanding of their needs.

Aiming for the full recovery of the village of Kirinda, Ban specified local labor and materials so the economy of the region would

benefit. Homes were constructed with locally-sourced compressed earth blocks. In addition, prefabricated furniture units were made out of lumber from local rubber trees. Ban laid out the homes according to the cultural needs of the Muslim community. A movable wall divides areas for men and women, and a covered outdoor space provides separation between the living areas and the kitchen and bathroom. Ban also adapted the homes to Kirinda's hot and humid climate by providing slatted upper walls at the gable ends of the homes to aid in cross-ventilation. The way Ban adapted his design to the local context is impressive. However, Ban's homes are not immune to the difficulties of

Fig. 2. Shigeru Ban, interior features, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

designing in a foreign context, as a more detailed analysis reveals. Still, Ban's attention to the cultural, climatic, and economic needs of the community contributed to a successful recovery for the village of Kirinda.

Siting

Fig. 3. Shigeru Ban, aerial view of project in context, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Ban's post-tsunami homes are scattered along the main road through Kirinda, interspersed with other small shops and dwellings. The densest part of town stretches for about 300 yards, along which the central mosque, marketplace, and temple are located. There is no supermarket in Kirinda; instead, a handful of small shops sell residents' daily needs. To the south, the paved road disintegrates into a dirt path providing access to additional homes, beach camps,

Fig. 3. Shigeru Ban, Kirinda's back roads, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Fig. 4. Shigeru Ban, surrounding farmland, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

and farmland. To the north, the road passes more small businesses and residences, a sports field, a school, and the village's fishing docks on its way to Tissamaharama, a large town located ten kilometers away. The cost of owning a car is prohibitive for residents of Kirinda. Instead, they rely on motorbikes, bicycles, and walking for their primary means of transportation. Tuk-tuks—motored tricycles with a small rear bench for passengers—act as the region's affordable taxi service. Buses arrive to the town daily, bringing regional visitors to Kirinda's Buddhist temple and beach area. On a busy weekend, Kirinda receives as many as 200 daily visitors, though these tourists have little interaction with the Muslim community in the center of town. Saleem, my guide and translator, informed me that "the Muslims go to the Mosque, the Buddhists go to the Temple; we do not mix."

Fig. 5. Shigeru Ban, view over Kirinda from Temple Rock, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Following the tsunami, villagers needed life to return to normal as soon as possible. It was decided that the new homes would be rebuilt in the same location as those that had been destroyed. Although initial plans called for 100 new homes, unforeseen expenses and irresponsible handling of funds by the contractor resulted in only 45 homes being constructed. Each home is located on a small plot, roughly one tenth of an acre, in close proximity to one another. This and other factors have led to the creation of a tightly-knit community.

Neighborhood Layout

Fig. 6. Shigeru Ban, site plan, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

As the new homes in Kirinda were placed in their predecessors' locations, the current layout of the neighborhood represents years of organic development, in contrast to Villa Verde's carefully planned arrangement. Despite being formed without an overall vision, the center of Kirinda operates as a catalyst for community. Analyzing the neighborhood's structure demonstrates how housing projects can encourage positive relations between residents.

Fig. 7. Shigeru Ban, elevations along main road looking northwest, Post-Tsunami Housing, Kirinda, Sri Lanka, 2008.

The most prominent homes front onto the main road. These nineteen residences form the backbone of the community. Much of the neighborhood's activity takes place on this road, with people walking to and from the mosque, visiting homes, and stopping by to shop at the general stores. The homes, placed close to the road, help define the street as a space, and the residents help bring it to life. An open corridor down the length of the street provides visual connection that ties residents at the north end to those at the south end. Together, these factors help the center of Kirinda function as a traditional main street.

Fig. 8. Shigeru Ban, main street, Post-Tsunami Housing, Kirinda, Sri Lanka, June 2016.

Branching off the main road are three lanes leading to smaller residential clusters. These secluded groupings encourage a more

introverted existence among residents. A few homes sit far back on their plot, barely visible from the road. North of the mosque, nearly all of the homes are hidden in the dense undergrowth. Offering residences in quiet settings as well as the busy center lets residents choose their preferred environment.

Fig. 9. Shigeru Ban, secluded home, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Fig. 10. Shigeru Ban, prominent home on main street, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

The lack of a rigid organizing structure lends the homes in Kirinda a sense of timelessness and belonging. Their scattered arrangement amongst existing structures defies the modern convention of erecting gridded neighborhoods on a single cleared site. By integrating the homes with other shops and houses, Ban has created new housing that is integral to the village.

Public Space

Fig. 11. Shigeru Ban, public space, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Like the layout of the neighborhood, Kirinda's public spaces are generally the result of organic developments rather than intentional interventions. Still, these spaces are effective in providing the community with a variety of places in which to gather. The primary social space is the street, which provides the most immediate and accessible means of interaction. With infrequent vehicular traffic, the street can be used for walking, playing, and socializing. The marketplace, just off the main road and at the base of the temple, provides a large open space ringed by merchants where more formal interactions can occur. The temple situated on the rocks above the ocean provides a gathering place for the village's Buddhist

community, who mostly reside further from town, while the Muslims living in the center can congregate at the Mosque along the main road. A beach and two sports fields receive frequent use by the community's younger generation. The men of the community come together at the fishing docks, where they set off early each morning to provide for their families. Although not all spaces were deliberately designed, the wealth of opportunities to interact in a variety of settings has encouraged the formation of a strong community in Kirinda. Offering a diverse range of useful spaces is critical to creating successful public space.

Fig. 12. Shigeru Ban, active public spaces, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Thresholds

In such close proximity, thresholds between the public and private space are necessary for user comfort (Zoller, 2014). Similarly to Villa Verde, the homeowners at Kirinda have erected fences around their property to help differentiate their space from their neighbor's. Thirty-seven homes, or around 80% of residences, have fences surrounding some part of their property. On the main strip, all but two homes have fences separating the front yard from the street. In addition to the manmade fences, dense vegetation has grown up along the property lines, further partitioning the spaces.

Fig. 13. Shigeru Ban, typical fenced in yard, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

For most residents, the approach to the home is as follows: step off the road, through the gate, across the yard, along the side of the house, up the steps, through the side door, and into the home. This sequence provides enough space for an adequate transition, though some homes are placed too close to the road to have a usable

Fig. 14. Shigeru Ban, street section, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

front yard. A minimum of twenty feet seems to provide the right amount of separation between the public street and the front of the

house. This distance is effective at Villa Verde and is also appropriate to the scale of Kirinda.

Another threshold included in the original design is a covered outdoor space separating the kitchen and bathroom from the living areas. During the design phase, residents informed Ban and his team that these areas would be helpful for storing fishing equipment and other large possessions. However, over time, residents have become dissatisfied with the practicality of these spaces and have decided to enclose them. Out of 44 households, 27 have closed off these open areas. Reasons cited include needing more usable living space, wanting to keep stray dogs out and young children in, and the need for greater security. By adding three new walls, residents are no longer required to step outside in order access the kitchen or bathroom, and they also expand their enclosed living space, from 480 ft^2 to 760 ft^2.

Fig. 15. Shigeru Ban, new wall construction enclosing open space in three homes, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Private Space

The private living areas have been thoughtfully arranged according to the needs and customs of the villagers. Entry to the home is located on the side of the residence, where a wooden door provides access to the main hall. This 190 ft^2 space serves as the living room and is where most household activity takes place. The original plans show a movable screen that could be used to divide the hall into separate spaces for men and women, but none of the homes I visited still had these in place. Instead, there were empty holes in the wall where the screens were meant to be. Off the hall, there are two identical bedrooms at the front of the house, each furnished with a built-in closet unit made out of local timber. These bedrooms are well-used spaces, benefitting from built-in shelving and daylight provided by windows on adjacent walls. At just under 100 ft^2, there is ample room for one queen-sized bed, though in some cases two beds are placed in the same room, one

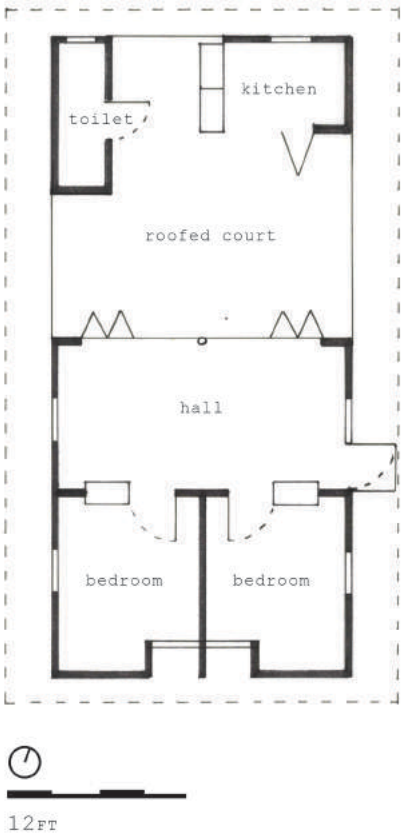

Fig. 16. Shigeru Ban, unit plan, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Fig. 17. Shigeru Ban, bedrooms, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

directly next to the other. Residents have also added mosquito nets to cover the beds while they sleep.

Back out and across the hall, large folding doors separate the main living area from the roofed court. Some residents have left these doors in place, while others have removed them after enclosing the covered area. Aroos, who lives in a home with his wife and three young children, decided to remove the folding doors and use them elsewhere in the house. Aroos has made numerous changes to his home since he moved there in 2006. In the kitchen, he took apart the furniture unit and the interior dividing wall. He then used those materials, along with the folding doors from the hall and a large piece of canvas, to close off the open area from the exterior. With some leftover materials, he built a partition wall between the kitchen and his newly expanded hall. Now he and his family enjoy a larger central space as well as a larger kitchen.

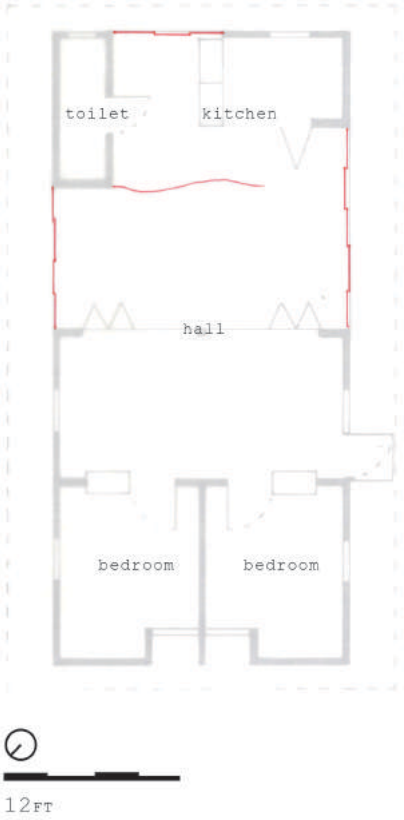

Fig. 17. Shigeru Ban, Aroos' modifications, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Fig. 18. Shigeru Ban, Aroos' expanded hall, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Expanding the kitchen is a common undertaking for residents of Ban's Post-Tsunami Housing. At Rifath's house, he and his family of

six decided to add a wood-burning oven that protrudes from the house, keeping the interior cooler during the oven's operation. Nasliya, a widow living with her mother and two children, uses the existing kitchen as a pantry and added a full kitchen to the back of the house, complete with a wood-burning oven and additional sink. The included kitchen lacks its own sink and instead shares one adjacent to the bathroom.

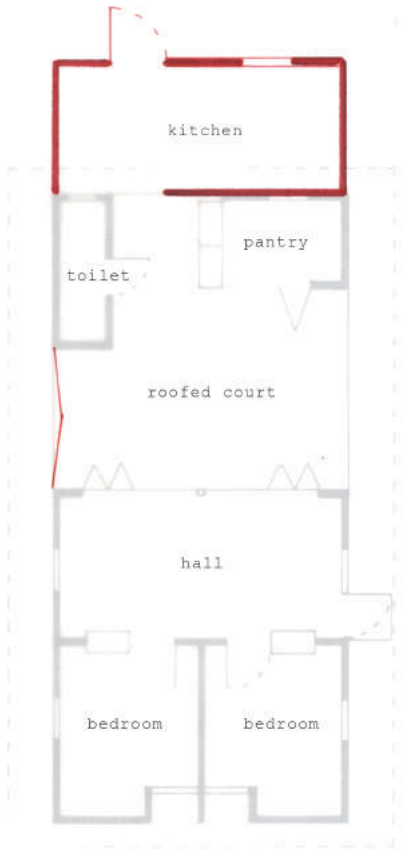

Fig. 19. Shigeru Ban, Nasliya's modifications, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Fig. 20. Shigeru Ban, Nasliya's new kitchen, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Fig. 21. Shigeru Ban, original sink, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Inside the bathroom there is an in-ground toilet as well as a showerhead. Running water and septic tanks were added to all the properties following the tsunami. Electricity was another welcome addition to the post-tsunami homes. Electric lights in each room and a ceiling fan in the main hall were provided in the original construction. Some residents have used the electricity to power a small refrigerator they purchased as well as other small kitchen

appliances. Without an electric stove, however, most of the cooking occurs over an open fire.

Beyond the four walls, residents make use of the small yards to hang laundry lines or set out chairs for outdoor gatherings. Some residents use the space to raise chickens. When Ban and his team were constructing the homes, they also planted trees and other shrubs. This vegetation has grown rapidly in the tropical climate and helps shade and cool the homes.

Fig. 22. Shigeru Ban, seating area in a side yard, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

An interesting development in Kirinda is the amount of construction and demolition work that has occurred on homes since their completion in 2006. Besides the modifications mentioned above, many other homeowners have decided to alter Ban's original design. These alterations stem from a variety of reasons ranging from aesthetic preferences to issues of usability and durability. Examining these modifications reveals some of the larger issues residents face.

Details

Durability is a major concern for residents of Ban's Post-Tsunami Housing. Compressed earth blocks, while a sustainable and local material, do not hold up well in a tropical climate that receives over 40 inches of annual rainfall. Erosion from the elements and daily use has left holes in some blocks, particularly near corners and doorframes. When residents are adding on to their homes,

Fig. 23. Shigeru Ban, eroding and damaged earth blocks, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

they opt for more durable and accessible materials, like brick or concrete masonry. Another concern is the durability of the wooden doors and furniture units, which have begun to splinter and break in areas of frequent use. Ramees, who lives with his wife and two children, decided to remove all wooden construction and earth block walls and replace them with smooth concrete, which he feels is sturdier, more secure, and more dignified.

Fig. 24. Shigeru Ban, Ramees in his concrete home, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Just a few hundred yards from the center of town, a large neighborhood of around 250 homes contains five different housing models built by various international aid organizations. One thing each home has in common is concrete construction for the walls and

Fig. 25. Shigeru Ban, neighboring aid homes, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

foundations. Residents appreciate the durability of concrete and are pleased by the ability to paint it, as brightly colored homes are customary to the area. Residents are also grateful for the way their new homes follow the typical style found in Sri Lanka. The success of these 'basic' homes stands in contrast to Ban's more original designs, which have received scrutiny by Kirinda's residents.

Local perception of Ban's homes has been an issue in Kirinda. Many residents shared with me their desire for a traditional Sri Lankan style home, one with a covered front porch, a front door, and a more traditional layout. Consequently, fifty percent of residents have altered their home's front façade to more closely resemble this

Fig. 24. Shigeru Ban, modifications to Ramees' "traditional" concrete home, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

traditional housing type. The result is a marring of Ban's original design coupled with an unsatisfying attempt to recreate the region's vernacular. After these additions, homes take on a piecemeal, almost shack-like appearance, far from the simple, yet elegant design Ban intended. The prevalence of post-construction modifications is unexpected considering Ban's participatory approach to designing the homes.

Fig. 25. Shigeru Ban, altered façades, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Design details that have remained unchanged include the use of clay roofing tiles that have kept homes dry while also improving upon the aesthetics of the standard corrugated-iron sheet roofs. The orange roof tiles help identify Shigeru's homes from others in the

neighborhood, even after residents have performed significant alterations to the façade. A solid concrete floor helps keep insects and disease out, and the slats in the upper gable walls provide cross-ventilation. Despite daily temperatures in the high 80s, indoor temperatures remain comfortable. One homeowner did find fault with the slatted walls, however, and decided to close them off to prevent dust from entering the home at the cost of higher interior temperatures.

These do-it-yourself modifications are similar to the construction that occurs at Villa Verde's incremental housing. Although Ban did not intend his homes to require additional construction, the possibility to easily modify the design was a useful provision. Allowing for residents to customize the home to better suit their needs is an important consideration when designing affordable housing.

Purpose

Shigeru Ban was called upon to help rebuild Kirinda after the destruction of the 2004 tsunami. This goal has been accomplished, and the village is again full of life. However, the shortcomings of Ban's Post-Tsunami Housing leaves room to question if providing quality, affordable homes was the only concern. In designing Kirinda's beautiful, award-winning homes, some decisions seem aimed at worldwide recognition of the project rather than the needs of local users.

After completing Post-Tsunami Housing in 2007, Shigeru went on to win the 2013 Aga Khan Award for Architecture for his work in Kirinda, and a year later, was awarded the Pritzker Prize. The reasons cited for his nomination include the originality, sustainability, and ingenuity of his work, as well as his humanitarian efforts. These qualities are highly valued by the architecture community, and are key ingredients to critically acclaimed projects. In Kirinda, it is easy to see how a strong focus on these issues resulted in homes that looked great on paper but failed in the field.

The sustainable materials selected for construction are listed among the top features of the project in every architectural article. However, less than ten years after construction, they have already begun to deteriorate. In an attempt to design something new and unique, the traditional residential style of the area was abandoned, leading international reviewers to praise Ban's original designs. Local residents, however, wish for something more familiar, and many

have taken action to accomplish it. Pressures from the architecture community resulted in award-winning homes that underperform in comparison to the standard housing built by foreign aid organizations. This inconsistency reflects larger issues that go beyond Ban's work in Kirinda. At what point does the pursuit of originality diminish a project's ability to perform its intended purpose? How can architects balance sustainability with durability? What is the appropriate response to designing in a foreign context? Through critical analysis of Ban's Post-Tsunami Housing, my hope is that future designers carefully consider these questions. The most urgent message I can communicate is to ensure the needs of the users are prioritized. Doing so will help prevent architecture from getting in the way of providing quality housing to those who need it.

Fig. 26. Shigeru Ban, residents in their award-winning home, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Buchheimer Weg

Fig. 1. ASTOC Architects and Planners, central public space, Buchheimer Weg, Cologne, Germany, 2012.

The third project studied is Buchheimer Weg, an urban housing development in Cologne, Germany. Designed by Cologne-based ASTOC Architects and Planners, Buchheimer Weg seeks to improve the model of standard housing developments constructed after the Second World War. Outdated and dilapidated public housing projects exist all over the developed world, offering bleak homes in characterless neighborhoods for residents whose future seems unduly grim. The project in Cologne aims to correct that predicament by replacing normative ribbon housing developments with colorful buildings that bend at odd angles, creating dynamic public spaces between adjacent volumes. This simple move

breaks the monotony of repetitive housing, and with the addition of cafes, offices, and well-programmed public spaces, brings liveliness to a once languishing neighborhood. ASTOC Architects and Planners' thoughtful approach to the layout of the neighborhood and its shared social spaces demonstrates how successful public space contributes to creating a desirable environment in which to live.

In 2005, ASTOC Architects and Planners submitted their winning proposal to a design competition hosted by GAG, a large non-profit building society in Cologne. Project planning continued for two years before the first phase of construction began in 2007. The third and final phase reached completion in 2012. Today, 18 buildings divided into 434 apartments house a diverse population of residents, providing them with quality homes in a good location just outside Cologne.

Siting

Fig. 2. ASTOC Architects and Planners, aerial view of project in context, Buchheimer Weg, Cologne, Germany, 2012.

From city center, a twenty-minute train ride on Cologne's light rail system brings you to Ostheim, an eastern district with a population of 12,600 residents, 30% of whom are foreign immigrants. Departing from the Ostheim train station, a five-minute walk down the heavily trafficked Frankfurter Road brings you to Buchheimer Weg. Fast food restaurants, convenience stores, a car dealership, and a grocery store line the first few hundred yards of the tree-lined boulevard. Commercial activity then gives way to residences, most of which are subsidized housing provided by the same company that sponsored Buchheimer Weg, GAG Immobilien AG. A mixture of single-family

dwellings, high-rise apartments, and attached multi-family units make up the bulk of the housing stock.

Fig. 2. ASTOC Architects and Planners, closer aerial view of project in context, Buchheimer Weg, Cologne, Germany, 2012.

Buchheimer Weg is well positioned along Frankfurter Road. In addition to the nearby light rail station, a bus stop sits at the intersection just outside the neighborhood. The complex benefits from its close proximity to the main road, while at the same time a 16-ft wide sidewalk, a line of trees, and a 50-ft setback provide a necessary buffer from the busy street. The neighborhood's location provides residents with many transit options, including walking. Being able to walk to the grocery store is an important provision in any affordable housing project, as it can sometimes be residents' only

means of transportation. An extensive network of pedestrian paths connects Buchheimer Weg to neighboring communities as well as a large forested park. The complex's well-selected site manages to provide residents a peaceful location within walking distance of a useful commercial center.

The site of Buchheimer Weg was previously occupied by a post-war social housing project, also owned by GAG. Built in the 1950s, this complex featured cramped apartments and a stagnant layout. Rather than renovate the existing structures, as GAG has done to many of their surrounding properties, they decided to demolish the old apartments and construct new ones in their place. ASTOC's new design for the neighborhood accommodates more residences on the same site and makes better use of the complex's residual space.

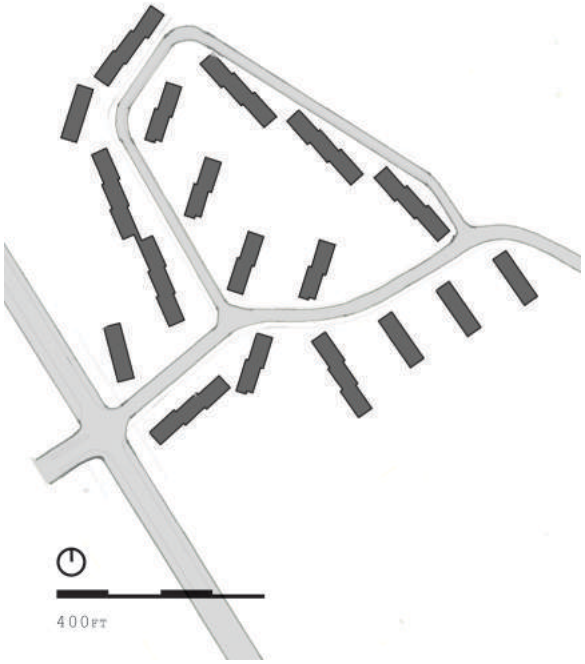

Fig. 3. GAG Immobilien AG, existing site plan, Buchheimer Weg, Cologne, Germany, 1950.

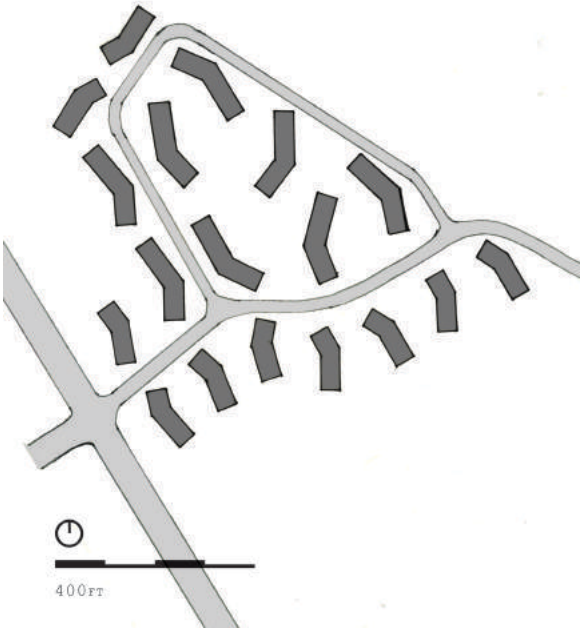

Fig. 4. ASTOC Architects and Planners, new site plan, Buchheimer Weg, Cologne, Germany, 2012.

Neighborhood Layout

Fig. 5. ASTOC Architects and Planners, site plan, Buchheimer Weg, Cologne, Germany, 2012.

Buchheimer Weg is generally laid out along two roads. The main road, appropriately named Buchheimer Weg, bifurcates the neighborhood from west to east. The other road, Grevenstrasse, branches off and

loops through the homes to the north. On the south side of Buchheimer Weg Road are seven apartment buildings arranged perpendicular to the street, each with their own small parking area and a shared courtyard between buildings. The two buildings furthest to the east are designed to house the elderly and those struggling with dementia. Just south of this line of apartments is a large green space bisected by a walking path leading to nearby adjacent neighborhoods.

Fig. 5. ASTOC Architects and Planners, small parking area and shared courtyard between buildings, Buchheimer Weg, Cologne, Germany, 2012.

On the north side of Buchheimer Weg Road, the other eleven buildings are arranged along Grevenstrasse, which circles through the complex. In the center of the loop, a series of large courtyards serve as the neighborhood's primary public space. At the southern end, there is a small parking lot that serves the businesses located on the ground floor of the adjacent building. A daycare center occupies the ground floor of the building next door.

Buchheimer Weg benefits immensely from a simple innovation: the introduction of a slight bend in the traditional bar housing scheme. This bend makes significant improvements to the structure of the neighborhood. With this bend, each building now shapes the exterior spaces surrounding it in meaningful and intentional ways. At the main intersection in the neighborhood, the four buildings open themselves to the corner upon approach, creating a large central space that lends importance to the crossroads. In the center of the complex, the

Fig. 6. ASTOC Architects and Planners, main intersection, Buchheimer Weg, Cologne, Germany, 2012.

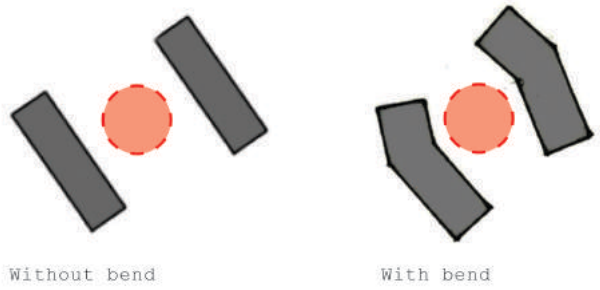

Fig. 7. ASTOC Architects and Planners, ability to define space between two buildings, Buchheimer Weg, Cologne, Germany, 2012.

buildings bend around the main social space, forming its boundaries and creating a series of loosely defined courtyards. Courtyards can be formed between just two buildings that, thanks to the bend in the middle, now provide four spatial edges to define the area. Exterior space compresses and expands as it moves around the structures, beckoning users through passageways and out into grand open spaces. These architectural, gestural moves allow the buildings to function on a theatrical level and lend drama and interest to the neighborhood's public space.

Public Space

Fig. 8. ASTOC Architects and Planners, public space, Buchheimer Weg, Cologne, Germany, 2012.

Buchheimer Weg boasts the most successful public space among the four projects studied. Residents of all ages make frequent use of the diverse spaces offered, ranging from gardens and picnic areas to

playgrounds and a basketball court. The layout of the neighborhood sets up an ideal environment for these public spaces to succeed. Organizing the neighborhood around a central green space while also providing smaller courtyards for each building gives residents ample opportunity to relax outside the apartment. Introverted and extroverted spaces provide moments for private retreat or social interaction. Their close proximity to the dwelling units ensures convenient access as well as heightened security provided by onlookers from windows and balconies overlooking the courtyards. These well-used shared spaces contribute to a safer and friendlier living environment at Buchheimer Weg.

The central public space, at just over one acre in area, is the rallying point of the community. The area has been loosely divided

Fig. 9. ASTOC Architects and Planners, central public space, Buchheimer Weg, Cologne, Germany, 2012.

into separate zones that are still able to function as one unified space. Parents can sit at a central location and easily keep an eye on children playing in different parts of the park. At the north end, a playground suited for younger children sits next to a workout area equipped with outdoor fitness machines. Moving south, another play area caters to older children, and two large trees in the center of

Fig. 10. ASTOC Architects and Planners, recreational equipment in the central public space, Buchheimer Weg, Cologne, Germany, 2012.

the space provide a shady gathering point. Across the sidewalk, a small lawn ringed by benches provides places to sit and spectate. At the south end, another play area sits opposite a paved multipurpose court that is used for skating, biking, basketball, and other various activities. Lush landscaping, paved sidewalks, and appropriate ground coverings, such as sand in the play areas, complement each of these spaces. The result is a functional and attractive courtyard that receives frequent use and contributes a sense of vitality to the community.

Fig. 11. ASTOC Architects and Planners, site section through central public space looking northeast, Buchheimer Weg, Cologne, Germany, 2012.

Buchheimer Weg's side courtyards support the neighborhood by providing semi-public spaces where residents can enjoy more privacy than in the central green space. These smaller courtyards have been programmed accordingly. One space holds a picnic table sitting under a

Fig. 12. ASTOC Architects and Planners, programmatic elements in the side courtyard spaces, Buchheimer Weg, Cologne, Germany, 2012.

large shade tree. Another holds a playhouse and sandbox. Gardens and small play areas are scattered throughout. These shared spaces adequately replace individual front yards. Communal front yards were employed with limited success at Villa Verde. What allows the courtyards at Buchheimer Weg to function more effectively is the removal of vehicles from the space.

Much of the success of Buchheimer Weg's public spaces is due to the priority given to pedestrians. In the central green space, no vehicles are present, as neither roads nor parking areas exist in the center. This puts parents at ease and makes for a safer, more enjoyable environment. The same is true for the neighborhood's side courtyards. Parking for residents is provided along the street and in small lots just off the road. The courtyard space in between buildings

is reserved for pedestrian use. ASTOC Architects and Planners understood the importance of vehicle-free public space. They were able to convince GAG to invest in two underground parking areas to keep vehicles out of the communal spaces. This allows the apartments at Buchheimer Weg to be surrounded by active green space, rather than a sea of parking.

Fig. 13. ASTOC Architects and Planners, approach to building's front door, Buchheimer Weg, Cologne, Germany, 2012.

The transition from public to private space at Buchheimer Weg differs from the previous two projects studied. With Buchheimer Weg's four-story apartment buildings, most residents do not have private ground floor entrances. Instead, lobbies equipped with two entrances on either side of the building provide access to interior circulation among residences. Each building is equipped with two or three lobbies, depending on the size

Fig. 14. ASTOC Architects and Planners, building plan, Buchheimer Weg, Cologne, Germany, 2012.

of the building, which provide access to a stack of eight to twelve apartments, at two to three apartments per floor. As there is no interior corridor system linking the different lobbies together, each stack of apartments can be accessed by only two entrances. Keys are required to enter the buildings. Alternatively, an intercom system allows residents to open the door for guests remotely. Building entrances are emphasized architecturally on the exterior with a concrete overhang and a projecting side wall as well as a brightly colored panel bearing the entrance number. A sidewalk lined by hedges leads from the street to the building's front door.

Fig. 15. ASTOC Architects and Planners, building entrance, Cologne, Germany, 2012.

Similar principles to those used at Villa Verde and Post-Tsunami Housing are applied to the ground floor entrances at Buchheimer Weg. Twenty feet of separation remains the standard distance between the public areas and the building's front door. In these twenty feet of space, ground floor units receive a small front yard surrounded by a low fence and hedge wall. Metal gates provide access to the yards, which residents have utilized as outdoor entertaining areas, gardens, and play areas. Units on the upper floors feature balconies that operate similarly.

Fig. 16. ASTOC Architects and Planners, residents' front yards, Buchheimer Weg, Cologne, Germany, 2012.

As in prior projects, the thresholds at Buchheimer Weg provide important transitions between the public and private realms. Giving ground floor residents their own small fenced-in yards keeps passersby at a comfortable distance and prevents pedestrians from being able to peer in windows as they walk by. The low fences and hedge walls provide perceived barriers while still remaining open enough to allow visual connection to the surroundings. Providing semi-private outdoor spaces, such as balconies and front yards, also encourages a friendly atmosphere where neighbors are more likely to know each other from chance encounters, as opposed to spending all of their time at home behind closed doors.

Fig. 17. ASTOC Architects and Planners, front yard bounded by hedge walls, Cologne, Germany, 2012.

Private Space

The new residences at Buchheimer Weg provide vast improvements to the dark, cramped apartments that existed on the site previously. The new layouts vary in size from 450 ft^2 for a one-bedroom apartment to 1000 ft^2 for a three-bedroom apartment. All units are equipped with a full kitchen and one full bathroom, with the three-bedroom units gaining a half bathroom. The range of apartment sizes accommodates single users as well as growing families, an important consideration for affordable housing projects.

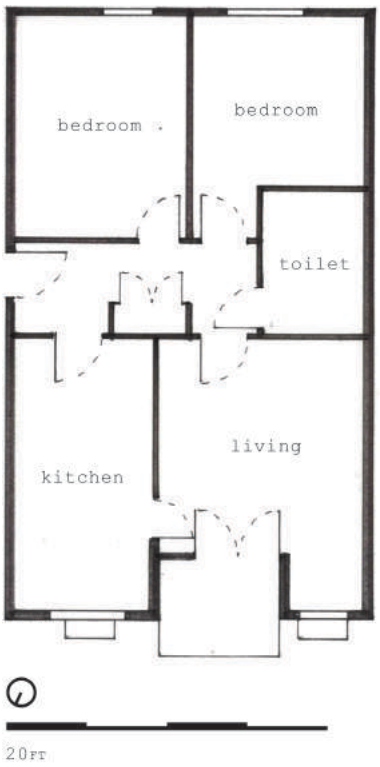

Fig. 18. ASTOC Architects and Planners, unit plan, Cologne, Germany, 2012.

In order to provide residents with ample light and ventilation, designers at ASTOC Architects and Planners ensured access to daylight on at least two sides of each unit. Large operable windows brighten the interior and allow for increased airflow. In addition to the balcony accessed off the main living area, floor-to-ceiling windows open onto balconettes—false balconies, or a railing at the outer edge of a window opening—in the bedrooms. These additions could have easily been left out, but their inclusion adds a level of value and comfort welcome in this housing type.

Fig. 19. ASTOC Architects and Planners, windows and balconies and balconettes, Cologne, Germany, 2012.

Unlike the previous projects that were discussed, Buchheimer Weg provides little opportunity for resident intervention at the architectural scale. Do-it-yourself modifications are not necessary, nor would they seem appropriate given the level of finish present in the project. Customization of the units is limited to furniture and décor selection. Many residents have taken to expressing themselves by hanging the flag of their home country in windows and on balconies.

Fig. 20. ASTOC Architects and Planners, flags hanging from residences, Buchheimer Weg, Cologne, Germany, 2012.

Large populations from Turkey, Italy, and the Middle East call the neighborhood home. Some tension between these groups exists among older residents, but children playing together in the park are mostly immune to such prejudices. In this way, Buchheimer Weg demonstrates the capability of architecture to bring people together. By providing comfortable private zones in addition to welcoming public spaces, residents are able to enjoy both the seclusion and interaction necessary for a healthy life.

Fig. 21. ASTOC Architects and Planners, friends pose for a photo, Buchheimer Weg, Cologne, Germany,2012.

Details

The complex of Buchheimer Weg is enhanced by a few well-designed details. The unique color of the buildings was an intentional design decision. Each of the concrete buildings is finished in a mineral-based plaster façade in varying shades of green. A five-tone gradient is applied to the neighborhood, with the darkest shades used on the buildings closest to Frankfurter Road and a pale green applied to the northern and eastern extremes. Residents appreciate the unique color choice, which makes the neighborhood easily recognizable. The hues chosen are neither too bright nor too dull, providing interest without being garish. The pleasant tones contribute a sense of novelty and also convey the newness of a fresh start.

Fig. 22. ASTOC Architects and Planners, five green shades, Buchheimer Weg, Cologne, Germany, 2012.

At Buchheimer Weg, green is the color of optimism. Abundant greenery enhances the livability of Buchheimer Weg, providing biophilic benefits as well as aesthetic improvements. The complex has been extensively landscaped with lawns, flowerbeds, hedges, and small

Fig. 23. ASTOC Architects and Planners, neighborhood greenery, Buchheimer Weg, Cologne, Germany, 2012.

trees. In addition, existing trees were preserved, helping new construction appear permanent and established.

In terms of aesthetics, ASTOC Architects and Planners pushed the boundaries of traditional residential design without taking it too far. The result is a neighborhood that is both striking and familiar. Playful variations on familiar themes are found throughout the complex. The slight angles that the buildings make in plan are reflected in the diagonally-ridged incline roofs that rise from one end of the building to the other. Windows on the façades jog side to side, alternating between floors. A large metallic orb in the neighborhood's center acts as both an art piece and a playscape. There are enough peculiarities in the project to be noticeable, but not enough to displace a sense of order. These features help Buchheimer Weg strike an appropriate balance between convention and innovation. The complex's whimsical design contributes as much life to the neighborhood as do its residents.

Fig. 24. ASTOC Architects and Planners, alternating window patterns, Buchheimer Weg, Cologne, Germany, 2012.

Purpose

ASTOC Architects and Planners set out to design a complex that could serve as a model for future affordable housing developments. They have achieved that goal in Buchheimer Weg. The vast improvements made to the quality of public space sets a high standard for projects moving forward. Similarly, well-equipped apartments filled with air and light demonstrate the quality of private space that can be achieved in affordable housing. Universal principles such as organizing homes around a shared focal point or keeping vehicles out of public space can be applied to any project, even if the budget does not allow for other additions. Key characteristics can be replicated to inform the design of any project. The unique innovation of the bent building greatly enhances the structure's ability to shape exterior space, but similar results could be achieved with a different geometry. The subtle green tones that give the neighborhood its fresh look could easily be substituted for another hue. Every affordable housing project constructed after this point need not resemble Buchheimer Weg exactly to be successful. The project serves as a model simply by offering designers an excellent example of how high-quality public space leads to a desirable environment in which to live.

Social Housing in Sa Pobla

Fig. 1. RIPOLLTIZON Architects, view from second level walkway looking south, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Social Housing in Sa Pobla, the fourth project selected for research, is a courtyard housing complex on the Spanish island of Mallorca, designed by locally-based RIPOLLTIZON Architects. This project is appropriately sensitive to the cultural and climatic environment surrounding Sa Pobla, a rare characteristic in public housing projects. In this region, homes are typically organized around a semi-private courtyard that fosters a rich sense of community among residents. Social Housing in Sa Pobla borrows from this tradition by organizing nineteen residences around one central shared space. Each home is unique, an accomplishment made possible through the use of

standardized building modules that can be arranged in various ways, allowing for individuality while still implying a unified, rigorous design. Another noteworthy feature is the structure's white exterior, which mitigates solar heat gain and also combines with a minimalist design to create a complex with striking aesthetics.

Social Housing in Sa Pobla proves housing can be both beautiful and affordable. It also demonstrates how affordable housing can be designed for a specific context. Studying RIPOLLTIZON's approach reveals what can be achieved with minimal resources, and analyzing the courtyard scheme provides a valuable study in public space.

Fig. 2. RIPOLLTIZON Architects, aerial view of project in context, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Sa Pobla is a small agricultural town centrally located in the northern region of Mallorca. The town benefits from a well-organized network of gridded streets and public squares. With a population of 12,000 residents in an area less than one square mile, Sa Pobla is surprisingly dense. The town's expansion is limited by 'La Ronda,' a highway that circles the town and acts as the boundary between Sa Pobla's urban development and the surrounding farmland. As a result, the bounded area has been filled with two to three story buildings on almost every block. Narrow streets make driving difficult; most residents rely on walking or cycling for transportation within the

center. A rapid transit station on the southern end of town connects Sa Pobla to Mallorca's public rail network. The line originates 42 km away in Palma, Mallorca's capital city, and terminates at Sa Pobla.

Social Housing in Sa Pobla is situated along the eastern edge of town, just off La Ronda on Carrer Mercat. The complex acts as urban infill amongst other residential buildings. Around the corner, a small strip of ground floor retail spaces faces La Ronda. Despite occupying one quarter of the block, Social Housing in Sa Pobla has only sixty feet of street presence, with most of the complex hidden in the center of the site. Formally, the project continues the existing urban fabric with a three-story building that meets the street and has an interior courtyard. The project's minimalist façade is the only thing that visually sets it apart from its neighbors.

Fig. 3. RIPOLLTIZON Architects, closer aerial view of project in context, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Fig. 4. RIPOLLTIZON Architects, elevations along Carrer Mercat looking southeast, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Social Housing in Sa Pobla benefits from nearby amenities. Across the street from the complex, a small playground sits along a walking track that parallels La Ronda as it circles the town. Three blocks down Carrer Mercat, a public square with a small park in the center provides a nearby gathering space. Four blocks further west is Plaça Major, Sa Pobla's lively main square. Several commercial centers are also within walking distance of the complex. Most importantly, two grocery stores are located less than 200 yards away, with one positioned directly next door. Restaurants, a public school, a pharmacy, and various small businesses are all located within a five-minute walk. Siting affordable housing near areas for recreational and commercial activity makes life more economical and enjoyable for residents, who sometimes have no other means of transportation.

Fig. 5. RIPOLLTIZON Architects, Sa Pobla's narrow streets, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Fig. 6. RIPOLLTIZON Architects, Plaça Major, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Neighborhood Layout

Fig. 7. RIPOLLTIZON Architects, site plan, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

The main organizing principle behind Social Housing in Sa Pobla is the shared courtyard at its center. In addition to supplying the complex with light and air, this open space provides a focal point for the community and encourages interaction among residents. Positioning homes around the courtyard also promotes safety and discourages crime by keeping eyes on the residences and eliminating isolated units. The central courtyard, however, is not the only defining feature of the complex. Architects at RIPOLLTIZON designed the project to mimic the varied spatial conditions present in Sa Pobla's urban environment.

Space compresses and expands as it moves through the complex, similar to the way Sa Pobla's narrow streets transition to open plazas. Exterior corridors, elevated walkways, secluded corners, and private terraces provide counter-spaces to the project's open courtyard. RIPOLLTIZON carefully arranged the residences to create this rich living environment, filled with depth and character.

The irregularities of the project's site preclude Social Housing in Sa Pobla from a symmetrical layout. RIPOLLTIZON's response to this constraint is a highly contextual arrangement that makes effective use of the L-shaped site. The complex's nineteen residences are divided into two primary groupings: five homes are located near the entrance while the other fourteen are positioned further back on the site. Ten of these homes immediately surround the courtyard, while the other nine sit a row back along the site's outer perimeter. The central courtyard sits against the western edge of the site, leaving only three sides open to the surrounding residences. On the fourth side, a party wall separates the courtyard from the neighboring complex and serves as a backdrop to the space.

Fig. 8. RIPOLLTIZON Architects, site plan, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Fig. 9. RIPOLLTIZON Architects, party wall serving as courtyard's fourth edge, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Access to each residence is provided by exterior circulation that winds through the complex, passing through the courtyard and continuing on through both sheltered and exposed walkways. Two staircases, one for each group of residences, serve units with entries on the second and third levels. Two elevators are also provided.

Fig. 10. RIPOLLTIZON Architects, exterior circulation, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

The neighborhood's complex layout inhibits an immediate understanding of the project. Interlocking units make it difficult to determine where one residence ends and the next one begins. Navigating the spaces can be challenging for visitors, who are frequently faced with diverting paths as they move through the complex. While this can be disorienting for guests, it adds richness to the experience of living at Social Housing in Sa Pobla. Moments of discovery await around each corner, and for Sa Pobla's younger residents, the labyrinth of passageways provides the perfect setting for inspired play. This complexity is welcome in a housing type that is typically devoid of such imaginative design. Designers of future affordable housing projects can learn from RIPOLLTIZON's effective methods of designing layouts that delight and inspire.

Public Space

Fig. 11. RIPOLLTIZON Architects, central courtyard, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Social Housing in Sa Pobla's primary public space is the central courtyard. At just under 2,000 ft^2, it occupies roughly 15% of the total site. Residents move through the space as they come and go, and children use it as an area for play. Unlike Buchheimer Weg's lush green spaces filled with playgrounds and seating areas, this hardscaped courtyard is sparsely furnished with a small planter that sits atop a concrete plinth centered against the western party wall. The minimal design of the courtyard matches the rest of the complex and makes for a visually compelling space. However, the

Fig. 12. RIPOLLTIZON Architects, public space, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

courtyard lacks utility and misses an opportunity to provide the community with a meaningful gathering space.

The primary role of public space in housing projects is to provide residents a place to rest and interact outside the home. The courtyard at Social Housing in Sa Pobla fails in this regard as it lacks any furnishings that would invite residents to gather. The courtyard's only users are children who ride around on scooters and throw tennis balls against the blank concrete walls. Seating, such as benches or café-style tables and chairs, would give residents a chance to read, relax, or converse. Instead of the small decorative plant provided, a larger shade tree would help soften the space and create a more comfortable environment for users. These simple additions would invite residents to spend time in the space and would help the courtyard function as a gathering place for the community.

Although RIPOLLTIZON's courtyard fails to function as a gathering space, it still serves its role as a focal point for the complex. Orienting the residences around the courtyard unifies the project and encourages a sense of camaraderie among residents. Windows and terraces face each other across the courtyard and allow residents to enjoy the shared space without physically occupying it. Even units removed from the courtyard are able to visually participate in the space thanks to spatial voids and visual corridors through impeding residences. Although the courtyard would benefit from some useful programming, it is still a welcome addition to the complex and should be considered as an effective organizational strategy for any affordable housing complex.

Thresholds

The diverse spatial conditions present in Social Housing in Sa Pobla create effective transitions between the street and residents' front doors. An elaborate entry sequence begins at the street, where a large void in the façade acts as an entry portal into the complex. The entrance is gated, but rarely locked. RIPOLLTIZON included the gate over concerns of vandals gaining access to the property; so far no incidents have been reported. Past the gate, residents move into a covered entry vestibule where mailboxes line the side wall and a staircase descends to an underground parking area. Standing in the vestibule, the compression of space is noticeable as residents have just left the open street and are now standing under the weight of two floors of residences overhead. Glimpses of the central courtyard are visible down a corridor straight ahead, and to the right, another corridor leads to the first grouping of residences. Two units are accessible from the ground floor, and another three are located up a flight of stairs and along an elevated walkway. To arrive at the other fourteen units, residents must walk down the corridor, across the courtyard, and through one of two openings in the structure where exterior passageways lead to three more floors of residences.

Fig. 13. RIPOLLTIZON Architects, entry sequence, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Entries to each unit have been thoughtfully placed to provide as much privacy as possible. No residences are accessed directly from the courtyard. Instead, units are entered from more private internal corridors. All of the units' front doors are recessed one foot into the wall. Doors positioned around corners and at the end of walkways give some residences their own exterior foyer. Many residents have personalized their entries by setting potted plants and welcome mats outside the front door. Arrival to the unit brings residents through a series of public, semi-public, and semi-private spaces. Once they reach the front door, they are ready to pass through the final threshold to the private realm.

Fig. 14. RIPOLLTIZON Architects, unit entries, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Private Space

The residences at Social Housing in Sa Pobla are well equipped to meet residents' needs. They feature solid construction, ample living space, passive heating and cooling strategies, and the modern conveniences of running water and electricity. The layouts are based on modular units used for each of the living spaces—the bedroom, bathroom, storage, kitchen, dining, and living areas. These modules are combined in various ways to produce six unique layouts. The units are generously sized compared to previous projects studied, with one-bedroom units occupying 580 ft^2 of living space and two bedroom units occupying between 775 ft^2 and 1000 ft^2. Ten of the fourteen two-bedroom units are two story residences, and eight feature a double-height space in the living room, a rare amenity in affordable housing projects. Eight of the units benefit from a private terrace, and ground floor units at the rear of the site have their own private courtyard.

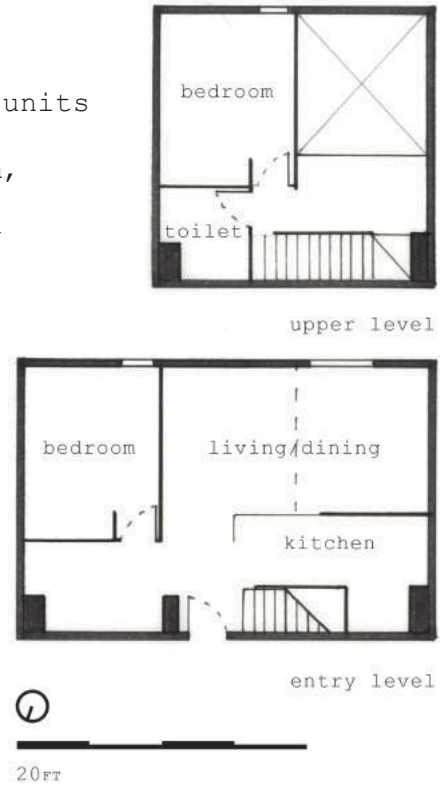

Fig. 15. RIPOLLTIZON Architects, typical unit plan, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Fig. 16. RIPOLLTIZON Architects, private terraces and courtyards, Social Housing in Sa Pobla, Mallorca, Spain, July 2016.

Although the homes provide amenities beyond the basic requirements for quality housing, there are issues the architects overlooked. Residents I interviewed consistently complained about the lack of a suitable space to hang laundry. For those living in units without a private terrace or courtyard, their only option is to hang their wet clothes on drying racks placed outside the front door,

Fig. 17. RIPOLLTIZON Architects, laundry outside the front door, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

making their laundry a very public matter. With no backyard and no alley, there is not a satisfactory alternative. Although it seems like a minor issue, this daily inconvenience significantly impacts residents' overall satisfaction of living at Social Housing in Sa Pobla.

Another problem concerns the swinging shutters on the windows, which are made out of a single piece of wood veneer. Although they make for an attractive façade, they do not offer the variability of the operable louvered shutters that are traditional to the region. When the shutters are closed, no light or air enters the residence. When the shutters are open, there is no way to limit the amount of light or

Fig. 18. RIPOLLTIZON Architects, window shutter comparison, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

air that comes in. The shutters are particularly problematic for residents on the ground floor, where they also pose a security issue.

Cristina and Andrea both have young children. When the weather is warm, they open their shutters and windows to allow for a breeze and leave a sheer curtain hanging to maintain privacy. Because the windows begin at the floor, they also function as doors when open. Not only does this make the home vulnerable to intruders, it also means their children can use the opening as an unsecured exit. Cristina's and

Fig. 19. RIPOLLTIZON Architects, Cristina's and Andrea's children escaping through windows, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Andrea's children are constantly escaping through the open window to play together in the courtyard. Their mothers wish they had either operable louvered shutters or shorter windows to correct the problem.

These negative issues are eclipsed by accounts of satisfied residents who are grateful to live in a quality, affordable home. Anna, who lives alone with her cat, appreciates the friendly community, the affordable rent, and the amount of living space provided in her apartment. Hermene, who lives with his daughter and grandson, has enjoyed living at the complex for the past three years. He particularly

Fig. 20. RIPOLLTIZON Architects, Anna hosts a guest in her home, Mallorca, Spain, 2012.

appreciates the private terrace attached to his unit, where he can hang his laundry and smoke outside the residence. Even Andrea, who complained about the laundry and unsecure window openings, said she prefers her home in Sa Pobla to anywhere she has lived before. These comments reveal the success of RIPOLLTIZON's approach to providing residents with amenities that go beyond standard affordable housing.

Fig. 21. RIPOLLTIZON Architects, Hermene and his terrace, Mallorca, Spain, 2012.

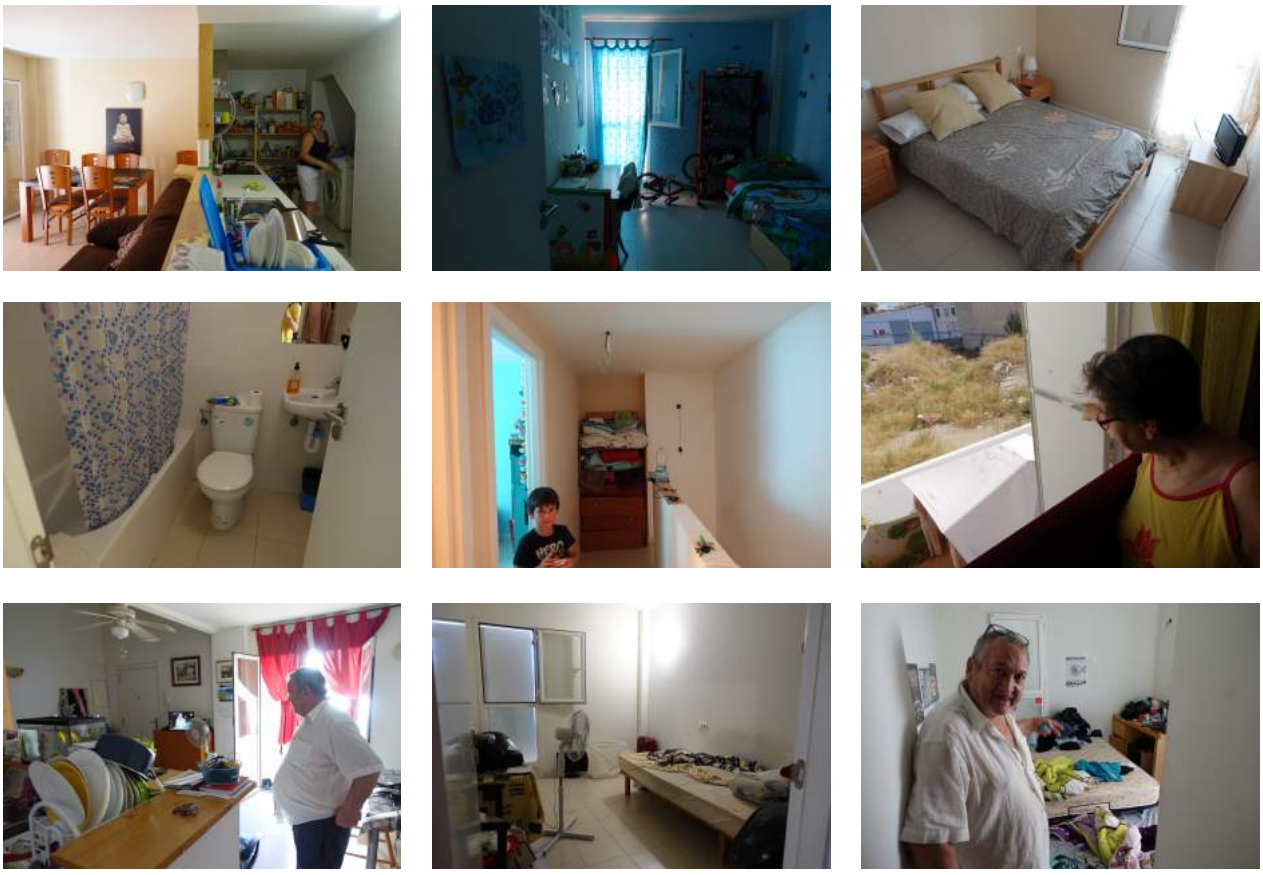

Fig. 22. RIPOLLTIZON Architects, interior conditions, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Details

In addition to the features already mentioned, Social Housing in Sa Pobla benefits from thoughtful details that add value to the project and enhance users' experience of the complex. The visual appearance of the project was carefully considered to provide residents with attractive homes. A consistent architectural language and a universal white finish unify the project and contribute to a pleasing minimalist aesthetic. This beauty is achieved with affordable and durable building materials—concrete structure infilled with clay masonry blocks and covered in white plaster finish.

RIPOLLTIZON enlisted sustainable design strategies to reduce the building's environmental impact as well as to make living at Social Housing in Sa Pobla more affordable. Solar thermal collectors placed on the roof provide 70% of the complex's hot water. High efficiency fixtures and a gray water recycling system keep water bills low.

Fig. 23. RIPOLLTIZON Architects, ventilation chimneys and perforations and views, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Passive ventilation chimneys circulate air in the residences, and a reduced building depth of twenty feet aids in cross-ventilation. Additionally, perforations in the building mass permit light and air to penetrate the complex and also allow scenic views of the western mountains. These sustainable design strategies improve residents' quality of life and can be easily incorporated into other affordable housing projects.

Purpose

RIPOLLTIZON's work in Sa Pobla exceeds the basic requirements of affordable housing and provides residents with quality homes in an inspiring setting. The residences' spacious layouts, double-height spaces, and private terraces and courtyards offer valuable enhancements rarely seen in affordable housing projects. A good location places residents within walking distance of daily necessities and offers them easy connection to additional transit options. Additionally, sustainable design strategies reduce the buildings' carbon footprint and make living at Social Housing in Sa Pobla more comfortable and economical. Perhaps the greatest accomplishment of the project, though, is the success it has had in fostering the formation of a close community.

The courtyard model has proved effective in encouraging strong relational ties between residents. During interviews, residents reported knowing all of the other tenants in the complex, an impressive feat for a neighborhood of nineteen households. Some of the relationships formed have grown into close friendships, like the ones shared between Cristina and Andrea and their children. Being able to know and trust one's neighbors contributes to a friendly atmosphere at the complex and makes life more meaningful and enjoyable for residents. Considering these relationships have formed in the absence of a successful public gathering space, it is exciting to imagine how the community would further benefit from a more useful and inviting central courtyard.

A fair criticism of Social Housing in Sa Pobla concerns a common dilemma architects face—how to balance beauty with practicality. RIPOLLTIZON spent great effort to create a visually appealing complex. Although the attractive design greatly enhances the space, it also inhibits the complex's usability. The solid paneled shutters that support the project's minimalist design function poorly as filters of air and light. In order to maintain a consistent design, floor-to-ceiling windows on upper story residences are continued in ground floor units, where alternative openings would provide more security. The priority given to preserving a minimalist aesthetic prevents residents from taking greater ownership of the space. With no ledges, hooks, or window balconies, the façades remain as the architects designed them—bare, with nowhere to hang a laundry line or set out a decorative planter. The courtyard suffers the same fate; the starkness of the space has stifled resident activity. Sacrificing some design autonomy in order to provide residents with more usable space is an adjustment architects should be willing to make.

RIPOLLTIZON's modern interpretation of a traditional courtyard housing complex offers valuable lessons for designers of affordable housing. The results produced by the courtyard plan prove the layout's effectiveness in promoting resident interaction. The neighborhood's safe, inviting atmosphere demonstrates how orienting housing around a central public space helps unify the community and eliminate crime. Furthermore, residents' ability to become acquainted with everyone living in the complex suggests that groupings of around twenty residences are appropriately scaled to encourage strong community.

Social Housing in Sa Pobla illustrates that when designing affordable housing, the shape of the neighborhood is just as important as the design of the home.

Homes for the People:

How to Design Quality Housing for the 1.6 Billion People Who Need It

Fig. 1. ELEMENTAL, Villa Verde, Constitución, Chile, 2010.

Fig. 2. Shigeru Ban, Post-Tsunami Housing, Kirinda, Sri Lanka, 2007.

Fig. 3. ASTOC Architects and Planners, Buchheimer Weg, Cologne, Germany, 2012.

Fig. 4. RIPOLLTIZON Architects, Social Housing in Sa Pobla, Mallorca, Spain, 2012.

Studying these four diverse architectural approaches has deepened my understanding of how to design quality affordable housing. ELEMENTAL's half-built houses at Villa Verde demonstrate the effectiveness of incremental design and the importance of choosing a site within walking distance of commercial centers. Ban's Post-Tsunami Housing illustrates the need for durable materials and contextual designs that put the needs of the residents first. ASTOC Architects and Planners' Buchheimer Weg proves that providing a

variety of well-programmed public spaces leads to thriving communities and increased quality of life for residents. Finally, RIPOLLTIZON's Social Housing in Sa Pobla emphasizes the importance of organizing residences around a central shared space in order to promote unity, security, and interactivity among residents.

Compiling this report has allowed me to synthesize the knowledge and experience gained by the architects of each of the selected projects. Through on-site investigations, resident interviews, and critical analyses, the projects have been evaluated for their effectiveness in providing quality affordable housing. By learning from the successes and failures of these projects, the collective expertise on designing affordable housing is broadened and strengthened. My hope is that this report would help architects and designers provide quality affordable housing that residents are proud to call home.

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