

Progressive Housing Modules



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Progressive Housing Modules

Patricia Carolina Lanzas Salazar

Chair:Bradley Walters

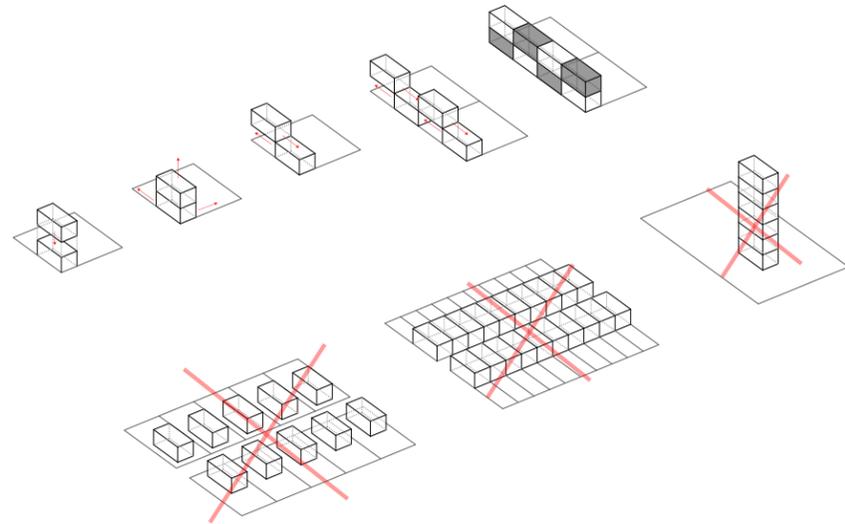
2nd:Charlie Hailey

UF SoA | Spring 2017

There are millions of people living in chronic poverty in the Americas, people that live day by day in a state of fear because of the lack of employment, lack of sustenance, lack of basic services such as water and electricity, and most importantly lack of shelter. Shelter is essential in these conditions because it gives people an anchor and home, a sense of belonging even when they seem to have nothing, and with nothing people build their houses out of found materials and corrugated metal sheets, these shelters do not provide the space or the function families need to live a more comfortable life; in addition, these shelters are not structurally stable and become a danger to its inhabitants. Because their main priority is to get a roof over their heads, important factors such as cultural, climatic, and technical principles are not present in such informal settlements. The necessity for social housing is imminent, so the question lies in how to create a housing model that is going to provide people with the hope they need and the essential shelter required for a more dignified way of living. Through the analysis of three different precedents that provided a flexible floor plan and means to expand and grow the house in the future, a study of informal settlements in three countries Mexico, Nicaragua, and Argentina and a set of different housing models were designed to accommodate each specific site, their culture, their climate, the topography, and their social aspects. This proposal seeks to give people a feeling of belonging and the potential to grow into a well-established community that creates a blueprint of replicable modules for the generations to come through the design progressive housing modules.



Quinta Monroy



Quinta Monroy was designed by Alejandro Aravena to aid in the housing crisis in Iquique, Chile after the local authorities reached out for help. With an specific neighborhood in mind, Aravena and the rest of the ELEMENTAL team were faced with some unexpended challenges. Because the project was going to be government founded, the one hundred families that had lived in the site illegally for the past thirty years were giving a budget that not only had to accommodate the cost of the material and the labor, but it had to stretch enough to buy the plot of land from the government. Each family was allocated seven thousand five hundred dollars which translates to roughly to thirty square meter. With a very limited budget per household, Aravena now had to deal with the issue of space and how to fit one hundred families comfortably in a small site. One house per plot of land and a row style neighborhood was not going to cut it. Instead, he designed a modular three-storey structure, two house, one house sitting on top of the other. The modulation allowed for a rhythmic form with strategically placed expansion voids.

Architect:
ELEMENTAL
Alejandro Aravena,
Alfonso Montero,
Tomas Cortese,
Emilio de la Cerda

Location
Pedro Prado, Iquique,
Tarapaca, Chile

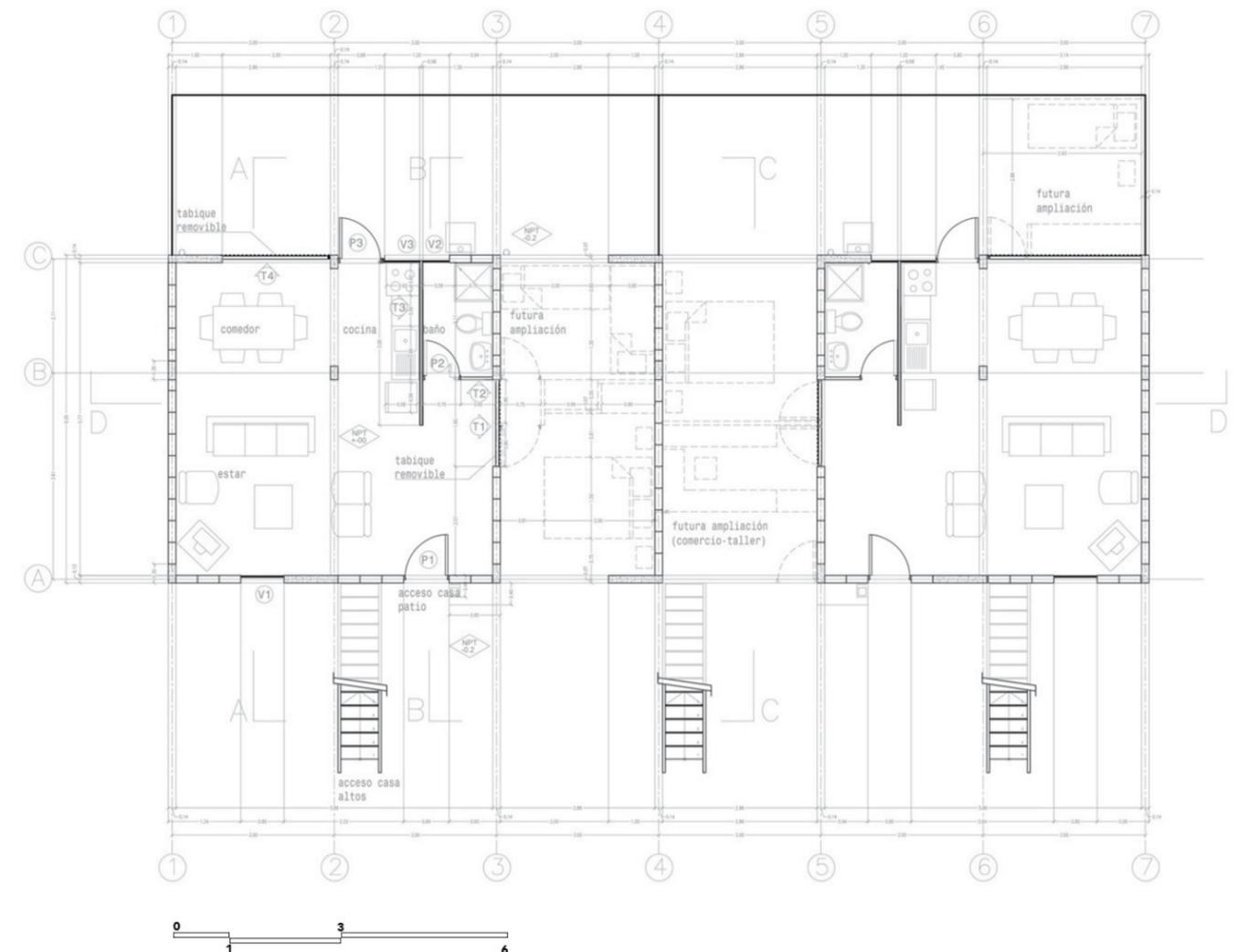
Area
5000 sqm
3500 sqm of constructed area

Completion Time
9 Months

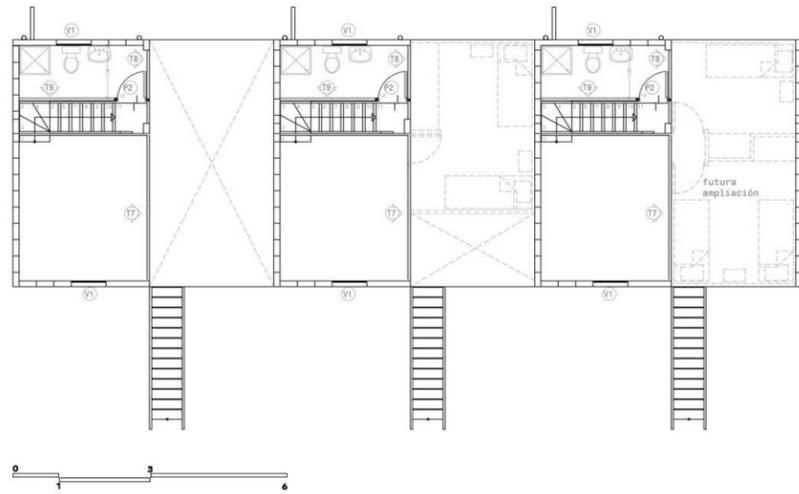
Year
2013

Budget
US \$204/ sqm

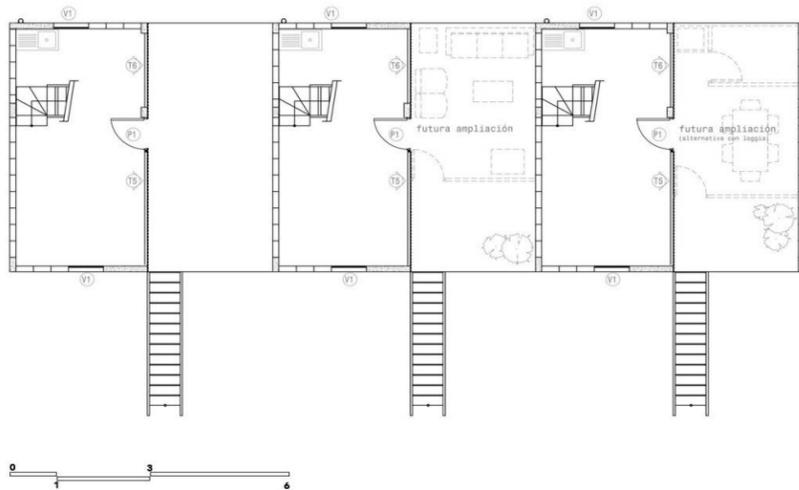
Material
Concrete and Cement bricks



First Floor



Second Floor

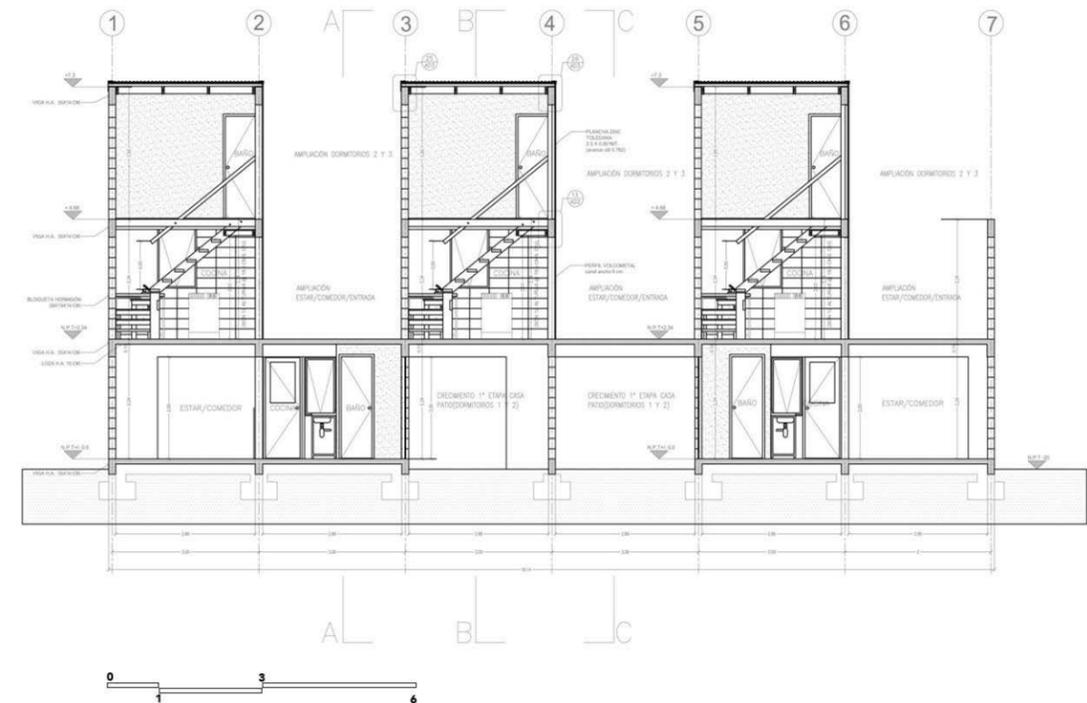


Site Plan

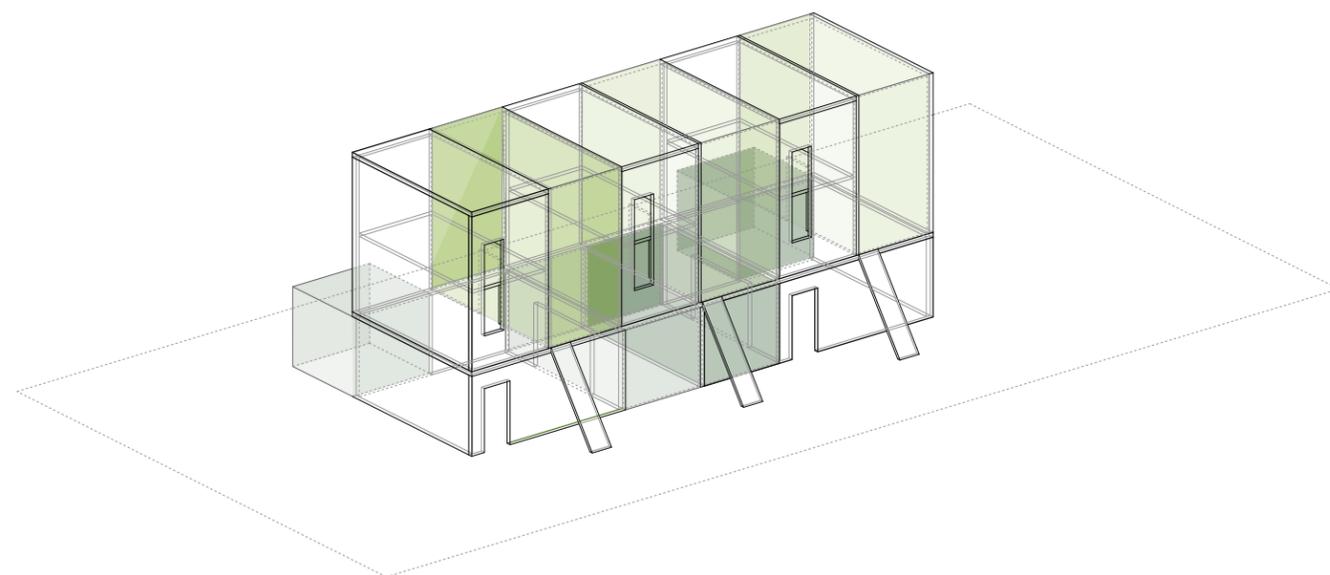
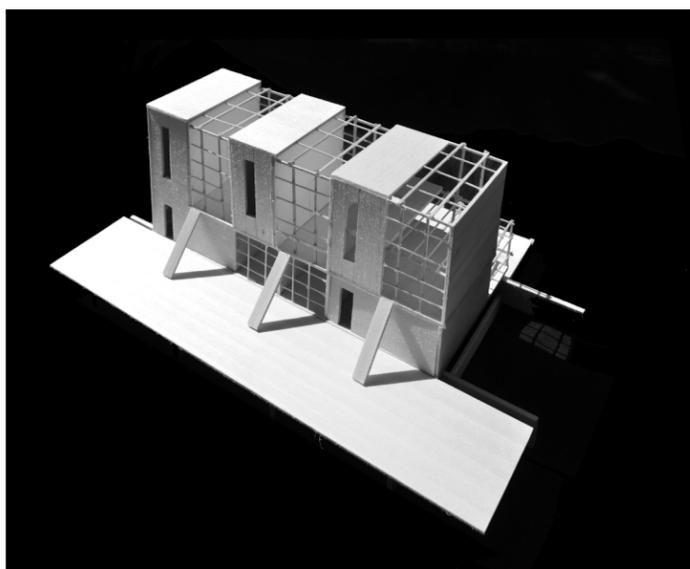
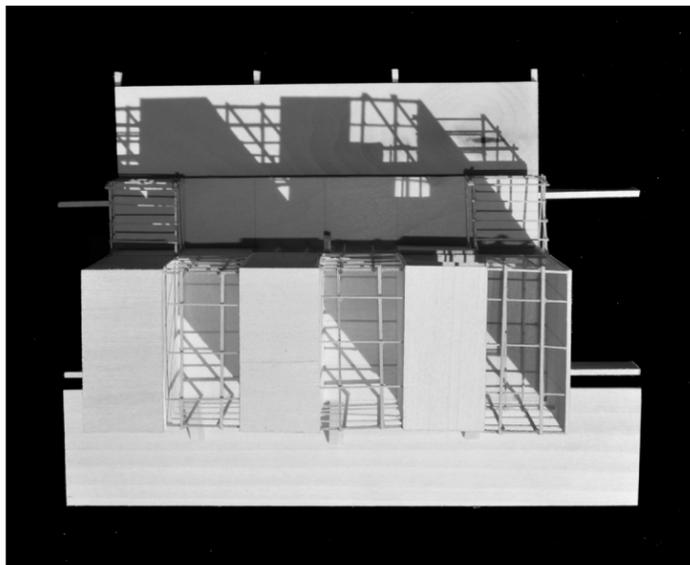


The voids that Aravena created within the rhythmic form of the project are intended for the growth of the family as well of the dwelling. The main building materials of the project are concrete and cement block; with the notion of the families are able to expand their homes, specific walls were constructed using a light wood frame and plywood for ease demolition. The expansion is crucial for the completion of the project because what Aravena provided for them was only half of a good house.

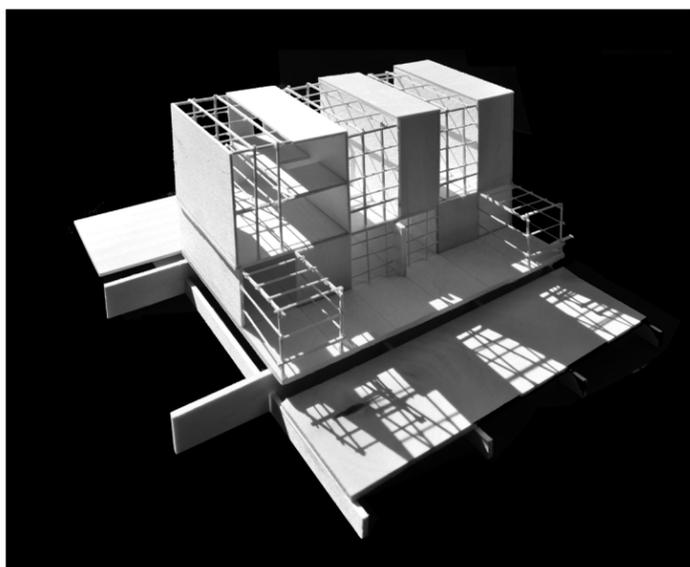
Even though the rhythm of the modules provide each family with roughly the same amount of square meters, there are certain disadvantages that need to be considered. For the families of the ground floor units, the design allows them to expand their house in a more efficient and rapid manner. First and foremost, there is no roof to build since the top units act as the roof of the bottom units; this proves to be a huge advantage since roofs are often the hardest and most crucial part of the construction. Also, the area that is needed to cap off the voids are smaller than that of the ones in the top units. However, the bottom units have to cope with a slower construction right above them which leaves them to deal with a noisier and longer expansion time. Even though the top units have more demolition and construction than the bottom units, the top houses count with a less compressed house and have the possibility to add private exterior space to their dwellings through the addition of a balcony in the new construction.



Cross Sections



- Analytic Model
- Learning the rhythm
 - Modulation
 - Provided space
 - Future space(frame)
 - Shared spaces
 - Relationship between the units

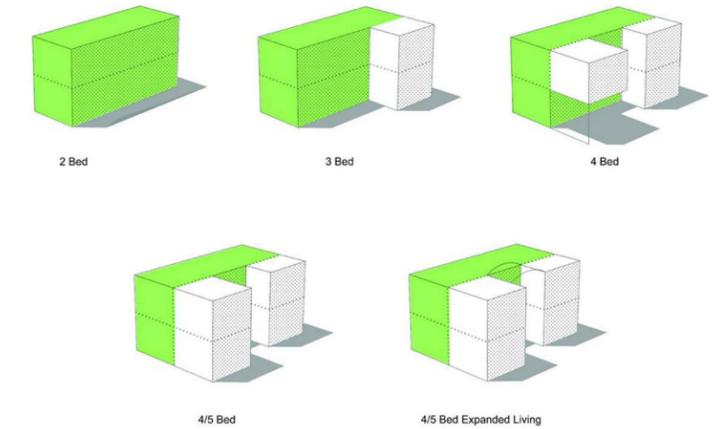


“Half of a Good House”

- Alejandro Aravena

SLO South Chase

The Simple Living Opportunities (SLO) in South Chase is a different take in progressive housing. In this type of modulation, the amount of land is greater allowing for a bigger footprint. Even though the plots of land are carefully delineated, not all is constructed at once. There is a start up module that consist in a basic two bedroom layout with a kitchen and living space; this basic module can then be expanded over time to adjust to the needs of its occupants. The module can be expanded into a three and four bedroom module, but even these modules can be adjust.



Architect:
Proctor and Mattheews
Architects

Location
Newhall, Harlow

Area
1.5 Hectares

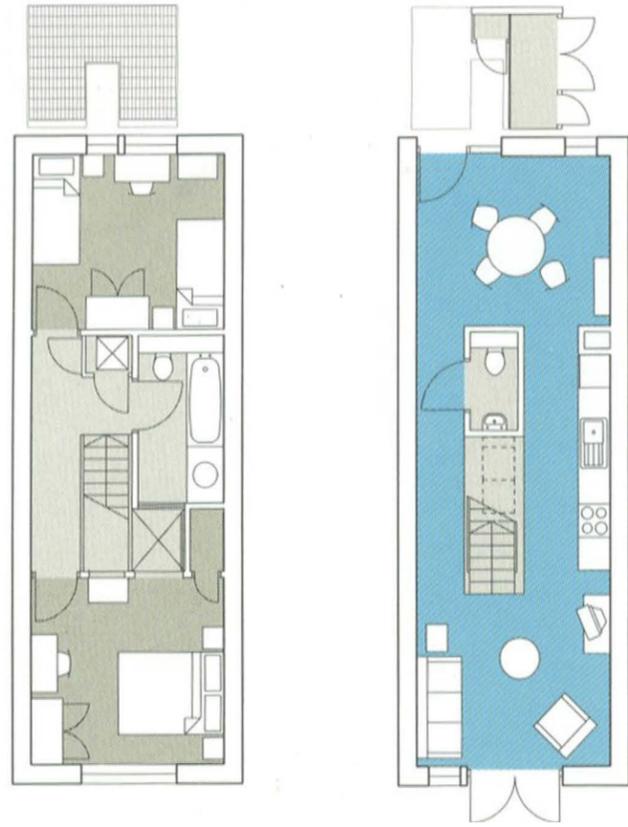
Number of dwellings
78 homes
52 houses / 26 flats

Year
2007

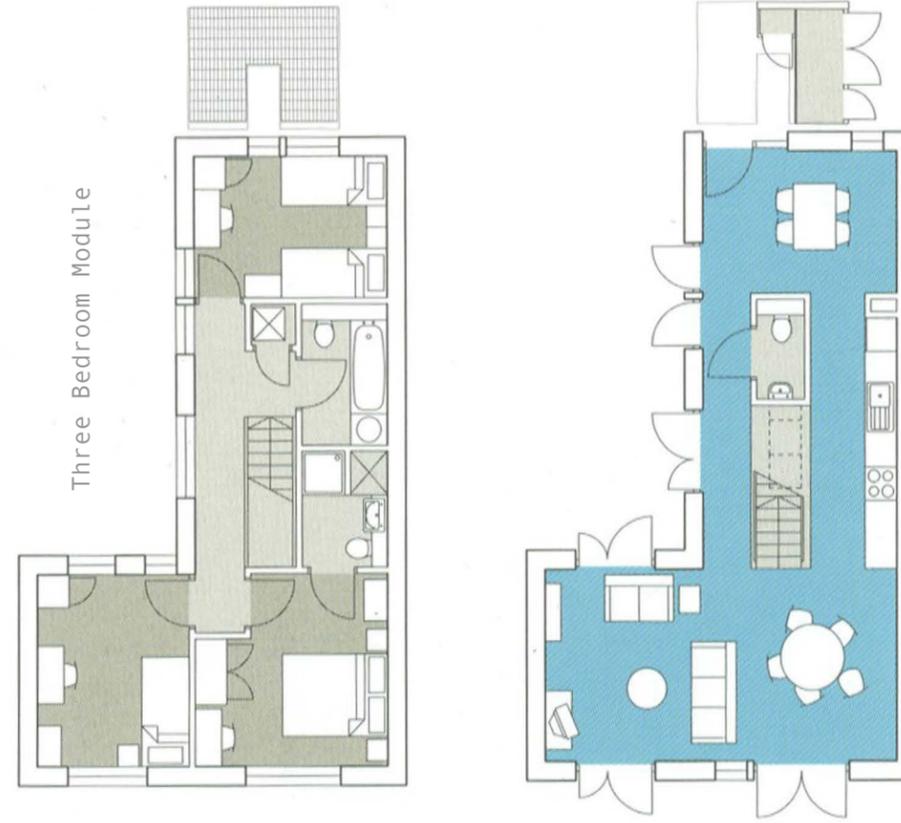
Construction Method
Steel Frame



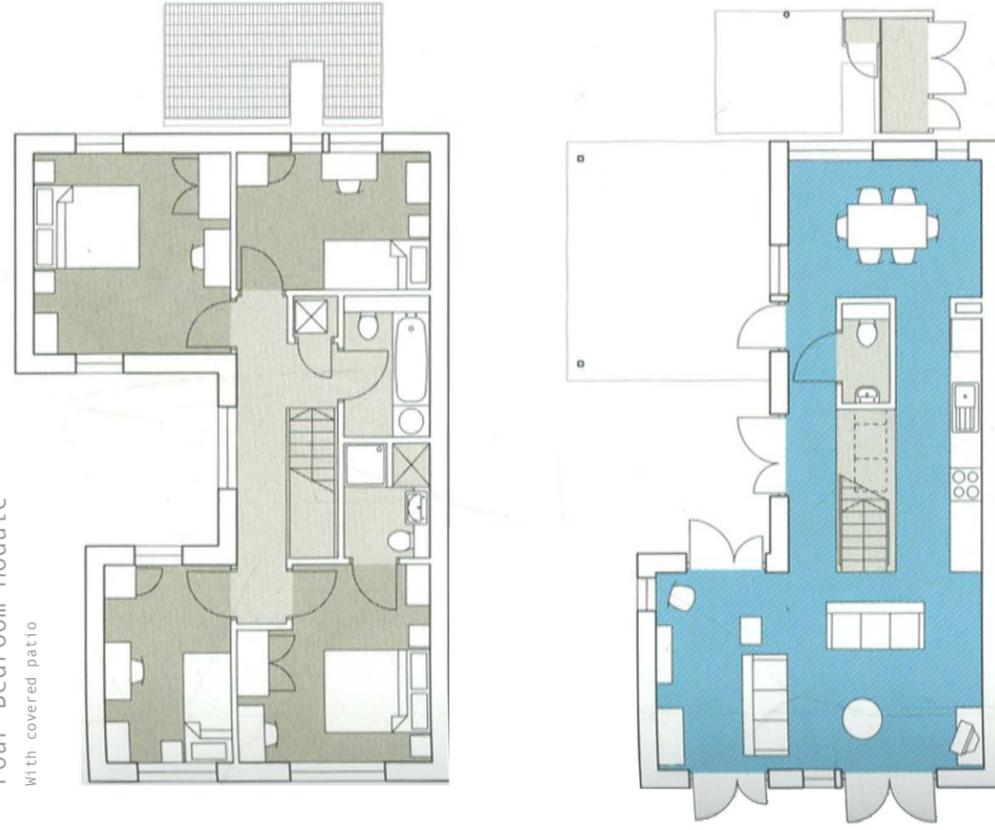
Two Bedroom Module



Three Bedroom Module



Four Bedroom Module
With covered patio



To expand the module to a three bedroom module an expansion to the living space occurs; the extra living space on the ground floor acts as the foundation for that third bedroom on the second floor of the module. The four bedroom module is even more dynamic. Since the fourth bedroom is located on the second floor, there is options in the space below; this space can become a covered patio or it can be closed off to further increase the living space on the bottom floor.

Biesdorf Housing Complex



Architect:
Leon Wohlhage Wernik

Location
Berlin, Germany

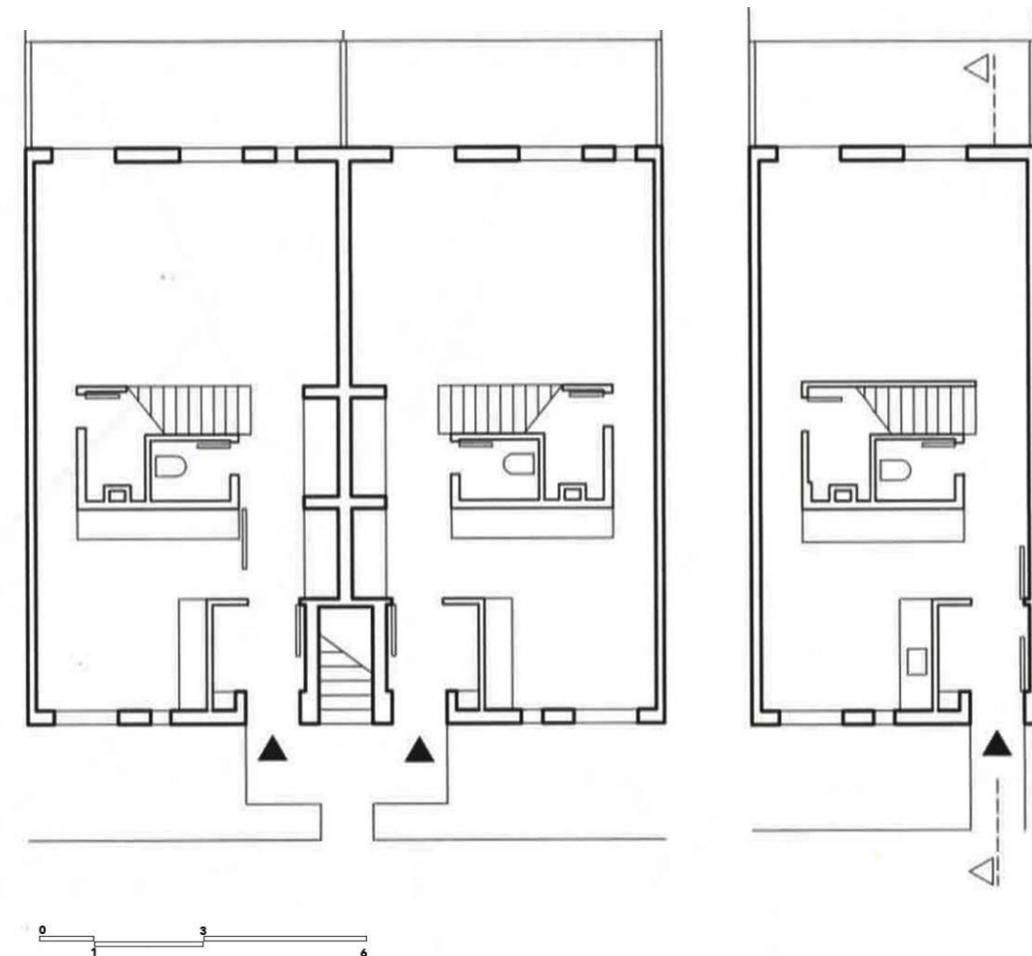
Area
Type A: 120 sqm
Type C: 105 sqm

Number of dwellings
64 Homes

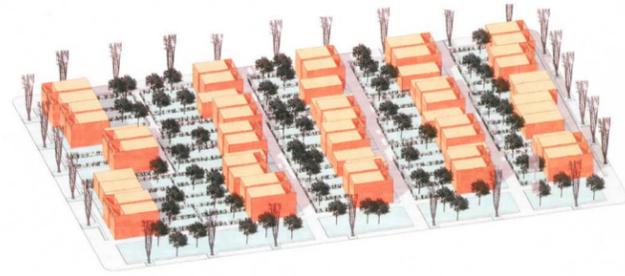
Year
1999

Construction Method
Masonry

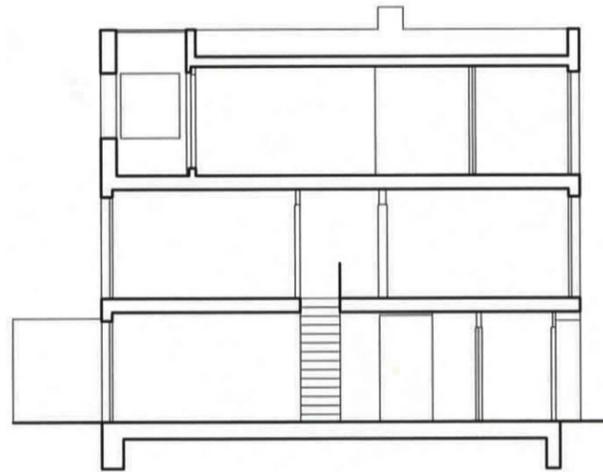
The Biesdorf Housing Complex offers another solution for progressive housing this time occupying the total footprint desired. The plots of land are delineated in rows, and to give interest to the façade of the modules they are stagger creating a visual rhythm in the complex. Just like in SLO, there is a start up two-storey module. This module can then be either expanded or used as a foundation for a second module or unit on top. The modules have to be planned and assigned a function from very early in the design process. Type A consist of two of the basic two-storey modules paired together to give place to an exterior stair that acts as a partition between the modules and allows external access to two flats that can be built on top of the original modules. Type B consist on the same two-storey module with a third floor addition; the area of the addition is of half of the original footprint leaving the other half to be used as a roof top terrace. Moreover, the terrace can then be enclose to complete the third floor. Because each type is already predisposed, there is not as much flexibility in the floor plan specially in type A since the flat is an external addition. Type B allows for that progressive construction to happens depending on the family's need.



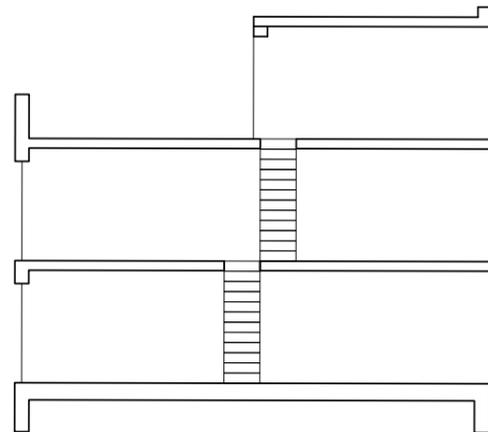
Type B
First Floor



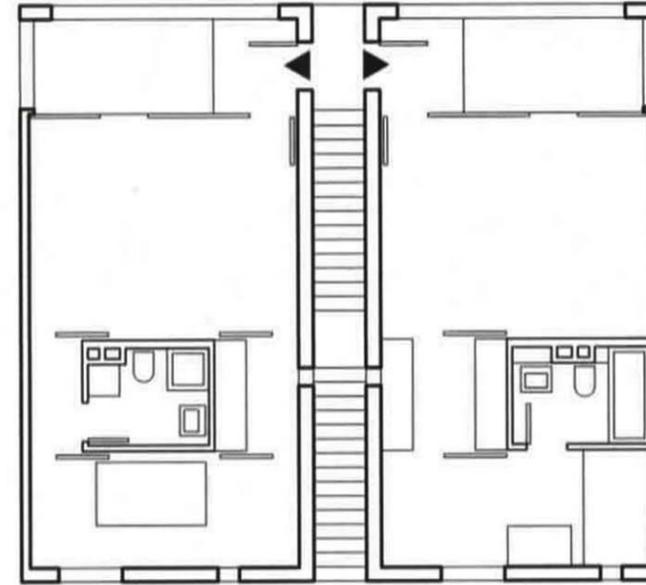
Site Plan



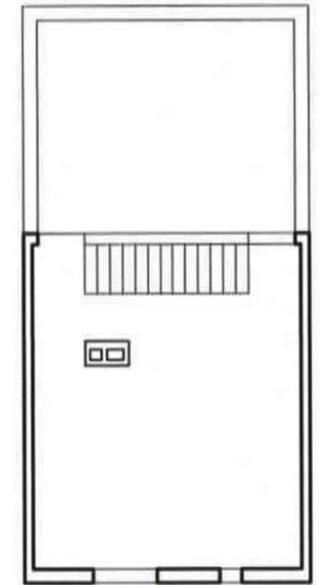
Longitudinal Section
Type A



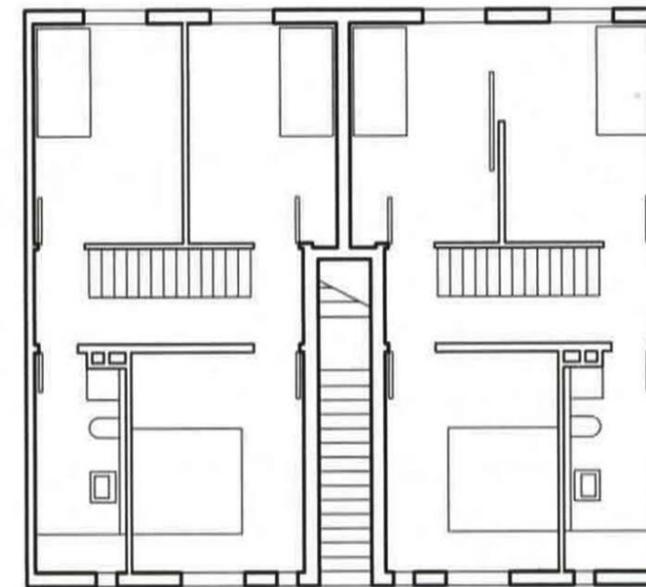
Longitudinal Section
Type B



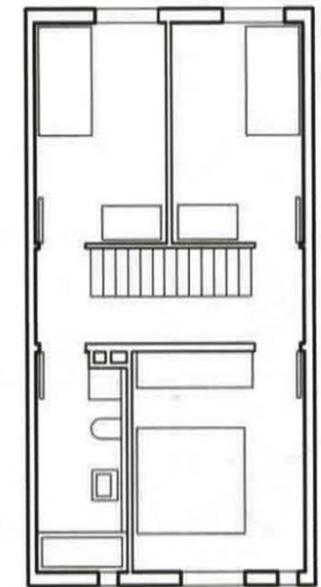
Type A
Third Floor
Private Flats



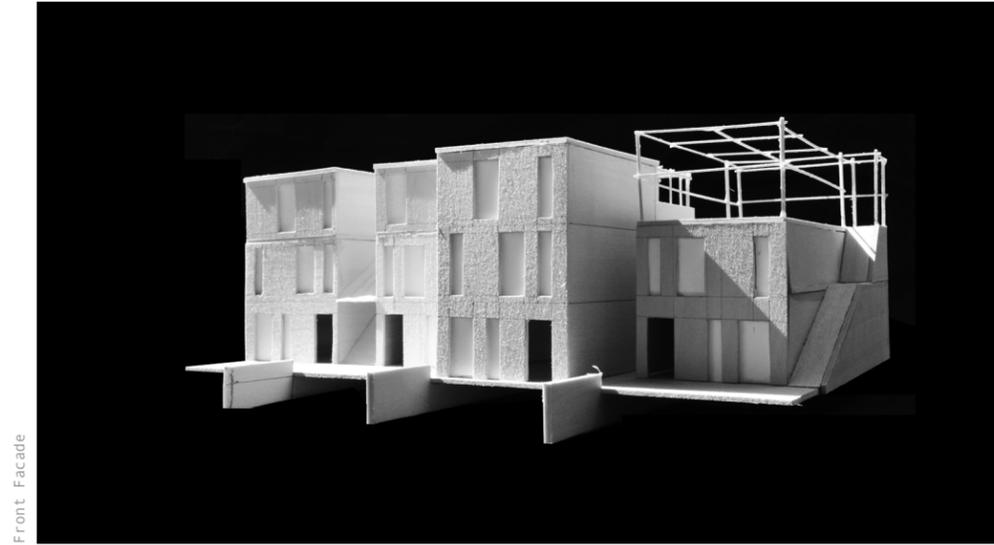
Type B
Third Floor
Terrace Extension



Type A
Second Floor



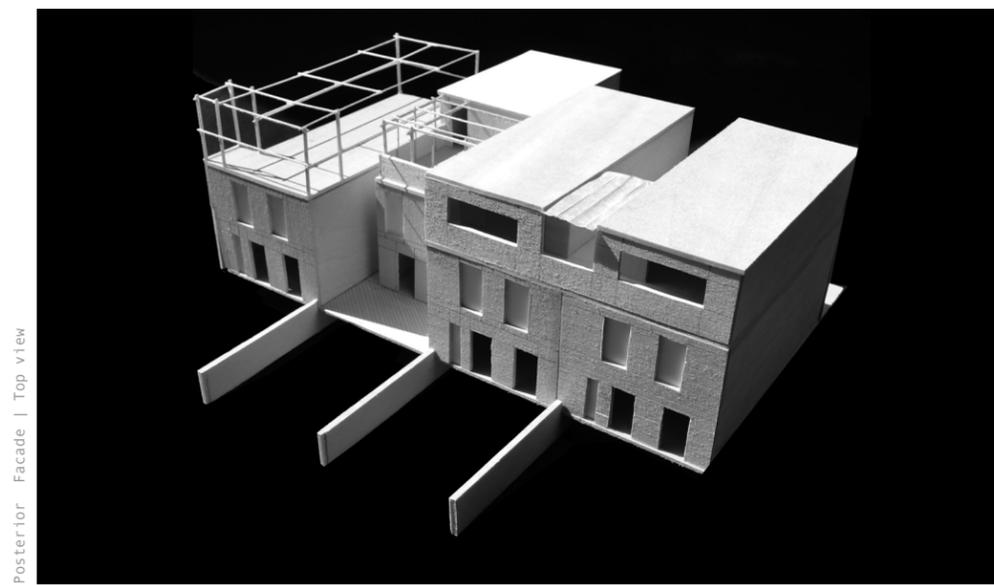
Type B
Second Floor



Front Facade

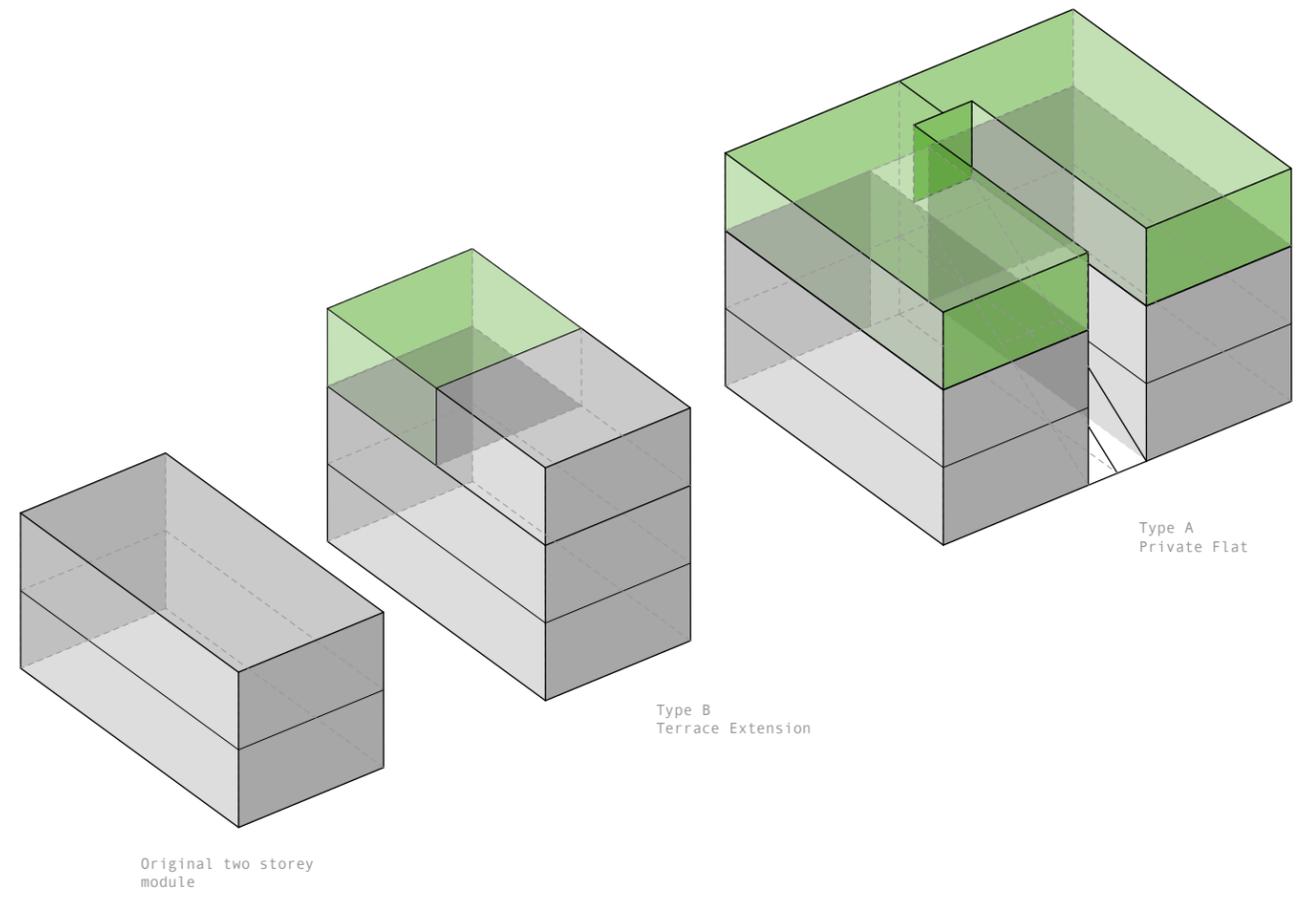


Posterior Facade



Posterior Facade | Top view

- Analytic Model**
- Learning the rhythm
 - Modulation
 - Future expansion(Frame)
 - Stagger layout
 - Type A Vs. Type B
 - Private Access(Stairs)
 - Advantages of each module





The three case studies presented above showed the flexibility of the floor plan to accommodate the needs of its occupants in terms of space and economy in both Europe and Latin America. Slo South Chase and the Biesdorf Housing Complex provide a bigger footprint, this correlates with the targeted occupants of the buildings and the cultural drivers of the site. Both European case studies presented challenges as Slo South Chase provides with the most flexible floor plan the fact that the additions have to be built by professional means that any expansion is more costly, requiring more time and professional skills. Biesdorf provides its occupants with the space to expand, using that expansion as a potential rental property or as an expansion of the unit's living space. However, the initial module itself is very large, and it is not possible to partly build driving up the upfront cost. On the other hand Quinta Monroy, deals with its own challenges and cultural drivers such as limited space and budget. However, being located in Chile, this study represents better the site and the people that this proposal is intended to target.

In their own right, all three case studies provide challenges when it comes to flexible floor plans, these challenges become design opportunities to improve and accommodate people's daily lives within their households. Challenges such as land, space, capital become just a part of the design as emotional attachment to the community, setting roots, expanding families become more relevant as one zooms in into one particular site. As a result of this research, three different sites in Latin America were picked for this proposal in which each site provides its own set of challenges and opportunities, and the social impact of a house becomes a crucial aspect of the design process.

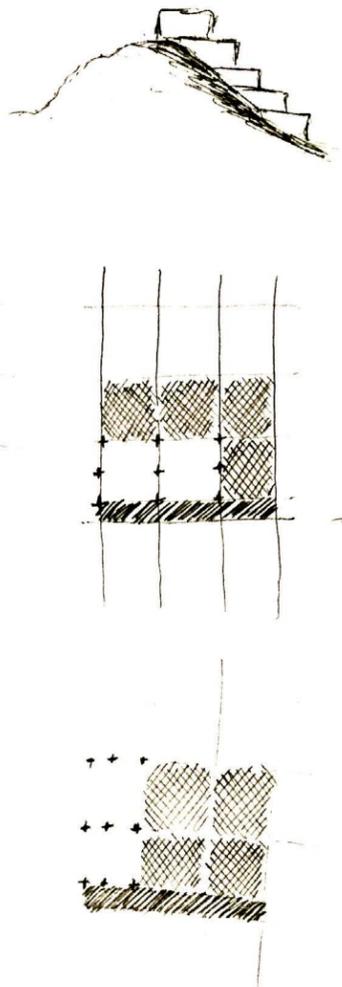
The three chosen sites are the border city of Ciudad Juarez, Mexico, the small agricultural town of Matagalpa in Nicaragua, and the capital city of Buenos Aires, Argentina. All three sites are different in topography, climate, social-economical status, and cultural trades. The proposal approaches each site with four different iterations of modules that can be self-built and replicated by the people. Modules that speak to the culture as well as the material and methods of the site. There are vast differences between the sites, but family is a factor prevalent in all three. With the notion of progressive building, the proposal uses small 1:100 paper models to quickly tackle the challenges provided by the sites. The paper delineates the envelope that each family would build as their start-up module, and the framework outlines the space that the families could grow into in the future when the funds allow for it very much like Aravena's Quinta Monroy. Each iteration follows a 3x3m modulation.

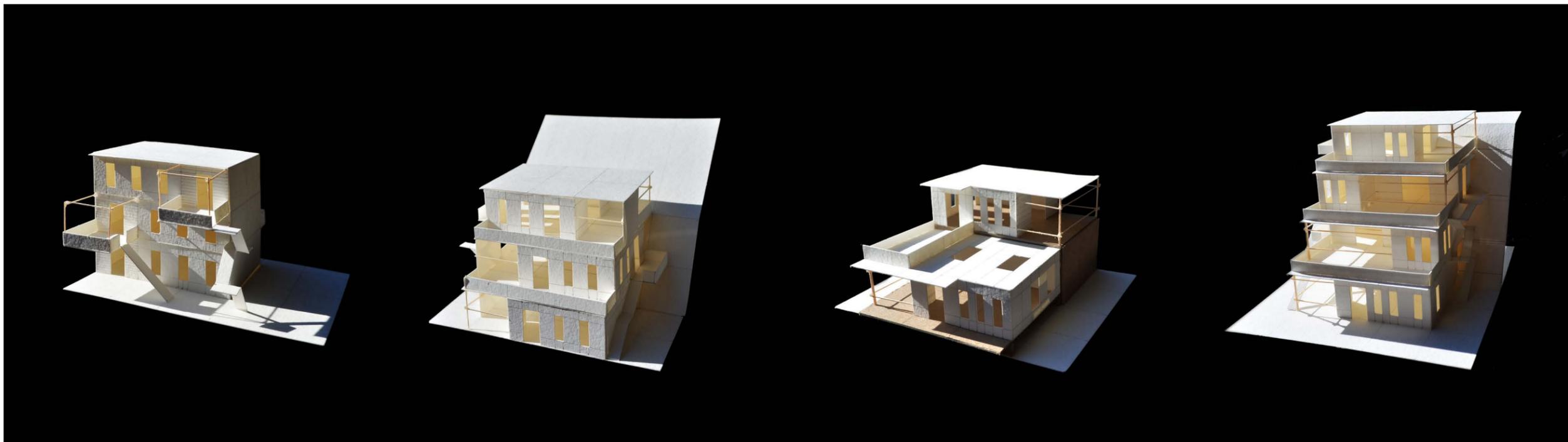


C I U D A D J U A R E Z , M E X I C O

Located in the boarder between Mexico and the United States, Ciudad Juarez and El Paso, Texas make for the second largest bi-national area on the boarder, this makes for a interesting mesh of cultures and businesses in the area. However, having has the opportunity to travel to El Paso, Text for an outsider the distinction between the two cities is drawn sharply by the Rio Grande and the 375 Express Highway. Located at the North of the boarder, El Paso presents all the characteristics of a major US city, but when taking a closer look the Mexican culture has infiltrated the fabric of the city with its many Mexican restaurants, a more colonial style of construction specially in the residential areas, and with the language. Having not had the chance to experience Juarez on the South of the boarder is difficult to say if the US has had as much impact in the fabric of the City. Looking out into Juarez from El Paso, the city seems untouched by El Paso. Located in the top most part of Chihuahua desert, Juarez experiences mid to high temperatures for most part of the day and year; however temperatures can drop to record lows at night. The aridness of the desert provides a dry, hilly, and rocky topography given this proposal a unique set of challenges to tackle. Extremely high and low temperatures, aridness, rocky and hilly topography, lack of shade, unpaved roads, and the lack of the continuation of the city grid are some of the most obvious challenges; with social housing, there are other factors that need to be present since they are the one that can affect the itinerary and function of the dwelling. Cultural driver such as the way houses are built, how multiple generations live in one household, the importance of a strong sense of community are some of these cultural factors. The issues addressed in this proposal try to deal and solve in the best possible way a combination of this challenges and tries to adapt and embrace the building forms of the place.

Juarez builds its homes in a terraced like manner which the proposal adopted, since it is the organizational form that addresses better the topography. However, this brings up the issue of structure or the lack-there-off. Because people lack the funds to build the entirety of the house all at once, extra rooms and living space are added in the future compromising the structure of the house. Structure and safety are some of the things that this proposal will address in four different iteration that also tackle the issues of square footage, roof conditions, light, outdoor space, and private access (stairs).





- SOLVING FOR:
- Square footage
 - Outdoor Space
 - Public vs. private access (Stair and entrance)

However:

- The original square footage is larger in area from the get-go.
- The amount of square footage to grow into the home is very limited.
- The private access to the units feeling like an after thought.

- SOLVING FOR:
- Square footage
 - Outdoor Space
 - Public vs. private access (Stair and entrance)
 - Topography

However:

- The amount of original square footage was reduced by a third.
- The area of the progressive square footage was increased to match those of the Argentina and Nicaragua sites.
- The hilly topography of Ciudad Juarez was address for the first time with a terraced layout.

- SOLVING FOR:
- Outdoor Space
 - Public vs. private access (Stair and entrance)
 - Topography
 - Light

However:

- A wider terraced layout was planned out which yield for roof space to address the issue of light.
- A large skylight was address to the top unit.
- The skylight also prevents people for future expanding on a structure that is not meant to handle the weight of a two storey construction.

- SOLVING FOR:
- Outdoor Space
 - Public vs. private access (Stair and entrance)
 - Topography

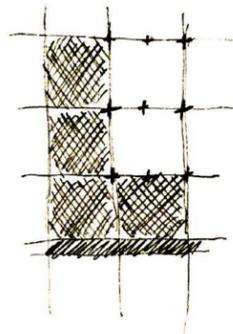
However:

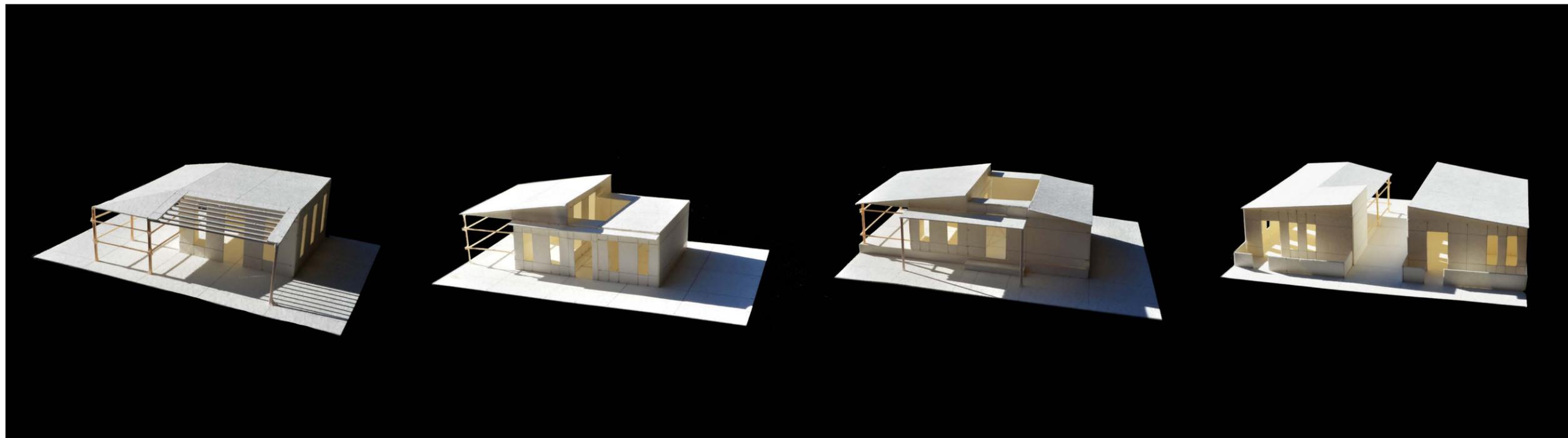
- A much steeper topography.
- Fours levels and the highest yet for the Ciudad Juarez site.
- Achieving private access for each unit becomes more of a challenge.
- Adding rhythm and interest to the facade change the location of the progressive square footage.

M A T A G A L P A , N I C A R A G U A

Matagalpa sits in the middle of the country in a mountainous agricultural region favored by its elevation and tropical climate, compassing a very different site from that of desert like Juarez in Mexico. Having grown up in this small town makes for a more cultural driving proposal. Having the opportunity to have lived among the people and seen the struggle and hardship of everyday life made me want to inject life into this proposal as this is the poorest of the sites explored. When looking into cultural drivers, the old Spanish colonial houses and churches that still exists and puncture the fabric of the city served as inspirations for the four iterations in this site's proposal; porches and courtyards became part of the organization and itinerary of the modules. In addition, height, roof, materials and methods were present from very early on in the design process. Unlike Juarez, people don't built their houses in a terrace manner.

Matagalpa builds its homes in a more traditional one-storey single family style manner. Also, the tropical climate and roof became a challenge in the site. People lack the funds to build their house from materials strong enough to withstand a storm from the get go, leaving their houses, their homes, vulnerable to the elements. The rainy season is reason for major concern. Because people don't build up to expand theirs house, the horizontality of the proposal became an opportunity to start treading courtyard spaces within the proposal to break up the scale and speak to the Spanish roots of the country; this added courtyard also broke up the roof and gave people the opportunity for private outdoor space. Other issues such as light, climate, square footage, and threshold were explored to provide people with a functional space to grow and expand.





- SOLVING FOR:
- Square footage
 - Outdoor Space
 - Public vs. private access (Stair and entrance)

However:

- A larger progressive square footage was giving to this floor plan.
- A porch was added as a threshold between the unit and the street.
- The flat roof started to present a future problem.

- SOLVING FOR:
- Square footage
 - Outdoor Space
 - Public vs. private access (Stair and entrance)
 - Roof

However:

- The progressive square footage of the unit was reduced by a third,.
- The porch was taken away in favor for a flat facade.
- Half of the roof was pitched for structural and safety purposes.
- A courtyard was added in the middle of the house replicating certain features of the old colonial houses.

- SOLVING FOR:
- Addressing the street.
 - The Roof

However:

- Both sides of the roof were pitch again for structural and safety purposes.
- The porch was reintroduced as it is the essential threshold between the house and the street.
- The house was elevated to create even more of a separation between the street and the units.

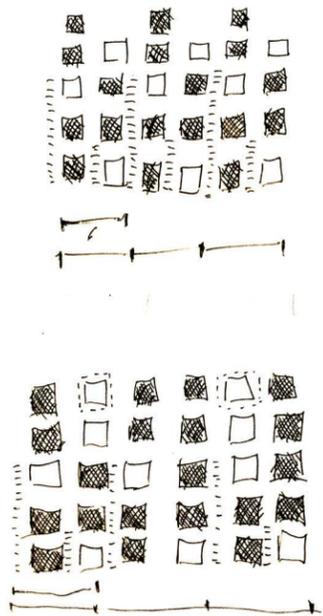
- SOLVING FOR:
- Rethinking the floor plan
 - Cultural drivers

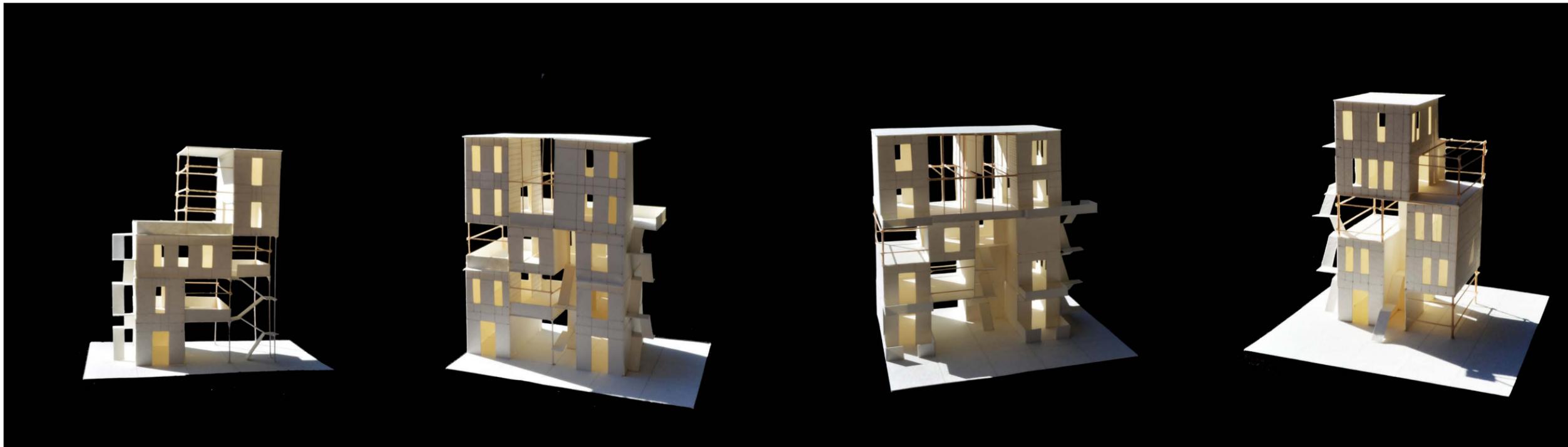
However:

- Conserving the pitch roof.
- Fencing the porch for more privacy.
- Locating the progressive square footage at the back of the house for the possibility of a larger backyard before the progressive space is filled in.
- Relationship between two separate units.

B U E N O S A I R E S , A R G E N T I N A

Buenos Aires is the last and southern most site in the proposal. One of the key differences in this site is that Buenos Aires is a metropolitan city exposed to a massive amount of tourism as well as exposure to different cultures. Climatically, Buenos Aires is favored by a stand range of temperatures throughout the year unlike the other sites which undergo extreme weather conditions. As Matagalpa did, Buenos Aires is charged culturally by the Spanish; however the city is not only influenced by the Spanish, but the rest of Europe specially Italy. The heavy European influence in the country has had a large impact the Argentinians daily lives. Buenos Aires builds it homes not in terrace manner to suit the site or in horizontal fashion, but it builds up. The vertically of the city is not only present in the more affluent areas, but also on the city slums giving the proposal a new organization as well as new challenges. The verticality of the construction give the proposal an unexpected rhythm, and issues like progressive building area, outdoor space, and public access(stairs) become more of a challenge as in a vertical construction space is very limited. The areas meant to be filled in in the future become crucial outdoor space for the families, as this space might take years to be closed off and completed, but in time, when the space is completed, the families gain more living space and lose all outdoor space, balconies appear is all four iterations of this proposal. The most challenging aspect are the stairs an access to each unit within a module. The question is, do people have to share the stairs or can one module accommodate private access to each unit? Even though sharing a stair is the norm, having a completely private entrance can provide people with the feeling of a single family home instead of a tiny apartment in a rundown neighborhood in the city. Although square footage is addressed in both previous site, the vertically of the proposal yield for a discrepancy in square footage from one unit to the other.





SOLVING FOR:

- Square footage
- Outdoor Space
- Public vs. private access (Stair and entrance)

However:

- The discrepancy in square footage between the units became too large.
- There was a clear lack of structure.
- The outdoor space lacked function.

SOLVING FOR:

- Discrepancy in square footage
- Outdoor Space
- Public Vs. Private access (Stair and entrance)
- Structure

However:

- To address the square footage, two more units were added to the same blueprint. This addition aided, but did not solve the discrepancy in square footage.
- The rearrangement of the units solve the structural problems in this model.
- The two top units share stair access.
- Progressive building space can be used as private outdoor space until it is filled in.

SOLVING FOR:

- Discrepancy in square footage which has not been successful in the past two models

However:

- There was a slight increase in the square footage of the units in the past model the individual units were getting smaller in size to keep the same blueprint.
- The blueprint of the model was enlarged. This aided in the discrepancy.

SOLVING FOR:

- Discrepancy in square footage which has not been successful in the past two models
- Modulation and rhythm

However:

- Going back to the first model. A smaller footprint was chosen. Three units instead of five, with the gap in square footage almost closed. The thinner footprint and equal size units provide a slender module that can be replicated in a row style creating rhythm between the units.

After the careful analysis of all three sites, their topography, climate, and culture, the importance of the social impact of the house in the family and the community became the primary area of focus in the proposal of this module. The challenge was to continue to expand the research in all three site and keep it even and balanced, it is also difficult to understand a culture and place that I have never been a part of. It is easy to research and imagine what people's daily lives are like in Ciudad Juarez and Buenos Aires coming from a country like Nicaragua, but how could this proposal push the social boundaries of a place without truly knowing the people. In each site, there were challenges that were faced and that with each new module iteration came a little bit closer in providing a solution for some of these issues. With each module iteration something new was learned that would help inform only one site and not three, pushing the people and culture of that site forward.

Picking Matagalpa, Nicaragua as primary site for this proposal because of my history with the site was how the proposal moved forward. A people driving project were builders (albaniles), members of the community, and building materials alike informed the envelope as well as the itinerary of the modules. To this point, this proposal had focused on the envelope, the original built space and the progressive building space, without investigating the interior of the home, and the importance of its function. Traveling to site and talking to the people that were meant to occupy these modules was crucial. On March 6th, 2017, I traveled back to my hometown to better understand the needs of the people.

Being in Matagalpa gave a better understanding of the topography, and how neighborhoods change according to it. Focusing on one particular neighborhood in the southeast part of town named Colonia Apoyo al Combatiente. The colonia is a relatively old neighborhood, establish in 1980, since more and more neighborhoods are being formed in the outskirts of town to due to the thousands of people immigrating from the rural agricultural areas to the city. The colonia started with 75 prefabricated houses which is very uncommon for the area, and it was now grown to 387 houses. The growth of the colonia has divided it into four different sectors. The houses in each sector vary from size, materiality, and economical status. Even though this is a poor neighborhood, sector three is the poorest part of the community. The houses in this sector are made out of corrugated metal with a wood frame, dirt floors with one window at the most. This is the sector of this particular neighborhood that would benefit the most from this proposal. The entire neighborhood started out in the same way and with time, hard work, and a bit of money it has flourished to a community that people are actually very happy to live in and will not leave. The jefa de barrio, she is the community leader, was eager to hear that someone cared about how people lived and the struggle of everyday life in a country like Nicaragua.

GUANTANAMO



These were photos taken from all over the Colonia Apoyo al Combatiente. I had the opportunity to tour the neighborhood with the jefa de barrio, and had the chance to go inside different houses. Photo #1 is one of the only three remaining original prefabricated houses that the neighborhood started with. Photos 2, 3, and 4 were taken in the poorest sector of the neighborhood. These are the houses that have the potential to evolve into the proposed modules. On the other hand, photos 5 and 6 are dwellings in a much better condition. Masonry construction, with a wood frame roof and corrugated metal sheets; the house is partitioned by a wood wall that does not reach the full height of the ceiling. Photos 7 and 8 present houses that have been added onto over the pass of time and with any material affordable at the time. Photo 9 is an example of the pedestrian walkthroughs that adjust to the topography and the compressed spaces between the houses.



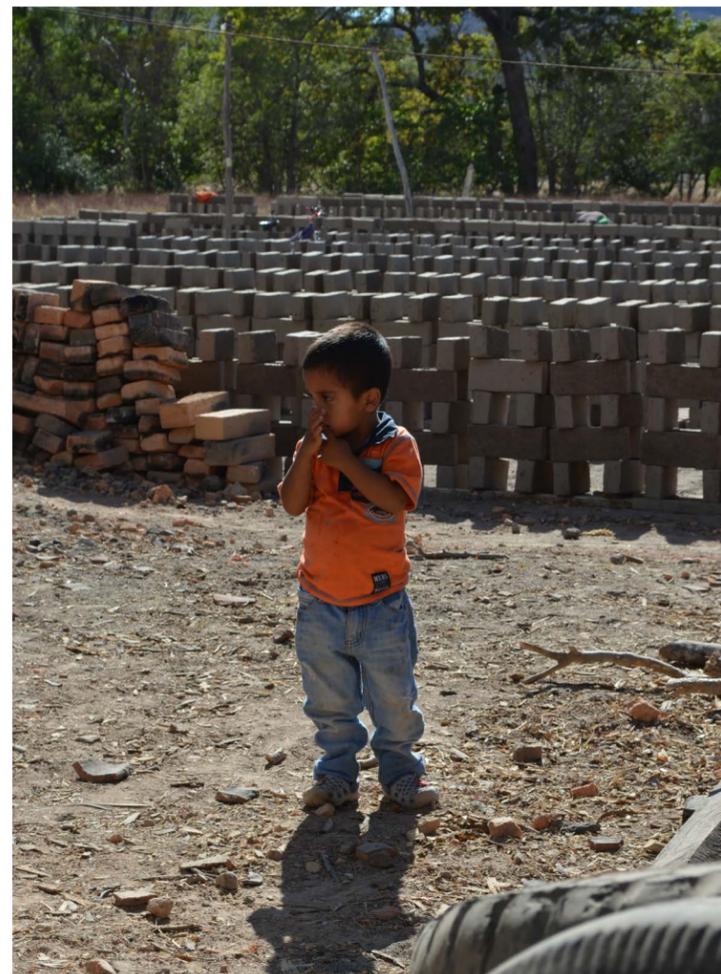
MATERIALS



Besides having the opportunity to meet the neighborhood leader, I had the privilege to meet with some of the towns local builders, albaniles. Arnoldo Matus is a class A builder which means that he has more experience, therefore, he is able to charge more for his services. However, Matus is aware that most of clients are people of limited resources and charges accordingly to his clients means. These photos are the materials required by builders like Matus to build limited resource houses. Brick is the prefer building block and foundation for the construction, 1/2" and 3/4" rebar for the columns, 2x4 and 2x2 wood members for the roof frame and partition walls, corrugated metal sheets, and clear corrugated fiber glass are the recurrent material thought my visit to the site.



BRICK



Brick is the foundation in the construction of low income housing in Nicaragua. The brick making process itself speaks to the culture of the site. It is a labor intensive process that requires the attention and care of the entire family. In the outskirts of town, there is family that has been making bricks for generations and it is currently training the next generation of brick makers. These photos depict a typical Sunday for the family. They start by mixing by hand clay, sawdust, and water in a dug whole in the ground. When the mixture has the right consistency, by hand it is poured into a wooden frame, so the bricks all have the same dimensions. The bricks then have to sun dry from 3 to 7 days. After the bricks are sun dried, they are transferred to the oven where they are baked for 24 hours. Because the bricks burn so hot, they are left to cool in the oven for about 3 days. When I asked the family how many bricks they make in a year, one of the members chuckled and said it is impossible to keep count. Bricks are sold by the thousand, that is the unit measure. One thousand commercial size bricks, 2"x5.5"x9", go for 3,500 cordobas that is roughly 120 dollars, and 35 of those bricks makes for 1 meter square.

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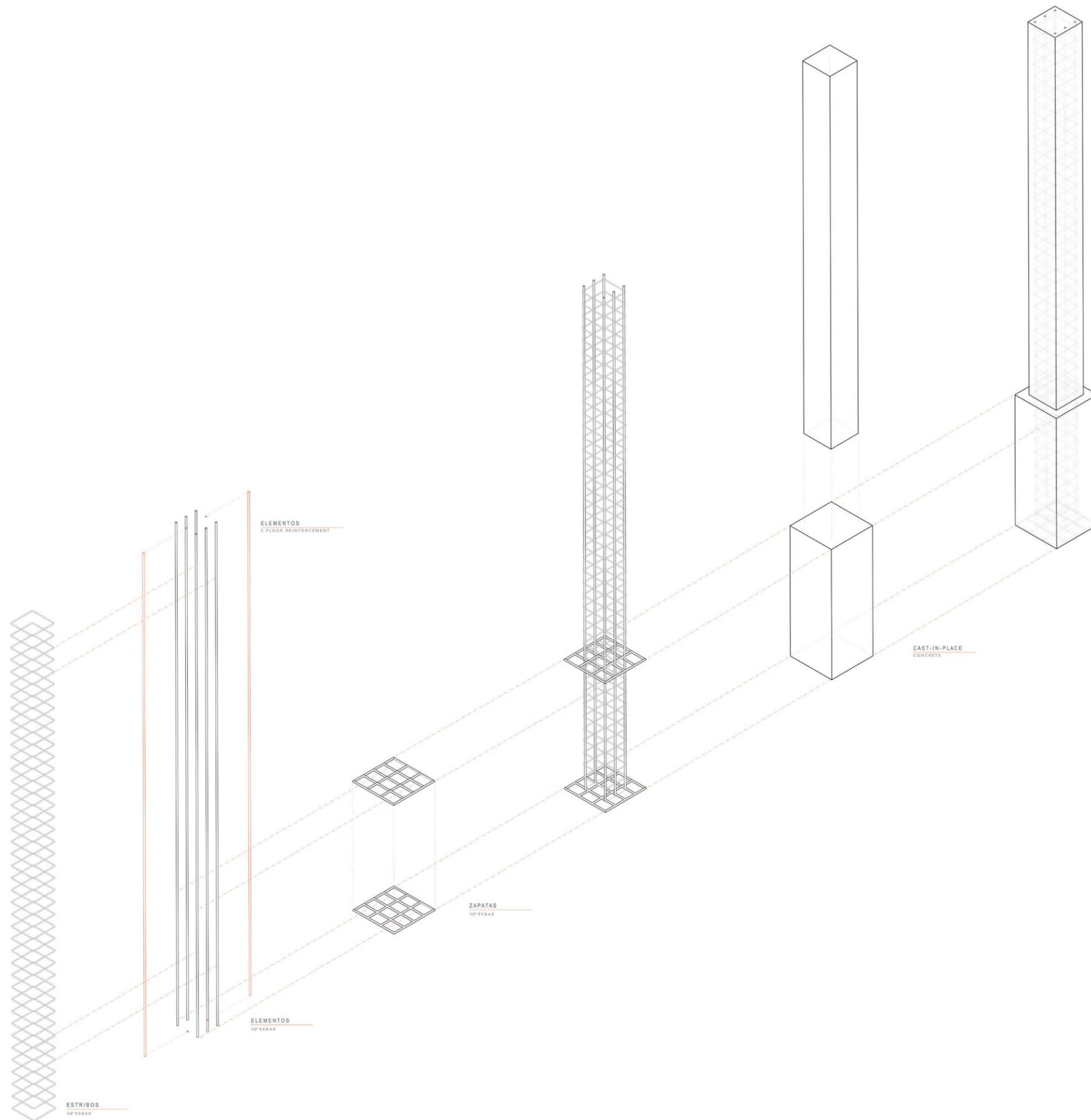


Houses in Nicaragua have been built the same way for countless generations, building with brick and rebar reinforced poured in place columns have been the norm, and it does not seem that that is going to change in the future. Starting with the foundation, it usually has a 1.5 meter depth because the terrain throughout Matagalpa is solid; however, there are pockets of soft terrain where builders/albaniles have to dig anywhere from 2 to 2.5 meters deep. Columns are then erected on the foundations, these are typically 3 to 4 meters apart depending on the building materials. Walls are then built by laying down bricks and cement, wood is used throughout the construction in various ways such as for the framing of the roof; 2x4 member are tied with wire to the rebar sticking out of the poured in place columns, corrugated metal sheets and every so often clear corrugated fiber glass sheets are laid on the wooden frame. Wood is also used as partitions and window shutters. Even though there has been incredible advances in construction, Matagalpa seems untouched by the new technology specially in housing. I did see some light steel construction in my visit to Matagalpa in the commercial part of town; however, local builders like Mr. Matus are reluctant in the implementation of a light steel frame and steel trusses, "Nuestros construimos a la antigua" he keep saying. Meaning we build the old fashion way. This is not at all uprising since local albaniles have been trained since their early teenage years by their fathers to continue with the family trade.



This was the first time that I had been exposed to construction methods in Nicaragua, and the way columns were built was the most fascinating aspect. Starting with the foundation, it is composed by two wire grids called zapatas, one placed at the bottom and the other one placed at the top of the foundation. The zapatas are the anchors for the rebar. Six ½" rebar are tied to the zapatas with wire forming a 20x20 cm square, formwork made out of wood is then placed around the zapata and concrete is poured in. The rebar that sticks out of the zapata will become the column. Because steel columns are seldom used in construction columns are made with ½" and ¼" rebar. ¼" rebar are shaped into squares and fitting for the six rebar sticking out from the foundation, these are called estribos. Estribos are placed every 10 cm along the length of the rebar, these are attached with wire. Wooden formwork is then placed around the rebar skeleton and concrete is poured in. Rebar usually sticks out of the concrete to serve as anchors for the roof wooden frame

C O L U M N D E T A I L

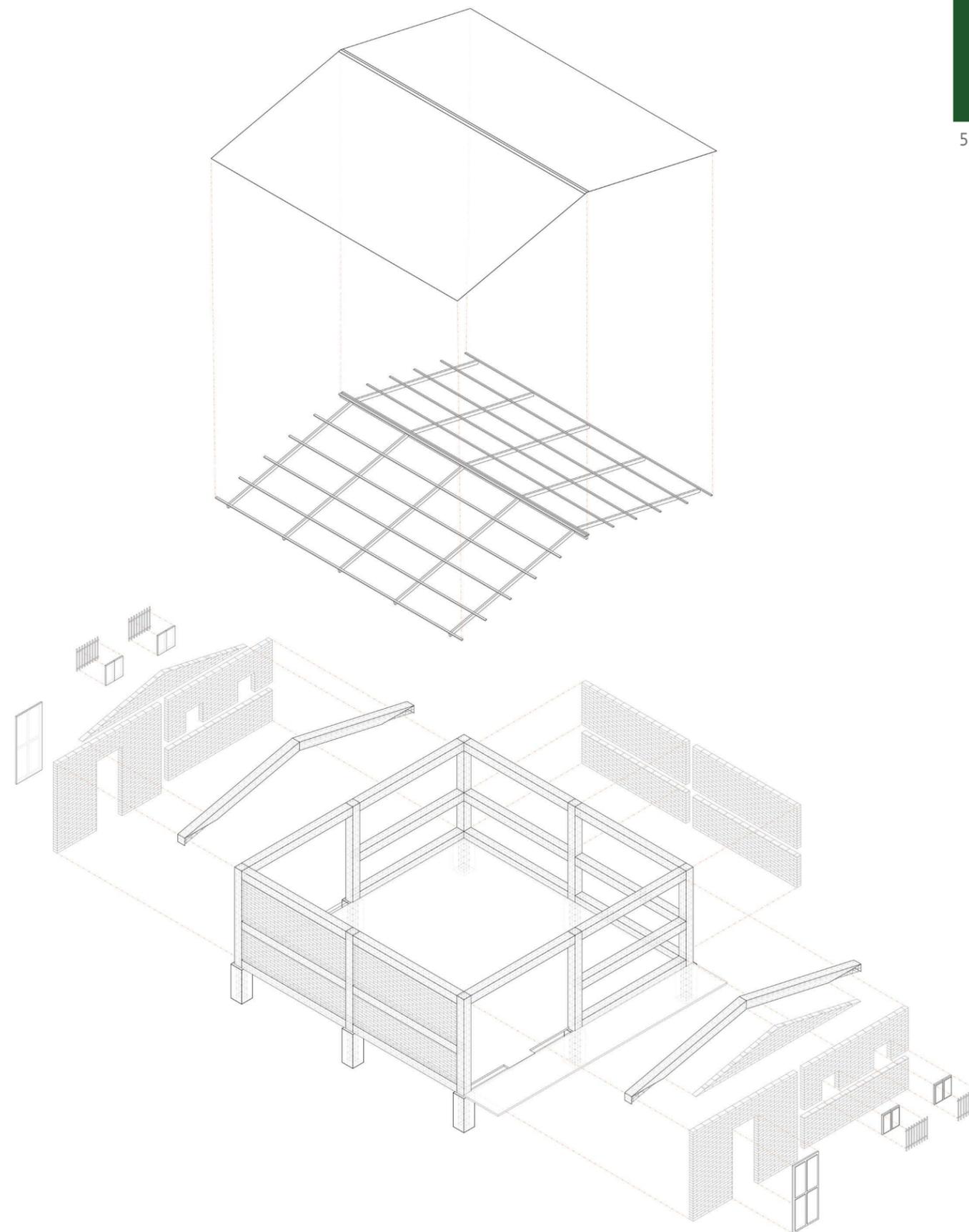


The ½" rebar are commonly known as elements. A normal column typically is composed out of 6 elements; however if the construction is more than one-storey high, two more elements are added for structural purposes. The addition of these two elements per column drive the price of the construction up. Yet, it will be cheaper than reinforcing already existing columns in the future.

As Built Envelope

According to Matus, houses range anywhere from an 8x8 m layout to a 10x12 maximum layout, but they can be as small as 6x6m. This seemed accurate as I walked through the Colonia Apoyo al Combatiente neighborhood. The house of the jefe del barrio which was located in one of the better sectors of the community had a 8x8 m layout. As seen in this axonometric drawing, the house is a perfect square. The perimeter walls are the only ones constructed out of masonry, el cajon is typically called. El cajon, perimeter walls, is what people building their houses put the most money, effort, and time in. Their goal is to build it as fast as their resources will let them as the interior of the house is the least of their concerns. With el cajon built and the roof in place, families are able to move in as most of people seek impudence from their extended family. In some cases, the funds are limited and they build meter by meter, and put in place a temporary house inside of el cajon typically made out of corrugated metal.

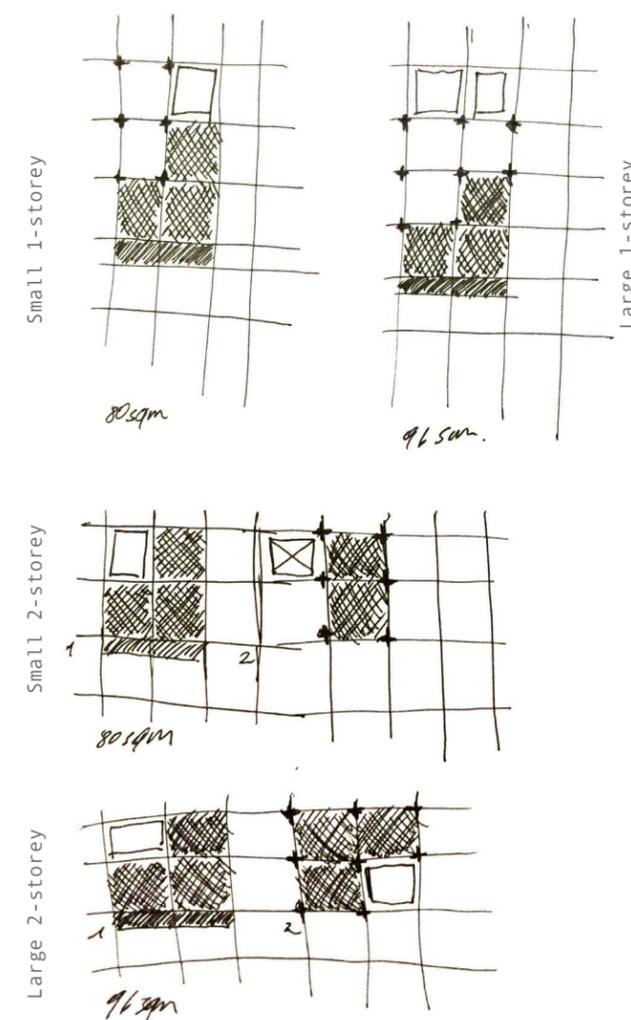
In addition, el cajon shows windows only in the front and rear of the house because as a rule for privacy if the houses are less than 2 meters apart windows cannot be placed on the sides of the house. This is also true for the rear, if there is no back yard and there is a neighbor less than 2 meters away, houses will only have windows in the front. The clear corrugated fiberglass sheets become a crucial source of light. The windows of the house are also protected by raw iron security bars, this a characteristic seen in all houses in Matagalpa, no exception



After all the data gathered during my visit to site, I had to re-visit some the decisions previously made. Because the proposals for Ciudad Juarez, Matagalpa, and Buenos Aires were based on the 3x3m grid following Aravena's plan for Quinta Monroy I quickly discovered that a 3x3 m grid was too small for the amount of square footage that the people of Matagalpa were used to having. So the grid was adjusted to fit the average square of the houses in the neighborhood of Colonia al Combatiente in a 4x4m grid.

Even though square footage was the most functionally driven change, there were other factors that informed the layout and form of the modules. Having lived in Matagalpa, there was a certainty that most people lived with their extended families in this small house, and this is true for the Latin America culture throughout. However, this has started to change since more and more families are opting to move of their parents home even if that means it is going to take them years to build their own. Time is not the problem money is. In addition, the new generations that are opting of moving out and living on their own are also opting in having less children, one to two children at the most. Population control is happening more in the urban areas, but it is slowly reaching rural areas as well. However, this is not always the case, Mr. Matus took me to his house for me to see what he had been able to build over the years on an albaniles income, he has a 10x12m house, two bedrooms one bath, were three generations live, 8 people. Another factor that had to be considered was the fact there is that land is scarce, so people instead of expanding out are opting to expand up.

The proposal has shifted from one module previously explored to two modules. One module following the traditional one-story house and a two-storey module adjusting to the land scarcity in the city. In addition, these two modules are presented in two different sizes to adapt to the new and old family dynamics.

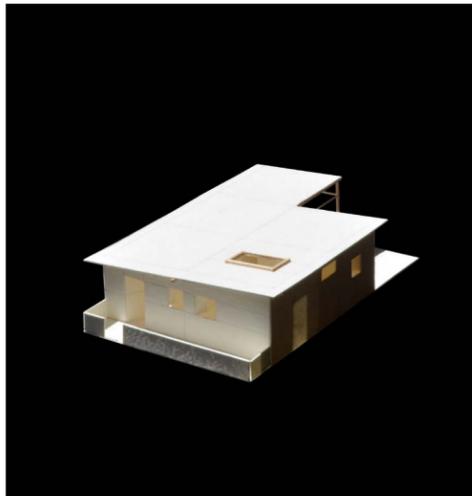


P R O P O S A L

Working with a 12x8m footprint for the small one-storey module, the ratio of the original part built and the progressive building space is 3:2. Were three 4x4m modules are built, and two modules are felt to be built in the future. This provides this module to have back yard space that is so very important to people for their daily activities such as laundry, air drying clothes, and for their dogs which they consider a security measure. While the large one-story takes the 4x4m back yard module to be part of the progressive building space adding more liveable square footage to the house.

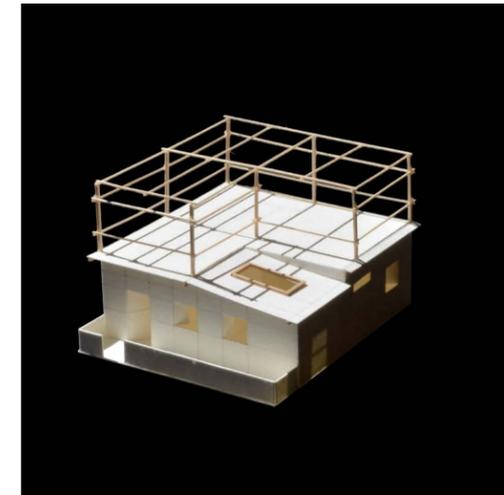
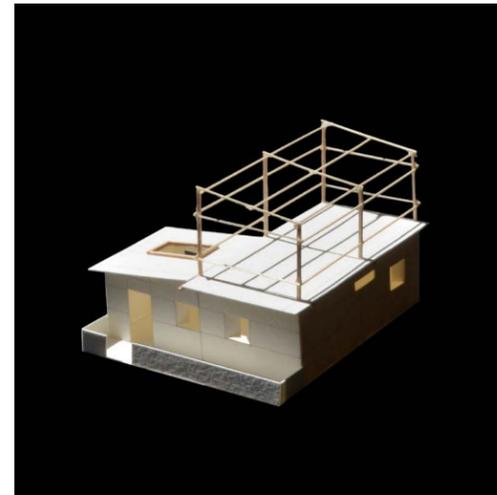
The two-storey module has a smaller footprint of 8x8m. The small module has a ration of 3:2, three 4x4m modules originally built on the ground floor leaving an additional 4x4m module as back yard and two 4x4m modules on the top of the original three as progressive building space. The variation on the large module is that the back yard space becomes a covered area as there is three 4x4 modules on the top floor. It is important to mention that not all the area of the second floor was been occupied to leave space for a skylight as windows would be scarce due to the proximity of the neighbors.

Small 1-storey 80sqm Module Large 1-storey 96spm Module



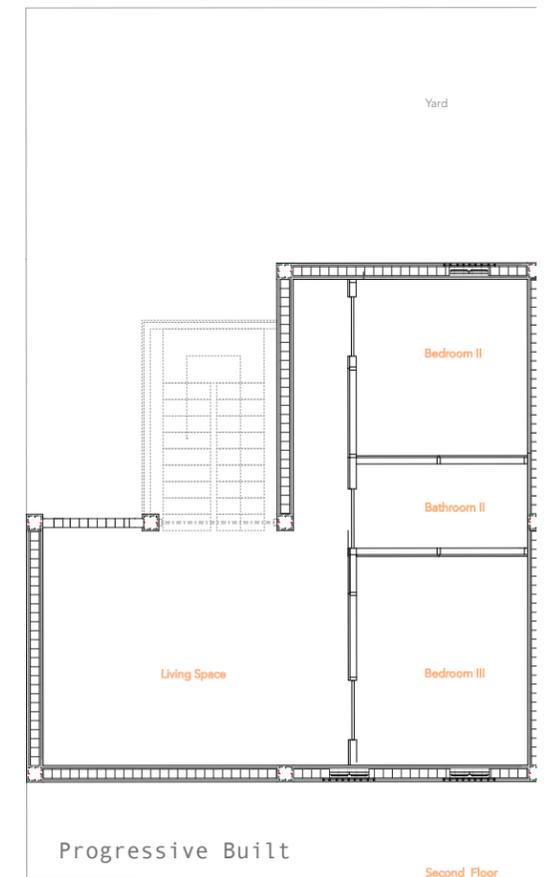
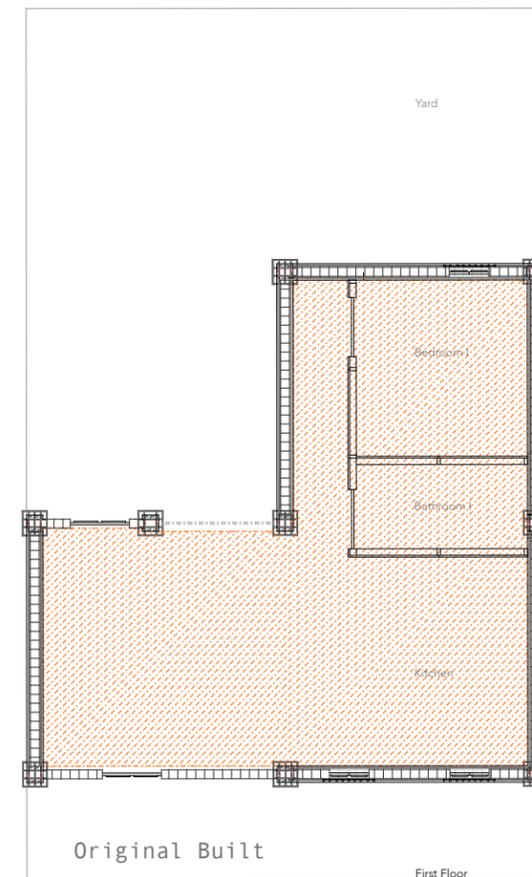
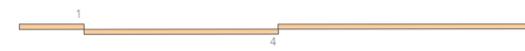
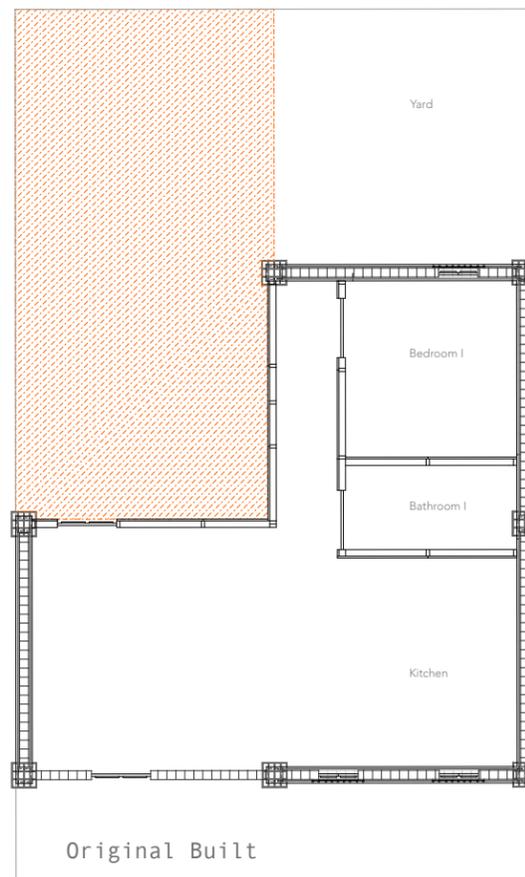
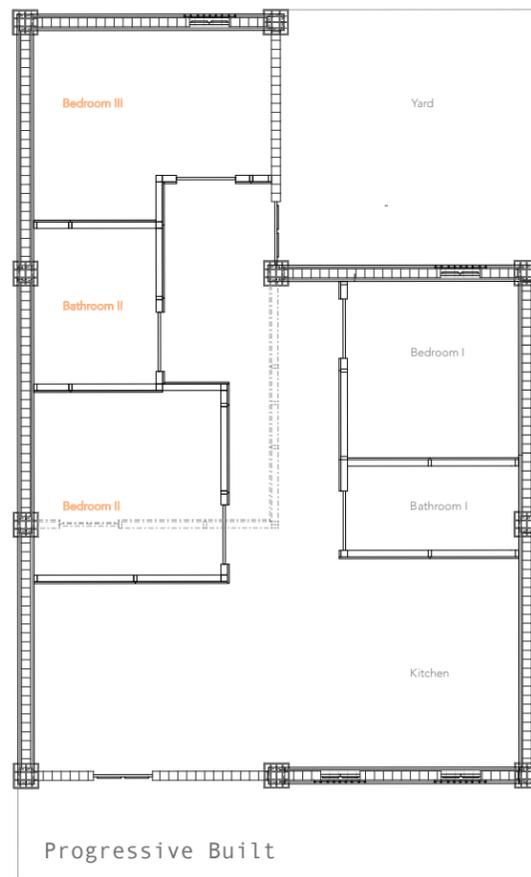
Small 2-storey 80spm Module

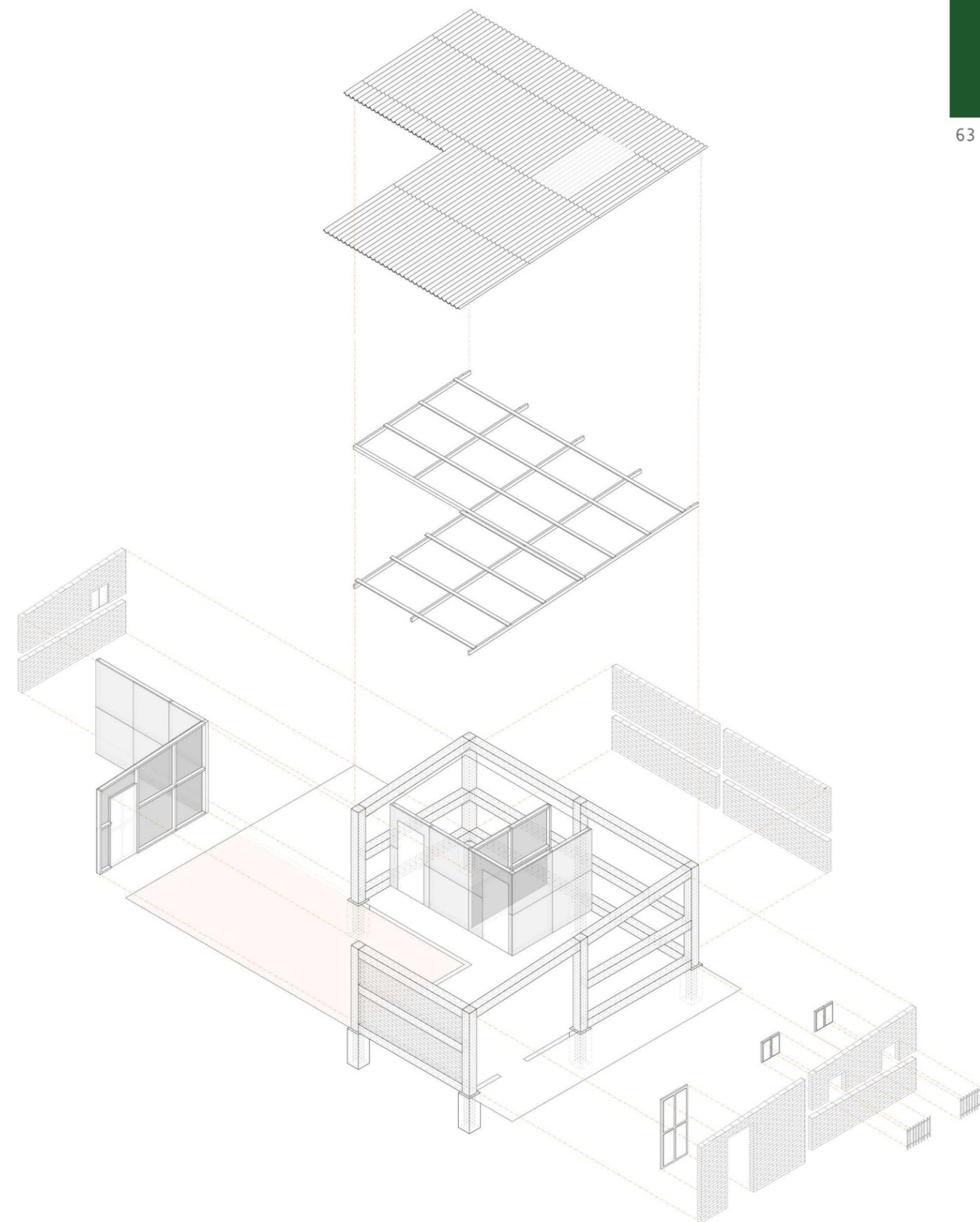
Large 2-storey 96spm Module



Growing The Floor Plan

Both modules and their different iterations, start with the same footprint and layout, a total of 48spm . This is on the smaller side of what people are used to having, but with a smaller footprint to build out at the beginning families are able to start and finish the entirety of the construction instead of outlining the whole perimeter and building meter by meter like it is typically done. Families are getting smaller and those multigenerational home are used to sharing space. With houses no matter the family size being two bedroom one bath houses, the proposal explores a larger living space from the get go and a one large bedroom one bath layout. Because the floor plans bellow show the itinerary of the smaller modules, the progressive building space would add to the floor plan not only the other bedroom lost in the beginning construction but a third bedroom and a second bathroom. A three bedroom two bath house. When I asked people of the Colonia Apoyo al Combatiente what they would add to their house if they had the money, the answer was always the same “one more bedroom”. So with the smaller modules, they get the third bedroom that they want in addition to one more bathroom; the larger modules would provide a third and fourth bedroom in addition to one more bathroom. The trade of is that the second bedroom usually present in a typical construction would come later on.

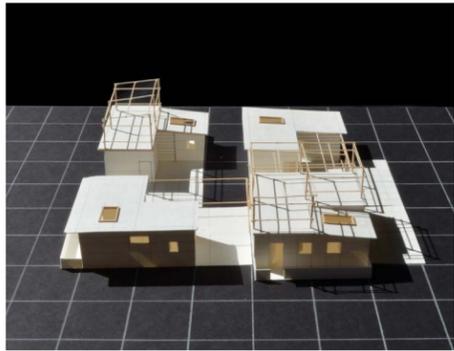
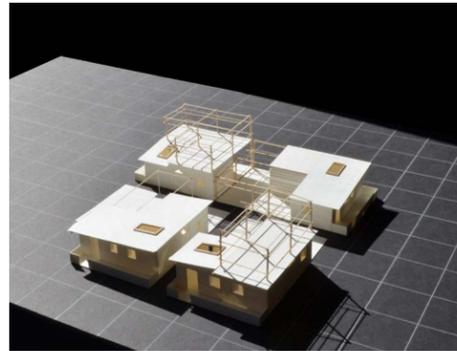
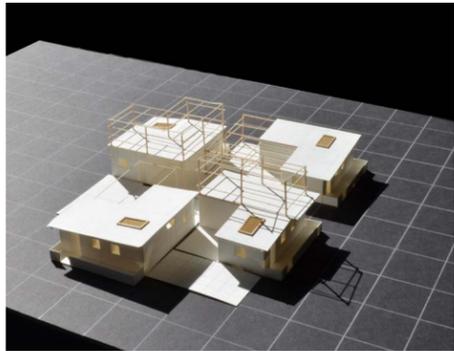
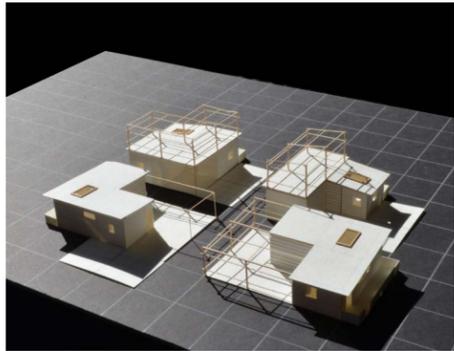
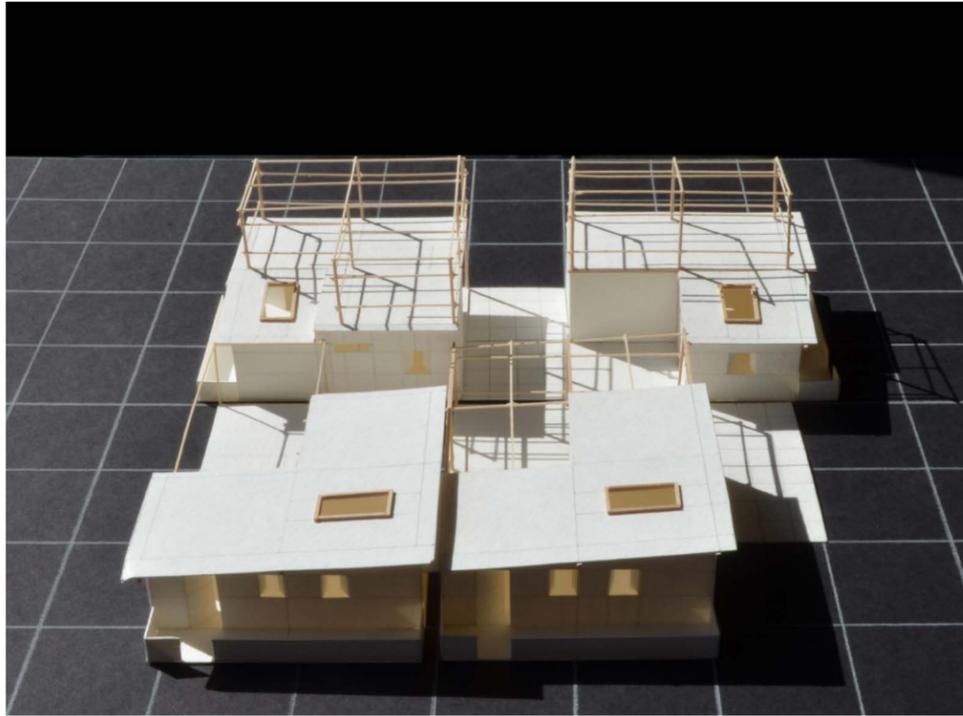




As Built Flexible Floor Plan Proposal

This axonometric drawing (right) is of the small one-storey modules built traditionally. With the zapatas in the foundation, rebar columns, and brick walls. Other features stayed the same as well as the wooden shutter on the windows and security bars, the clear fiber glass skylight, and interior walls made out of wood and not extending the full height of the ceiling. However, the roof changed in favor of a single sloped roof, typically refer to as medio ojo, instead of a pitch roof, typically refer to as cayon, for easier construction and better control of rain water as a lot of people collect it to do laundry and water their plants. Better control the rain water also comes as a security measure in the rainy season

A s a C o m m u n i t y



All modules can be arranged together to start developing a sense of a community and in a way that each module is far apart enough of its neighbors to have the possibility of lateral windows. Also with enough clearance in the back as well as to the sides to provide the larger modules with outdoor space that people so badly crave.

By giving people a buildable flexible floor plan that gives people a more functional space to live in, people can thrive in other areas of their lives knowing that they are returning to a safe functional home. This is something that Colonia Apoyo al Combatiente has been doing for the years by updating their house to suit better the needs of their daily lives, and in turn help those that have less so the community can thrive as a whole. A better layout built in the same old fashion way may seem as small insignificant chance to people in the outside, but for the poor all throughout Latin America it can be life changing.





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