

## ABSTRACT

Title of Document: RIMAC RENAISSANCE: HOUSING  
PROTOTYPES FOR RIMAC, PERU

John David Martinez, Master of Architecture, 2008

Directed By: Professor Ralph Bennett, AIA  
School of Architecture, Planning, and Preservation

The physical environment of Rimac, Peru provokes improvements in current living standards. Cultural values and traditions are lost in the deteriorating conditions of the city. This thesis provides housing solutions of modest aspiration to regenerate notions of community by addressing three agendas: a socio-cultural, an urban design, and architectural. The socio-cultural response activates the community by exploring self-help construction, flexibility, and best practices as devices to resolve cultural informalities and insecurities. The urban design proposal incorporates a neighborhood center composed of an institution and building yard to provide resources for learning and training in traditional crafts, construction practices, and city patterns. The architectural agenda proposes an interpretation of traditional Rimac housing typologies as new solutions to infill vacant and abandoned lots. An analysis of the house through incremental growth, the flexibility of spaces, and use patterns provide options for living that promote the development of Rimac, both socially and physically.

# RIMAC RENAISSANCE: HOUSING PROTOTYPES FOR RIMAC, PERU

By

John David Martinez

Thesis submitted to the Faculty of the Graduate School of the  
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## Preface

As a native born citizen of the United States living in suburban America for a majority of my life, serious misconceptions about the nature of the living environment and the diversity of housing that people inhabit has inspired me. Exposure to a new living condition and the experience of a familiar culture could bring clarity to this misconception.

I planned a trip to Peru with the intent of researching an unfamiliar place and the houses that sheltered its citizens. There are associations to family life that are deeply rooted in each dwelling type. Living with my family in Peru is ideal to understand this. Outside the dwelling, I was confronted by a cultural and social barrier not only directed toward me but which was also inherent within Peruvian society. These aspects generated an interest in understanding the connection between these realms: dwelling and society.

I am resolved to study the urban conditions and context of these dwellings. I am determined to understand how living environments influence society to feel fragmented and insecure. The thesis develops approaches to bridge this gap through rehabilitation and improvements in housing. This thesis can provide guidelines for design that inform what the nature of the house wants to be according to that particular culture.

## Dedication

To my family in Peru who gave me a home away from home.

To my family in the United States to whom I owe this work.

Les agradezco mucho.



## Acknowledgements

In appreciation of the support and assistance of those individuals involved in the evolution of this thesis and the efforts taken to complete it:

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## Introduction

The house: the dwelling, the property, and the shelter. The home: the place for living, the place of pride and ownership, and the place for family. The house represents the tangible thing; the object of focus. The home is established by the lives of the family living within it. It can be well enveloped and functional as experienced in higher income urban conditions, or less defined and less functional like some conditions found in poorer urban areas. The specific circumstance in which one defines as their home can have a variety of physical and psychological attributes.

This is a thesis about site and context. It discusses what can be done to “save” and reinvigorate the city of Rimac. It suggests what can be done to renew the city while retaining its historic elements, urban fabric, texture, and pattern of life-styles. This is a site that seeks to restore the community to its former state; a community that acknowledges its neighbors and acknowledges their house. This is a site rich in historically influenced typologies with potential for reinterpretation to accommodate the needs of today.

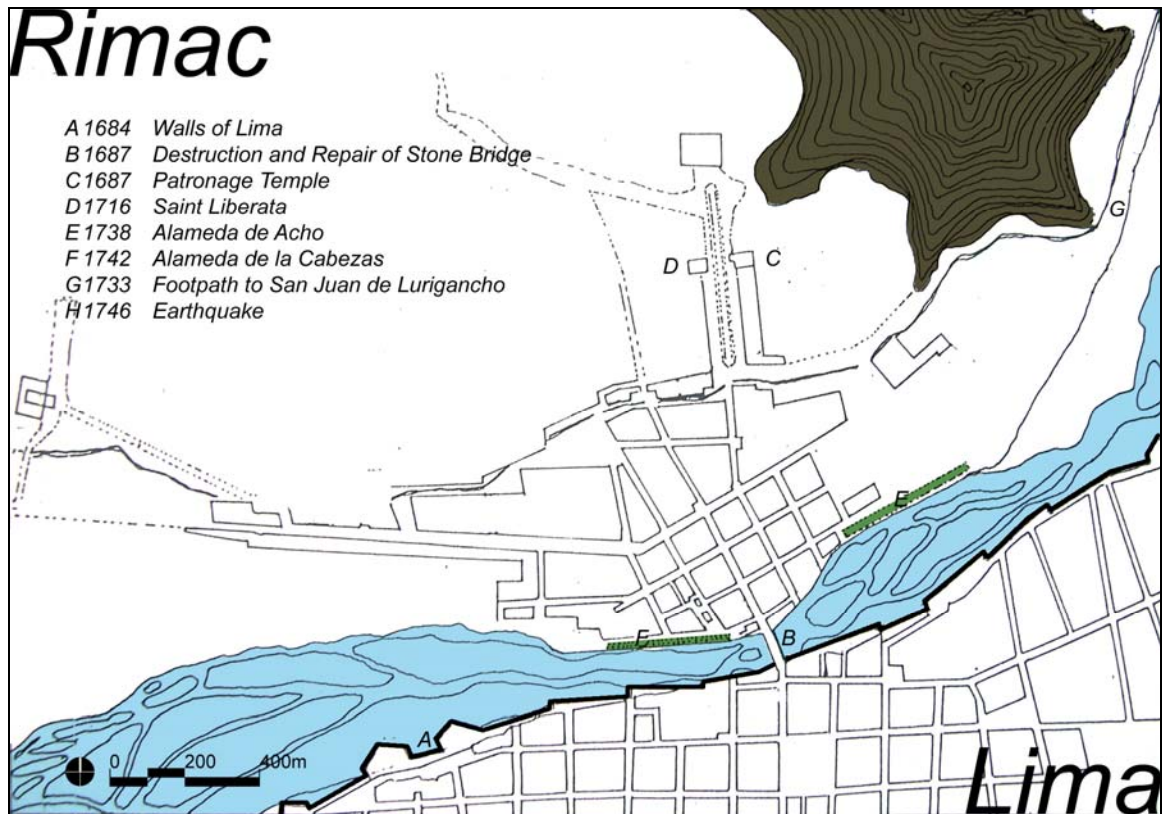
The site offers solutions for housing rehabilitation. These solutions use certain criteria to develop guidelines for design. These design principles accommodate the needs of the typical Peruvian resident and the functions that occur within the dwelling. The necessary association of the neighbor to the community is initiated through active participation in the construction process. Self help becomes integral in the design of this thesis proposal.

The following chapters study the importance of the following three agendas and their connection. The socio-cultural agenda advocates the self-help process as means to improve the social and living inadequacies in Rimac. This participation encourages the choice process outlined in the architectural agenda. The urban agenda acknowledges and promotes the need for a neighborhood center. This center implements a learning institution to serve as the gathering place for proper training of the self help process. The architectural agenda provides the community with an understanding of appropriate housing typologies and involvement in the design to incorporate the needs of their house.

The thesis demonstrates these agendas through the design of the following: an urban scheme layout of the site as it integrates a new neighborhood center, a proposal for standard lot sizes that are necessary for certain typologies to exist or alter, housing prototypes that promote modified and appropriate living accommodations, and the manual for self help construction. The thesis is presented from the viewpoint of a facilitator at the proposed institution, the community architect. This reinforces the basis for this thesis to promote community awareness and interaction through a connection to housing and how it is built.



## Chapter 1: Rimac, The Neglected City



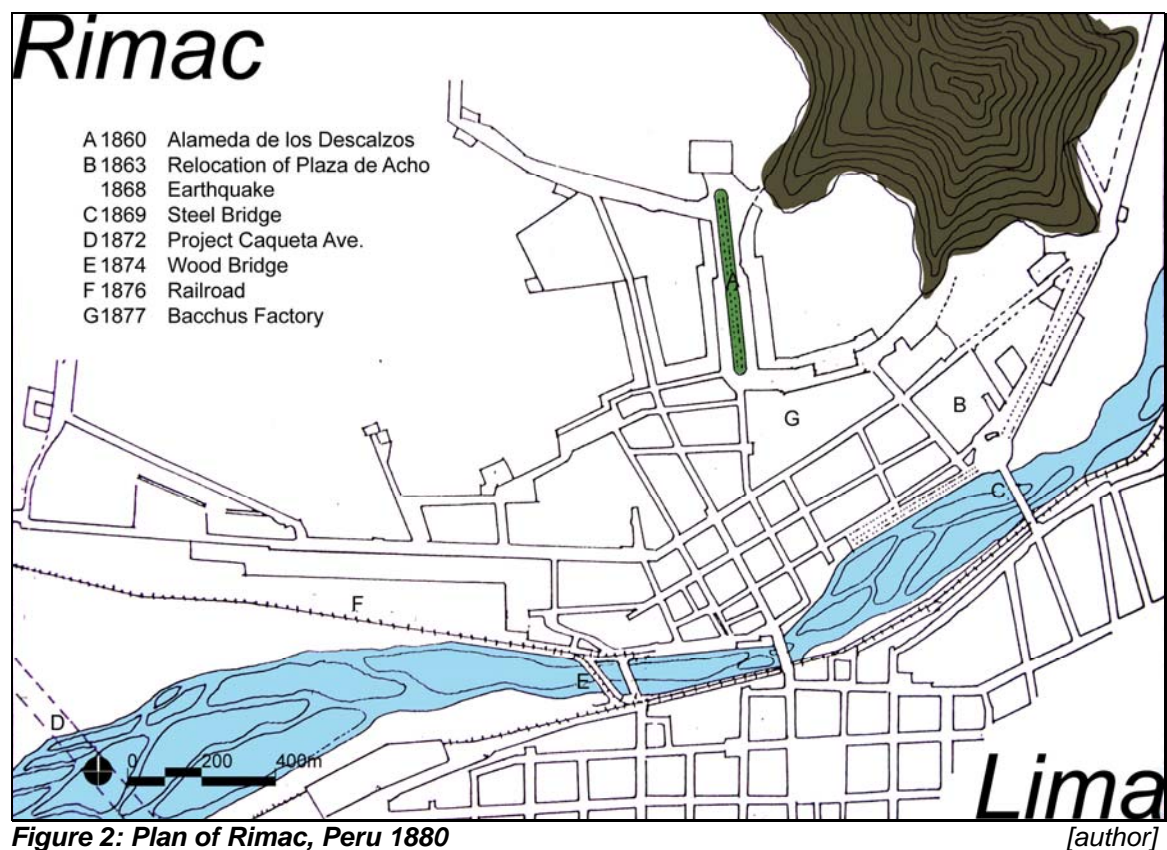
**Figure 1: Plan of Rimac, Peru after the earthquake of 1746**

[author]

Lima as it was separated from Rimac through a fortified wall. Irregular development of blocks sprawls from the original grid.

In the 17<sup>th</sup> and 18<sup>th</sup> centuries, Rimac grew as a city recognized for housing all classes of society. With its close proximity to the walled city of Lima under viceroyalty reign, the city of Rimac became a destination for walking and recreation for the upper class. The viceroyalty of Peru created specific public landmarks and spaces in Rimac designed for the upper class with the intent of separating them from the mix of society.

The walls of Lima came down after the independence of Peru from Spain on July 28, 1821. Slowly, with new urban development taking place and with no walls to shelter the upper class, Rimac grew in directions that followed less of the original grid. The city sheltered new neighborhoods that housed squatters migrating from poorer sectors of Rimac, while those of the upper class were driven out from the city towards the South to cities along the coast such as Miraflores and Barranco (refer to figure 5).



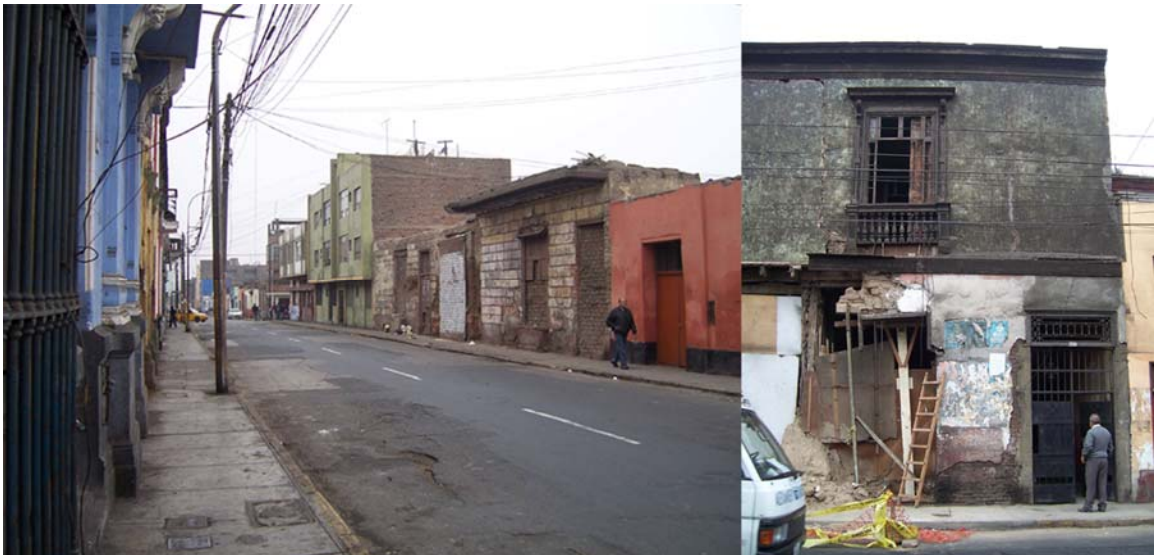
As the development of Lima as a commercial center continued, small businesses initiated in Rimac. This allowed residents to support themselves integrating shop fronts into their property along the street. This avoided the need for relocation among the residents. President Balta (1868-1872) saw potential in investing in this land immediately bordering the Rimac River; however, was

advised of the risk of taking back the city that separated itself from Lima. Thus, little investment was put into the city which led to little commercial development in Rimac, and resulted in the neglect of the city that stands only 400 meters from Lima's Plaza Mayor.

A severe problem within Rimac is the unclear ownership of property. Proper documentation is not provided by the residents and leads to a lack of "rights" for those living in the city. Spontaneous migration occurs from those living in the mountain and jungle regions of Peru and looking for potentially better shelters. Squatters claim unrecognized properties as their own. Although the formal structure of Rimac is an urban city with its own local government, the lack of documentation for most properties had led to the informal and precarious condition of the city.

This lack of organization is evident in a variety of stark circumstances that Rimac unfortunately projects on its citizens. Improperly maintained city streets and buildings leave an unreal image of what should be a livable place. Building facades that fall apart and rot display the neglect of a traditional past. Abandoned properties become landfills for trash and illegal dumping. The lack of activity along certain streets leaves neighborhoods lifeless and empty. Properties reveal improper, quick-fix, and temporary solutions to repair broken or dilapidated surfaces. Modifications or alterations on properties are done without consultation or permit and result in improper or unfinished construction. These observations demonstrate a lack of finance, a lack of information, and a lack of civic pride (refer to figures 3 and 4).

What is understood about these circumstances is the high risk of living in these damaged houses over time, little attention to investment, the need for appropriately distributed land use along streets, no records for proper ownership of the properties, the instability of finance, uniformed construction practices and maintenance, the disregard for public services, the social insecurity and discomfort among citizens, the negative influences of crime, and little interest in the city's touristic landmarks and traditional architecture. The value of the Rimac as a historically and traditionally significant city is lost and demands revitalization.



**Figure 3: Precarious State of Properties**

[author]

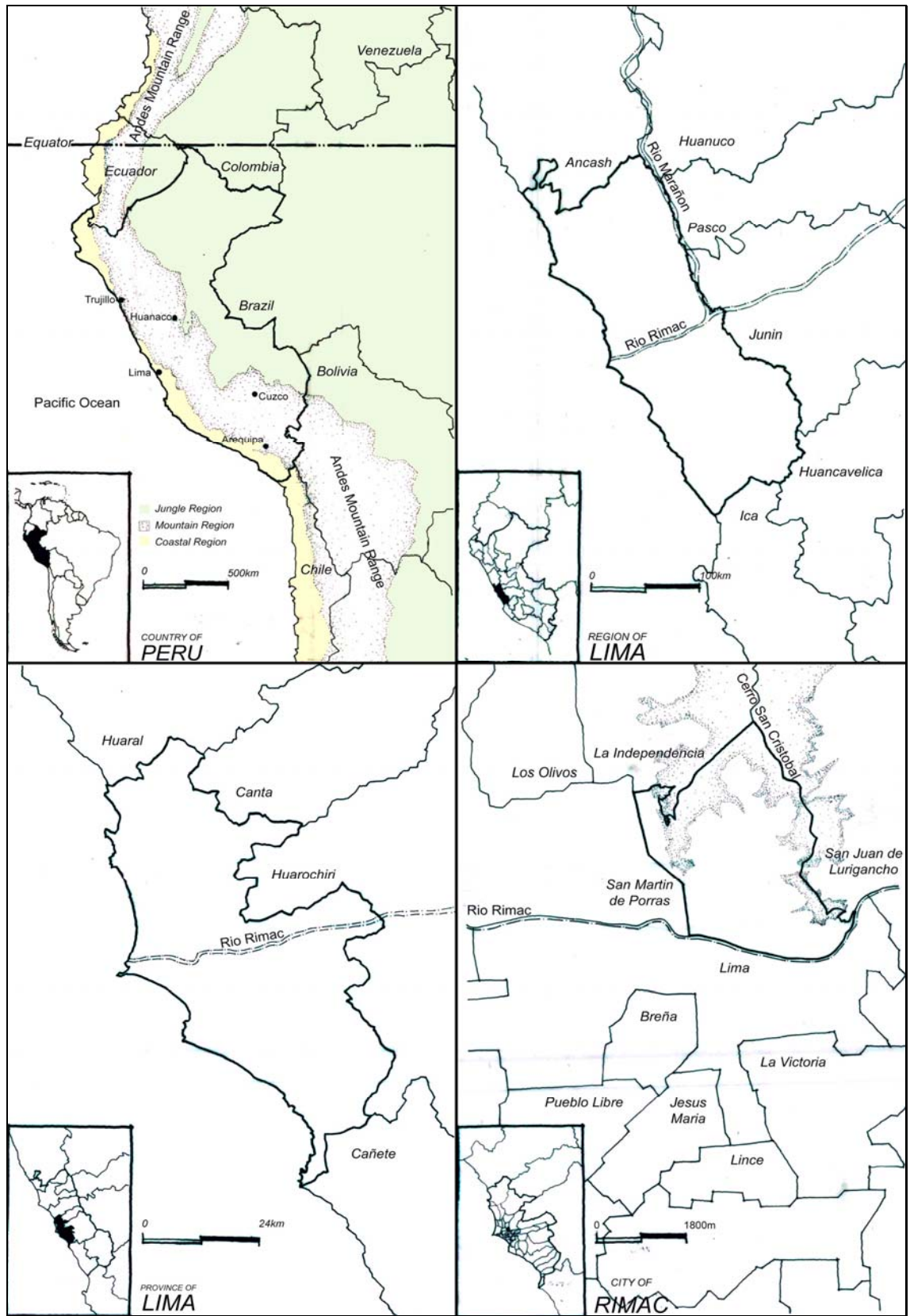




**Figure 4: Precarious State of Properties**

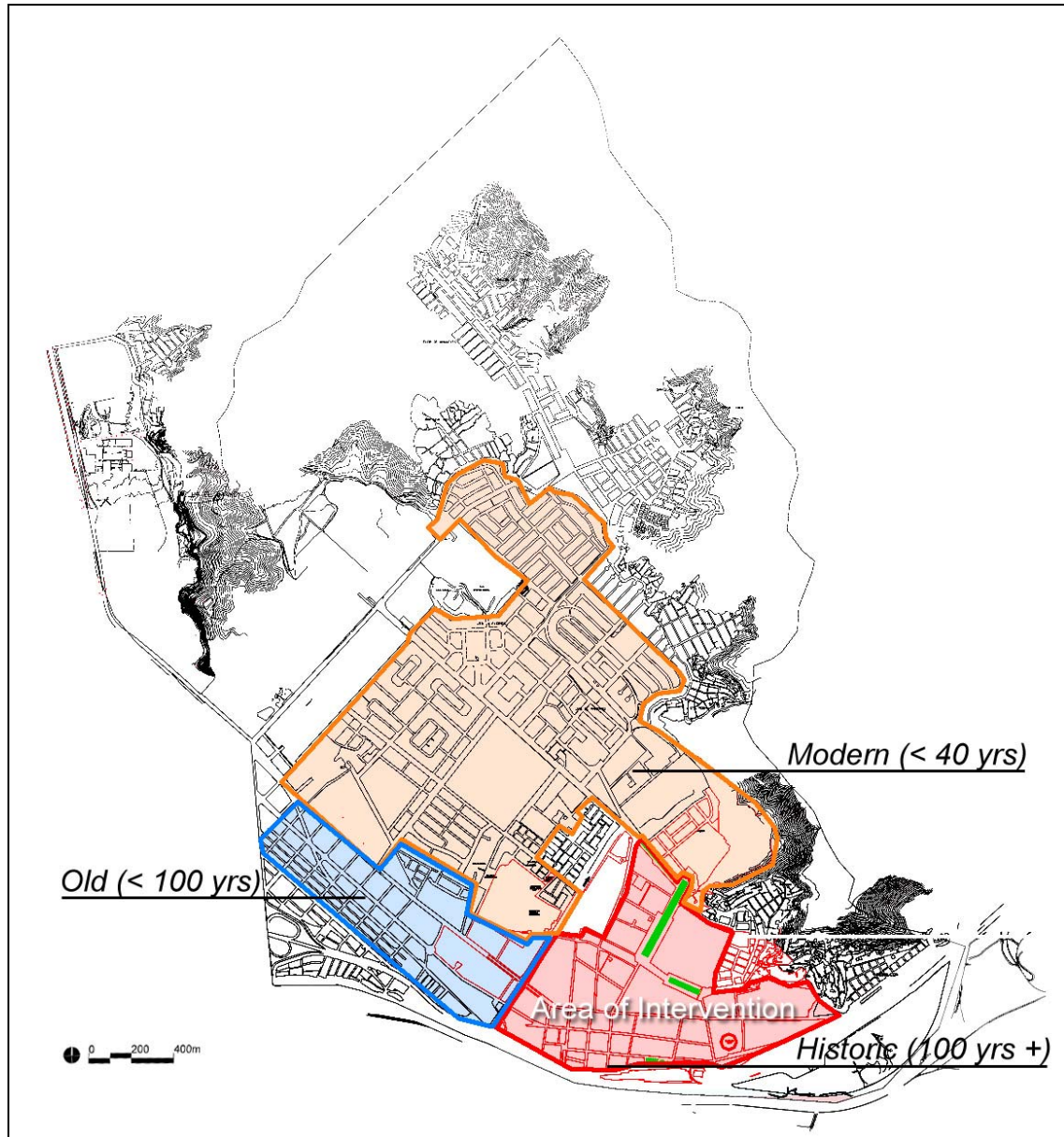
[author]

Peru is located just south of the equator in South America. It is bordered by Ecuador and Columbia to the North, Brazil to the East, and Bolivia and Chile to the South. Peru has three geographic divisions: the coast, mountain, and jungle (refer to figure 5). It is politically organized into 25 regions among which Lima is one that falls along the coast. Within the region of Lima, are 11 provinces among which Lima is one. Within the province of Lima is the city of Rimac which is just north of the Rimac River that separates it from the city of Lima.



**Figure 5: Organization of Peru into country, regions, provinces, and cities** [author]

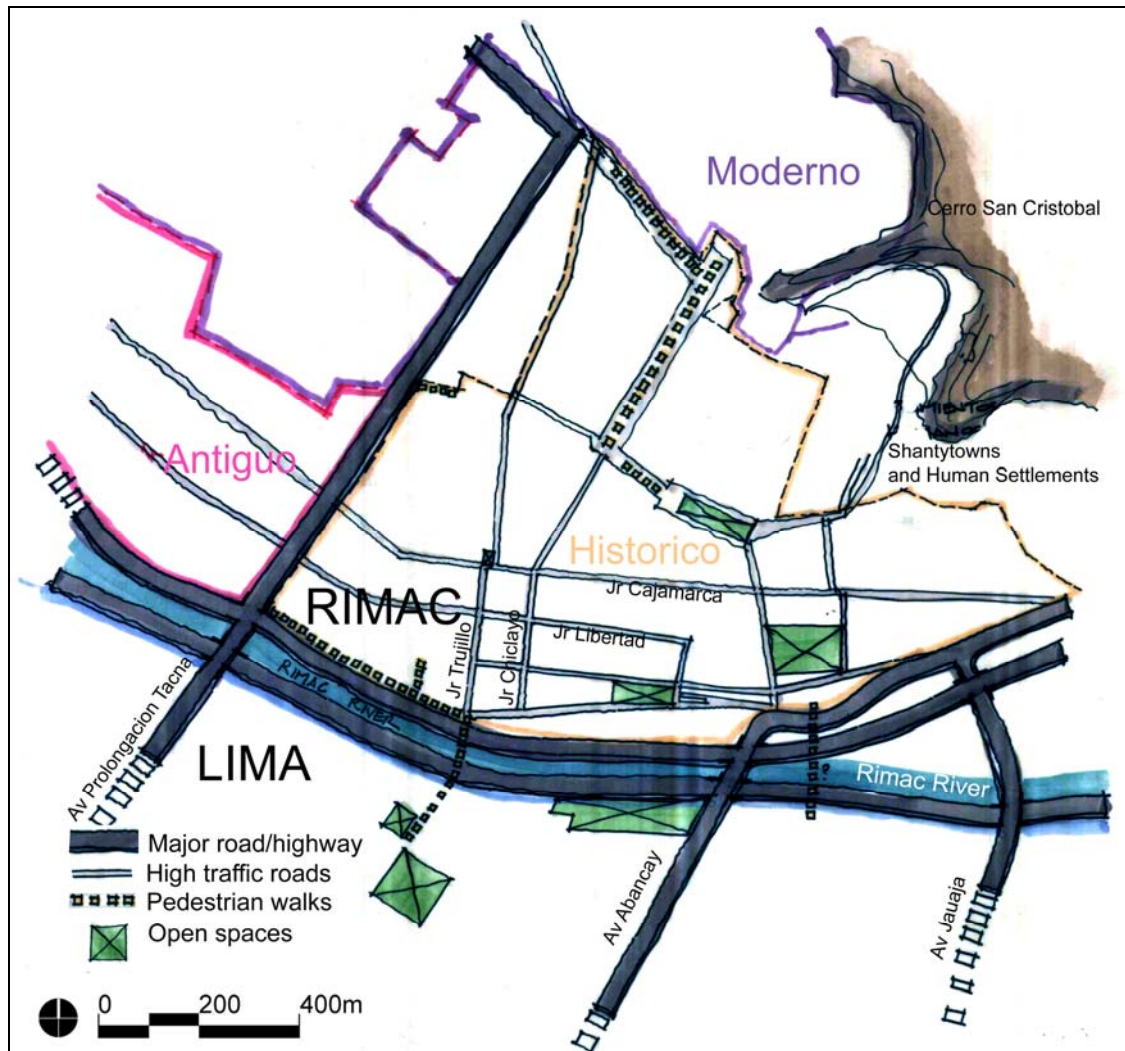
Rimac, Peru is located at 12 degrees 34' South latitude and 69 degrees 9' West longitude. Rimac spans over 12.87 km<sup>2</sup> of land with an approximate population count of 211,769 as of 2003. The city itself is subdivided into three zones: the “historic” (17<sup>th</sup> & 18<sup>th</sup> century), the “old” (19<sup>th</sup> century), and the “modern” (20<sup>th</sup> & 21<sup>st</sup> century).



**Figure 6: Three zones of Rimac and proposed area of intervention**

[author]





**Figure 7: Vehicular and pedestrian access through Historic Rimac**

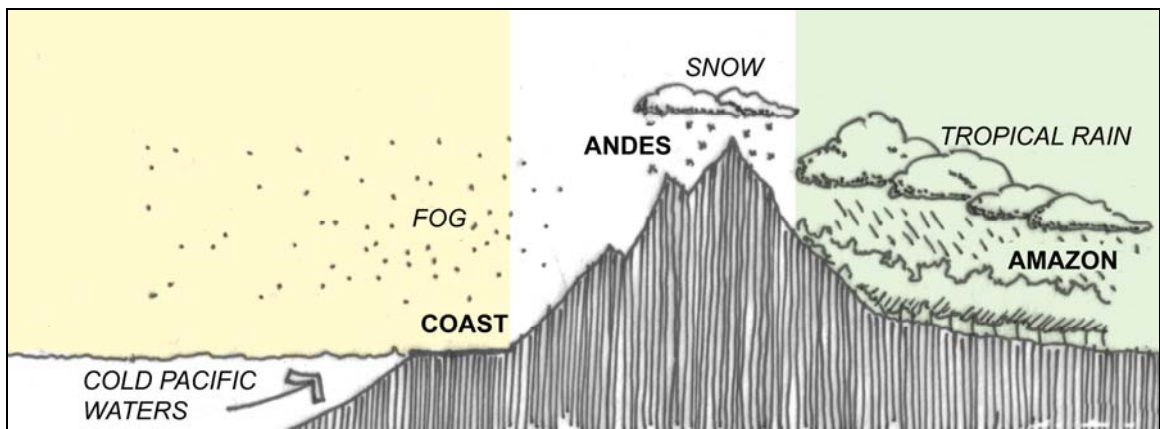
[author]

The “historic” zone has a direct association with the past. It holds a number of the city’s oldest structures. Colonial style influenced buildings dated more than 100 years are declared as monuments by the government, yet are not well maintained. The “old” zone shelters the poorest of Rimac. Very similar to historic Rimac, the tenants here lack documented ownership or proof of residence. This is primarily due to the descendants of previous tenants not securing proper documentation. The “modern” zone of Rimac is an upgrade to the urbanization of the city. Here, properties are no more than 40 years old



having a denser residential character than that of the other zones. Mid-rise apartments and stacked housing are the predominant housing types. A distinct commercial sector exists that acknowledges the needs of this zone. Regulated construction with licensing is practiced and proper ownership is well documented. Thus, a clear segregation of “communities” are distinct in their building typologies, current condition, and historical significance.

The proximity of Rimac along the Pacific coast to the Equator would imply a warm and tropical climate. However, it is quite the opposite. It is the cold Humboldt current from the South as it mixes with cold Pacific waters along the coast that defines the very little precipitation, the high levels of humidity, and the mild temperatures. During the summer months of December to March, temperatures rise to highs of 30 degrees Celsius and when combined with the humidity, leave the temperature unbearable. The winter months of May to November carry with them lows of 12 degrees Celsius along with cloudy days and misty fogs. Southern winds are predominant. The combination of high public transportation and dirty dusty streets create pollution that makes the air uncomfortable to breathe along the coast. This is situation in Rimac.



**Figure 8: Climate regions: coastal, mountain, jungle**

[author]

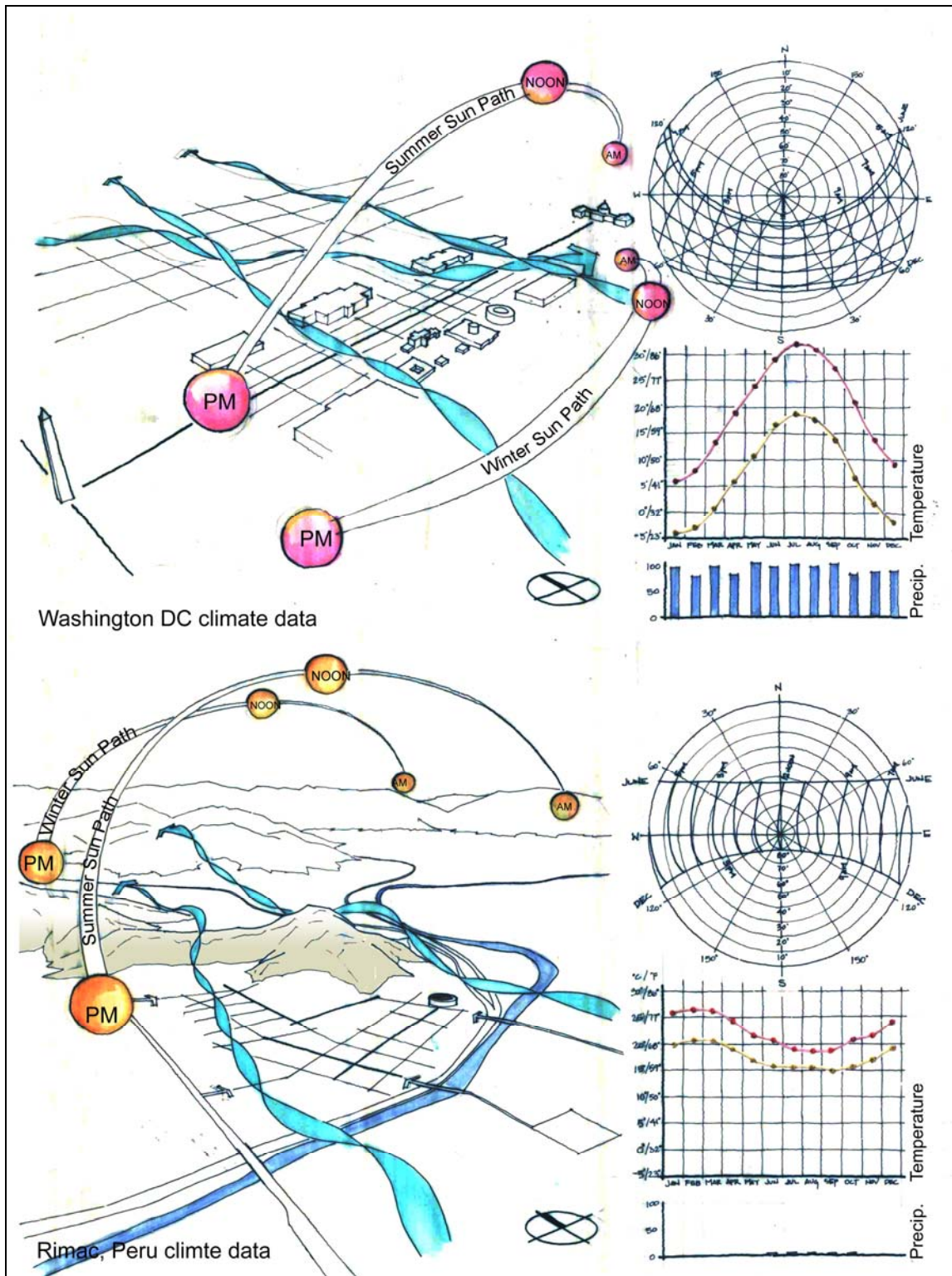
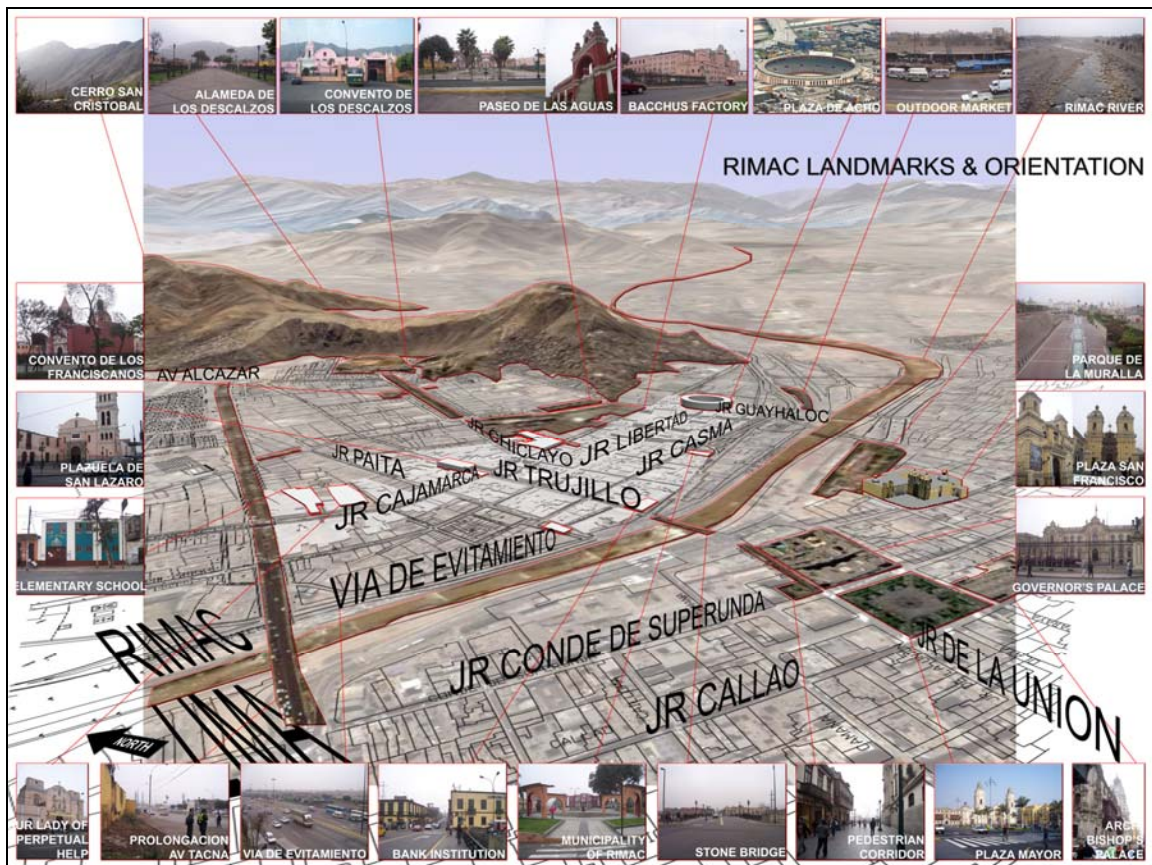


Figure 9 Climate comparison of Rimac to Washington DC

[author]

There is an array of architecture and landmarks in Rimac Historico that make this place rich with culture and tradition. There is value to this city that promotes tourism and attraction from adjacent provinces. There are tour buses that run routes through Lima and Rimac linking the history of these places with the final destination at the top of Cerro San Cristobal. Significant landmarks found are the Plaza de Acho (a bullfighting stadium), Alameda de Los Descalzos ("Boulevard of the Barefooted," a pedestrian boulevard), Paseo de Aguas ("The Walk of Water," a garden with a central pool), Plazuela de San Lazaro (Little Plaza of Saint Lazaro, a public forecourt to a church), the Bacchus Factory (operational Cristal beer production factory), the town hall of Rimac, the Rimac river, and the Cerro San Cristobal (small mountain range).

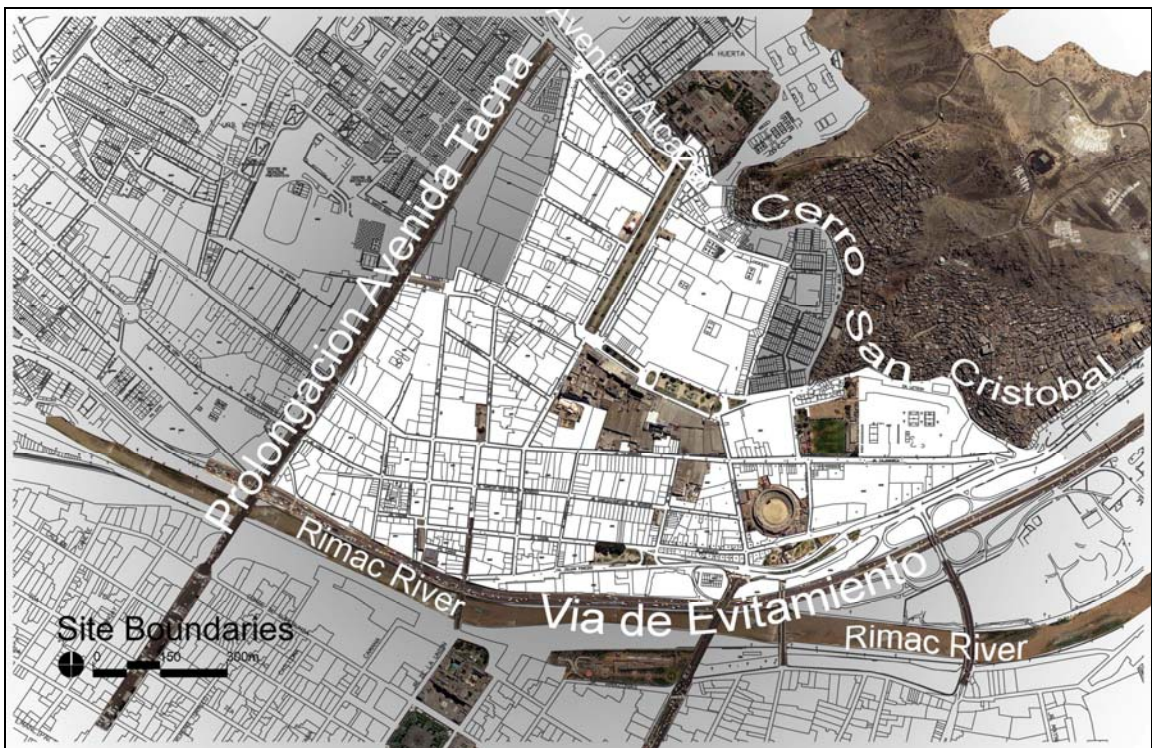


**Figure 10: Landmarks and orientation of "historic" Rimac and Lima**

[author]



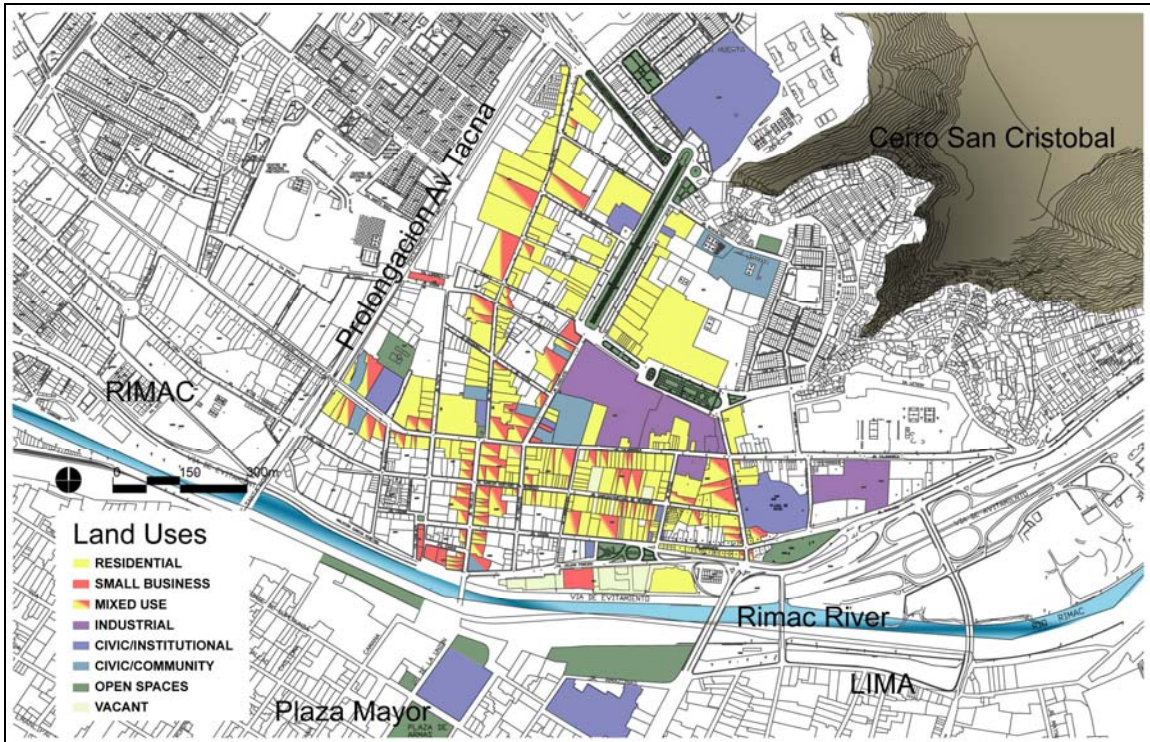
Given the context of Rimac, Peru in its current and historic context, the area of intervention for this thesis is the historic zone of Rimac. Its proximity to Lima and serious state of neglect provide potential opportunity for redevelopment and rehabilitation. A five-minute walk from Lima's Plaza Mayor, the historic zone of Rimac has opportunity to become the once renowned destination from Lima for all people (refer to figures 13 and 14) ). The zone is bounded by two major stretches of road and a major geographic feature: the Prolongacion Avenida Tacna (a high traffic boulevard running north to south), Via de Evitamiento (a highway running east to west), and the Cerro de San Cristobal to the North (a mountain with an altitude approximately 400 meters high).



**Figure 11: Historic Rimac and its site boundaries**

[author]

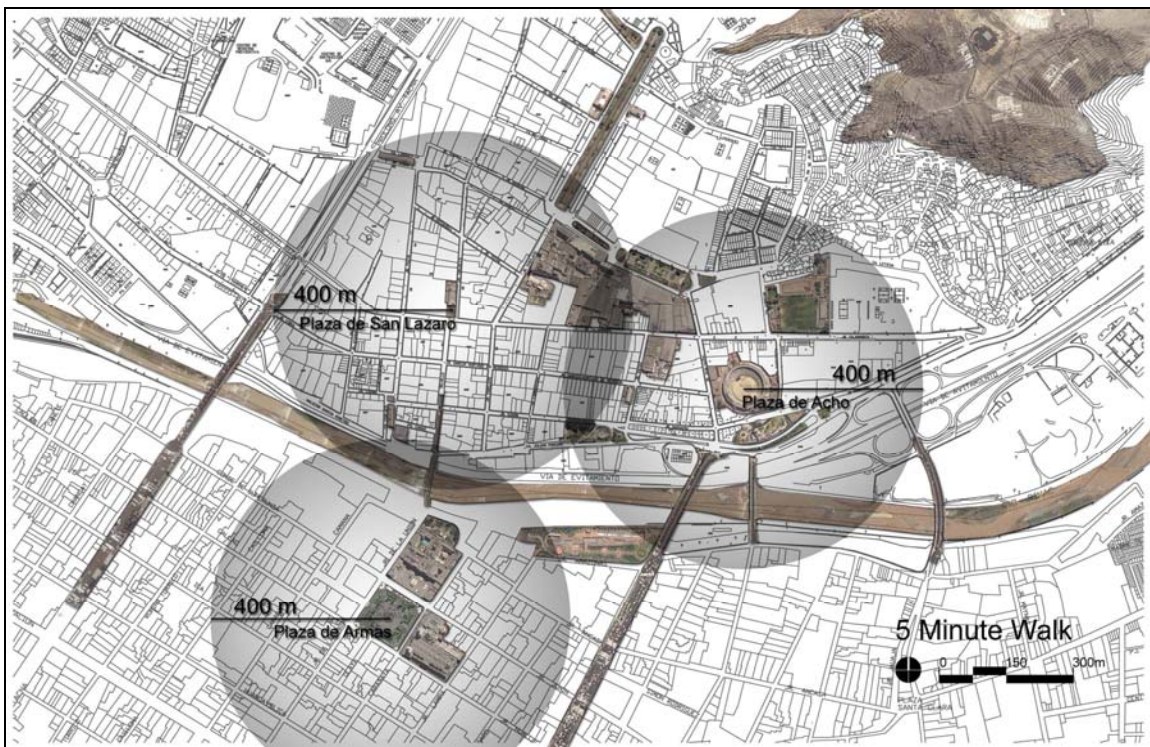




**Figure 12: Land use diagram**

[author]

The diagram demonstrates the variety of land uses that occur within properties throughout Rimac. It also demonstrates the lack of mixed use development along particular streets adjacent to important landmarks to promote activity (for example, along Jr Cajamarca and Jr Libertad).



**Figure 13: Five minute walk diagram**

[author]

400m is the distance one can walk in five minutes from these three significant points of origin.



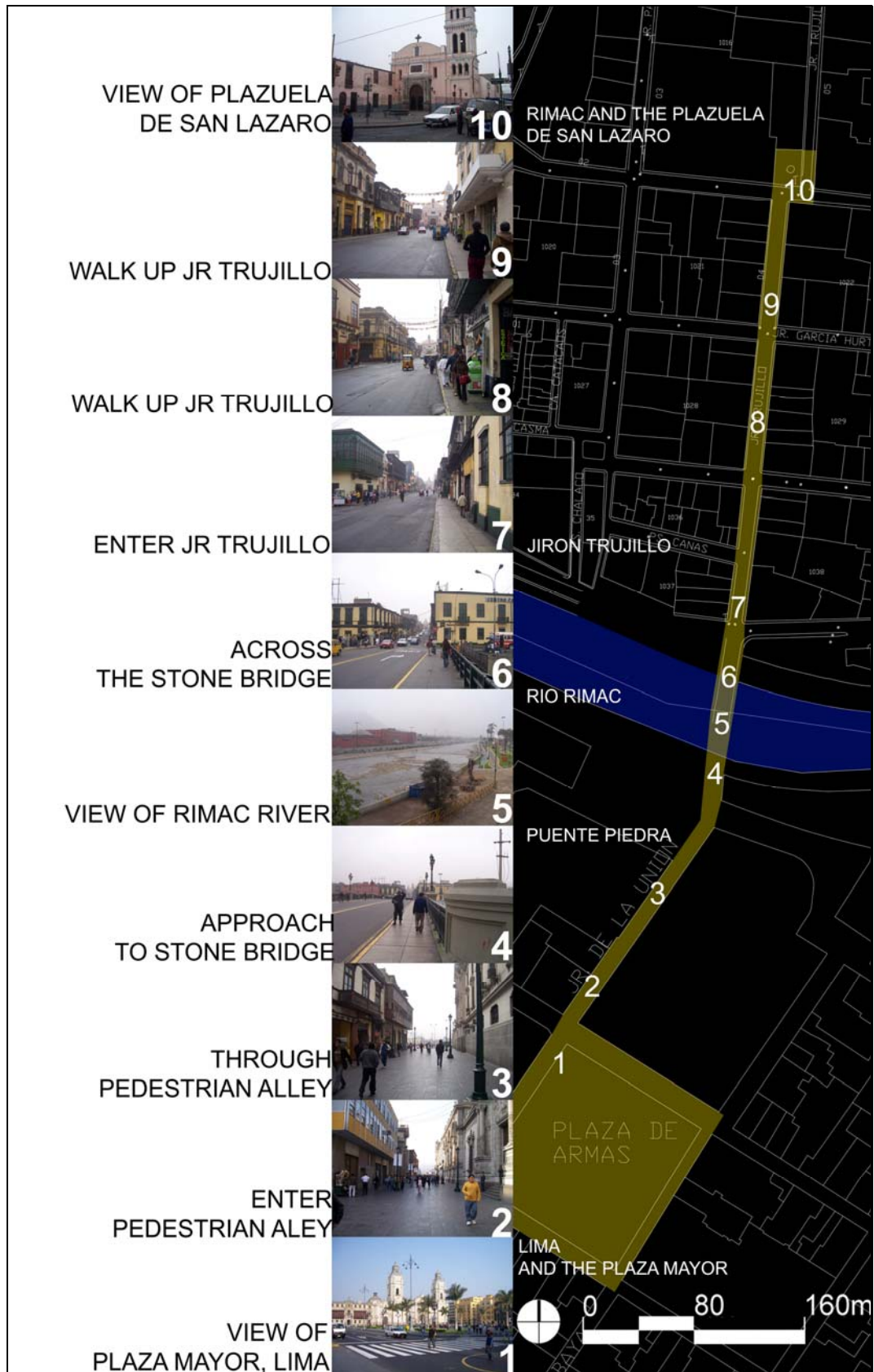


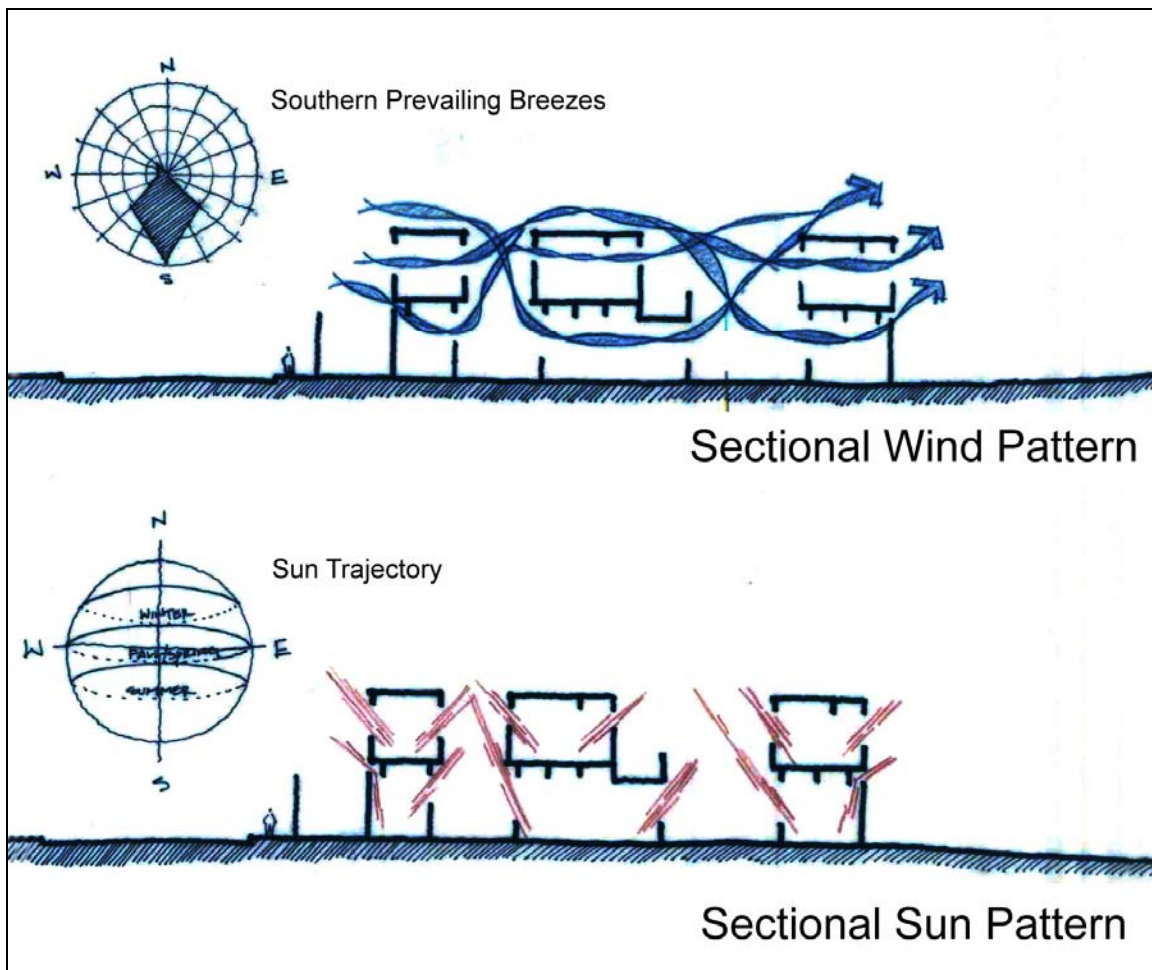
Figure 14: Promenade from Lima into Rimac

[author]



**Figure 15: Building conditions diagram**

[author]



**Figure 16: Wind and sun patterns for a proposed house in Rimac**

[author]





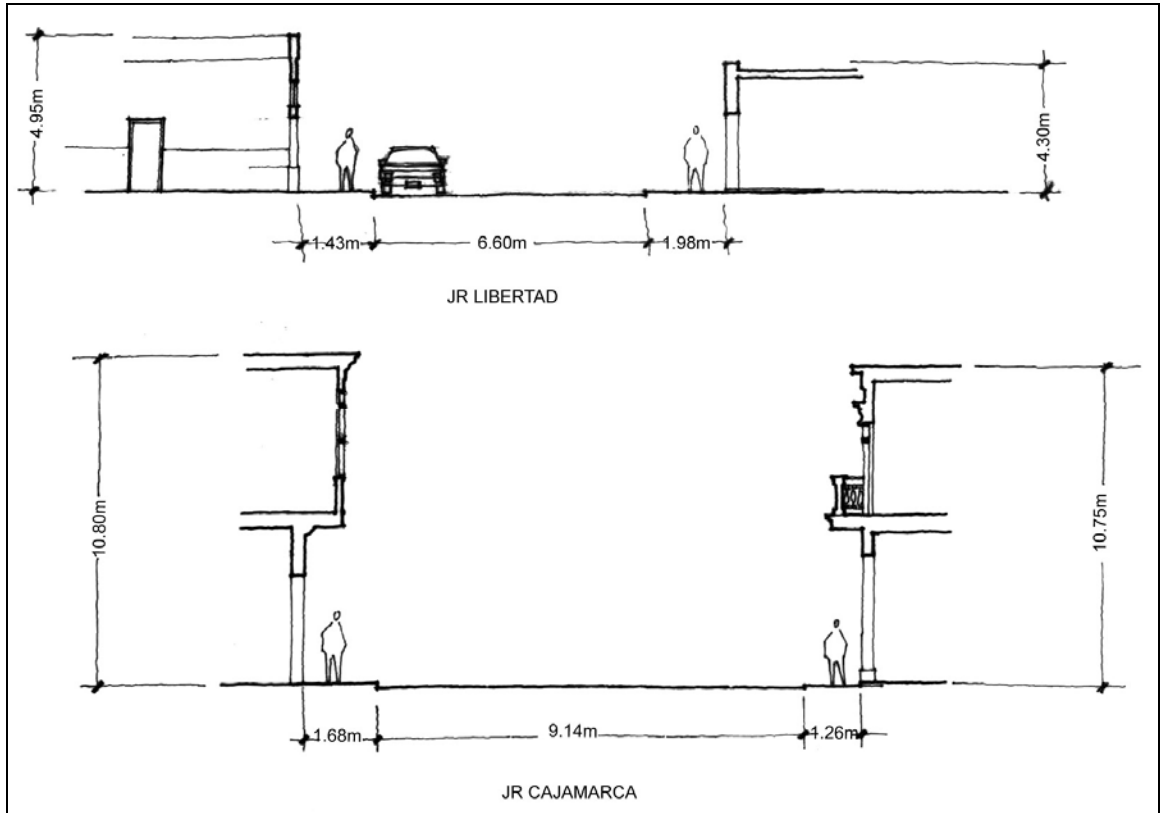


It is essential to understand the nature of how light, air, and seismic conditions affect the built environment in Peru. How these analyses impact the current building conditions and what will be proposed has very strong implications on the direction of this thesis. The percentage of solid to void within each block varies; how well they suffice the above conditions is what will be tested. Massing, structure, circulation, and space-making become important components to housing solutions that address these environmental concerns and building conditions.



**Figure 18: Figure ground of selected blocks in Rimac, Peru**

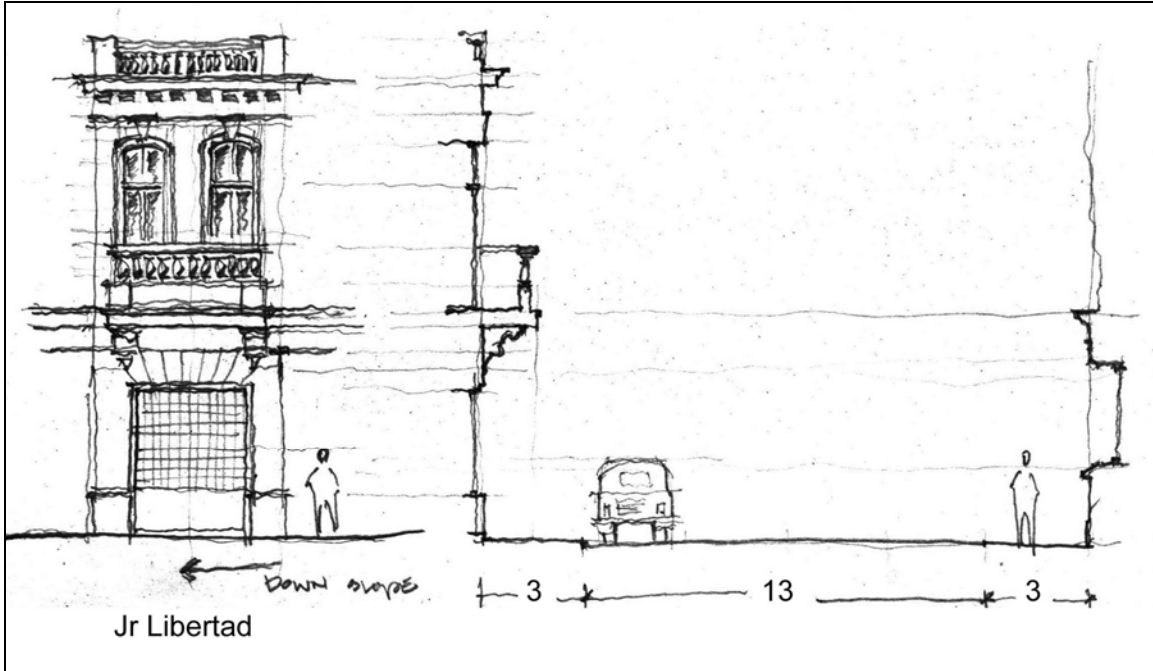
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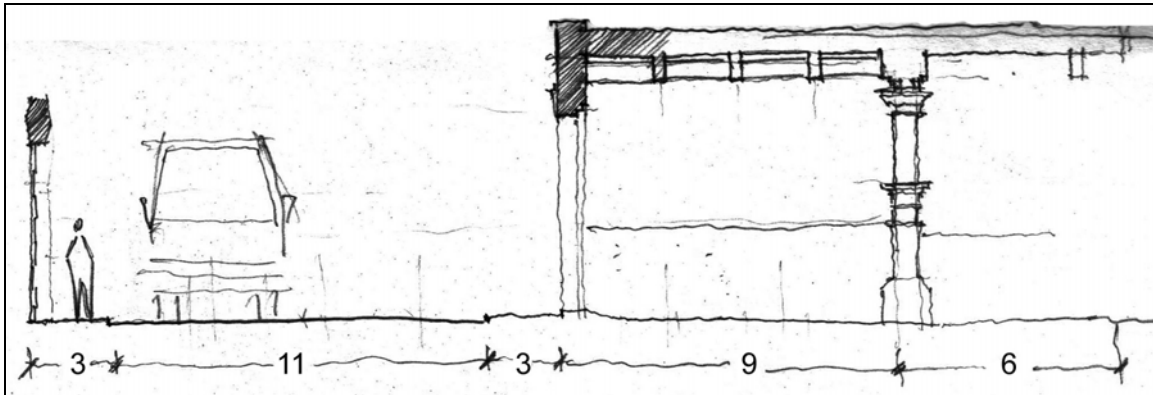
**Figure 19: Typical street sections along Jr Libertad and Jr Cajamarca**

[author]

Buildings in Rimac typically range in height from two to four stories. Due to the traditional quinchá construction, the load that any first floor can withstand is not much. Typical two-story construction uses pure adobe walls at its ground level and another floor of quinchá walls. However, there are buildings that use masonry construction. A typical floor-to-floor height is can range from 3m to 4m. As unusual as these heights can be for residential properties in the United States, there is the issue of sunlight and ventilation that is lacking in Peru; thus, taller ceilings allow more exposures to light and air.



**Figure 20: Jr Libertad street section with selected façade** [author]  
 Sketch drawn on site observes the street-to-sidewalk ratio. It acknowledges heights relative to human and vehicular scales. Drawing demonstrates the articulation and detail of the façade.



**Figure 21: Jr Cajamarca street section through portal opening** [author]

The observations made in the street-to-sidewalk ratio sketches inform the priority of path and lanes. Given that a typical sidewalk width is 1.5m (4.8ft), a typical street width is roughly 6m (19.2ft). The sidewalk width is given less importance; however, allows more opportunity for the pedestrian circulation within the lot to be organized, whether used toward forecourt area or corridor (refer to figure 19). Nonetheless, the given width for a sidewalk may not be

appropriate along certain streets given the amount of traffic that may accompany them and the proximity of the pedestrian to the street. This width also does not allow for landscaping to occur along the street front. The lack of landscaping leaves sidewalks strictly as circulation with little experience of the natural elements like trees or plantings. The color that vegetation would have given off is replaced by the vibrant and warm colors of the facades. Any landscaping that does exist is located in the city gardens like Alameda de los Descalzos and Paseo de las Aguas. Very seldom do residents' properties have landscaping. The city is charged with only maintaining Rimac's gardens and landmarks.



**Figure 22: Sample of colors that are applied to various facades in Rimac**

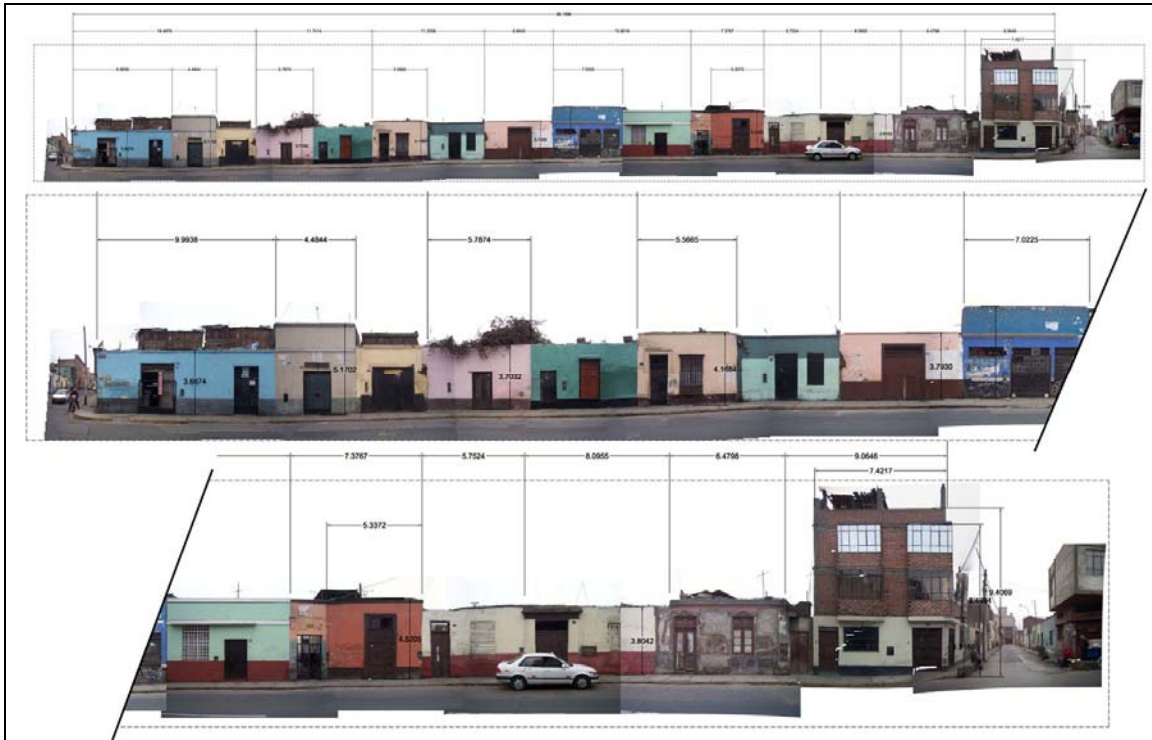
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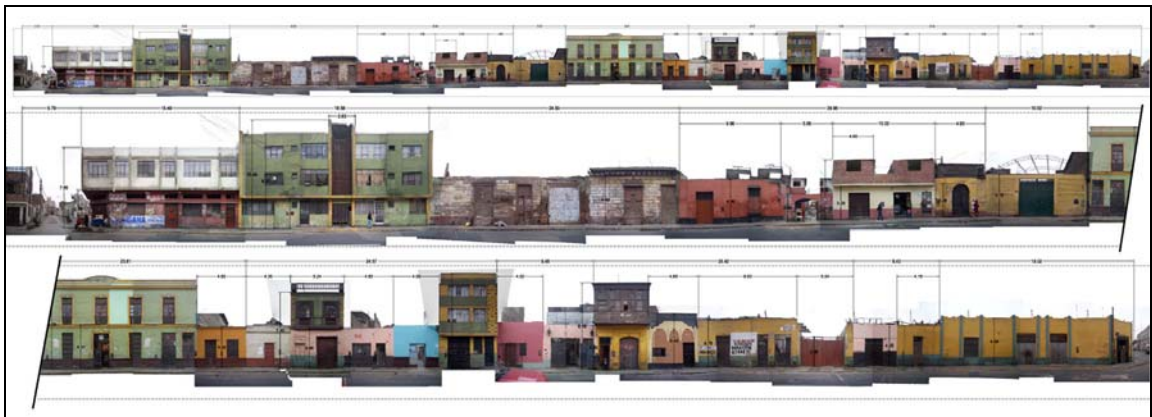
**Figure 23: Landscaping elements in Rimac**

[author]



**Figure 24: Typical heights and widths along Jr Libertad**

[author]



**Figure 25: Typical heights and widths along Jr Libertad**

[author]

## Chapter 2: Socio-cultural Agenda

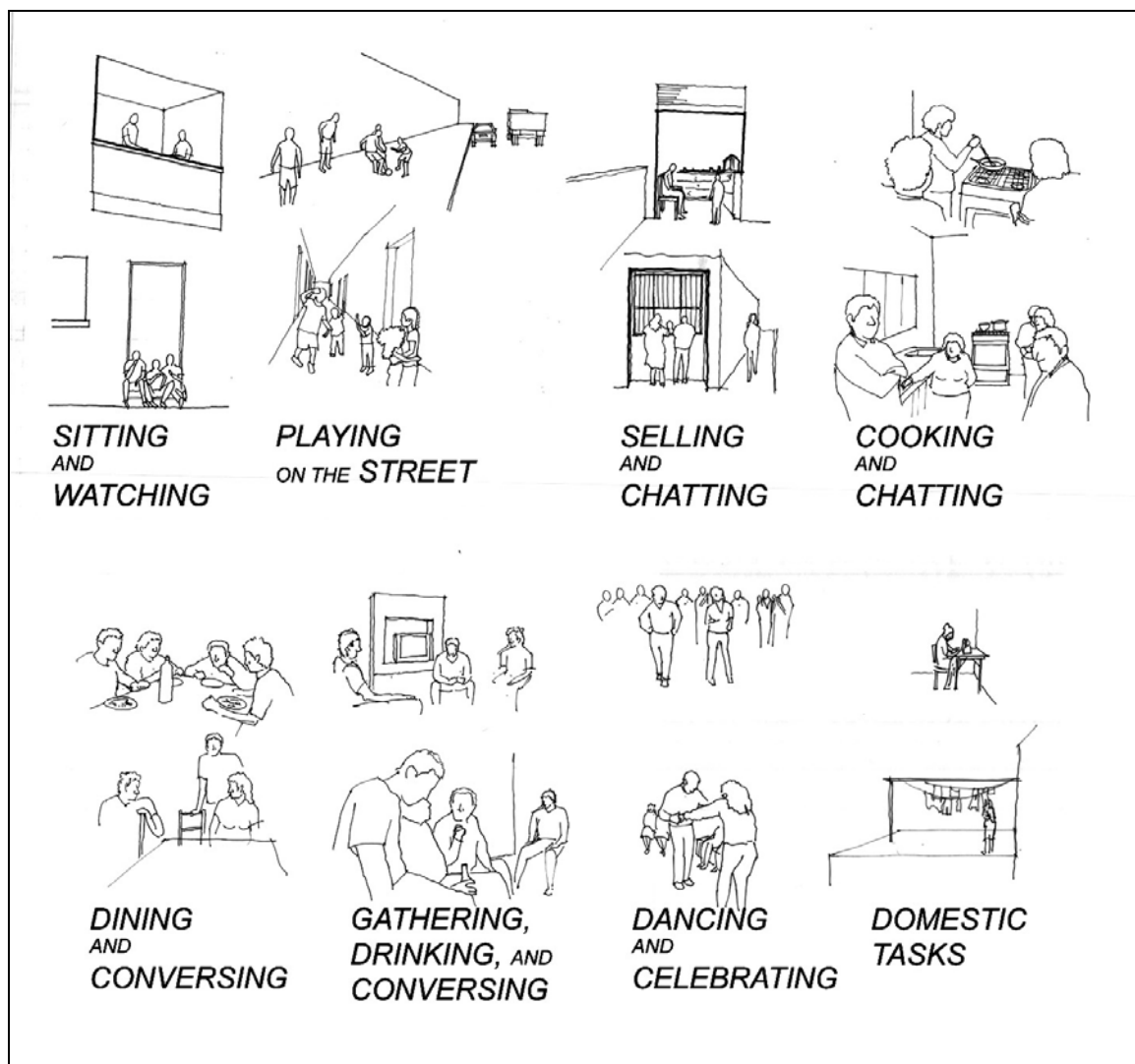
“...people do not only need to obtain things. I think they need, above all, the freedom to make things – things among which they can live. To give shape to them, according to their own feelings, their own tastes, their own imagination. And put them into use in caring for each other and about each other.”

Ivan Illich and Richard Wollheim

The social structure of Rimac residents is broken down into family and neighbors. The family is the center of the dwelling. The house does not function if it does not have the family to function for. Why preoccupy with this aspect of Rimac's culture? The implications that family life in Peru has within the city impact the success of this thesis. The nature of a community is to engage the residents as participants in the overall social structure. Currently there is a minimal amount of pride for one's neighborhood and community. With little to encourage the people to grow and build upon their community, it is difficult to evaluate what type of housing solution works best. Therefore, it is necessary to understand the nature of the family in depth in order to recover information that could initiate inspiration and encouragement within the neighborhood to build and form a community.

Many of the activities that take place inside and outside the home are very family oriented. Peruvians tend to want the company of others and avoid being alone. Sitting on the front step or street watching from a balcony is a passive activity. Whatever opportunities Peruvian receive to enjoy the outdoors is usually

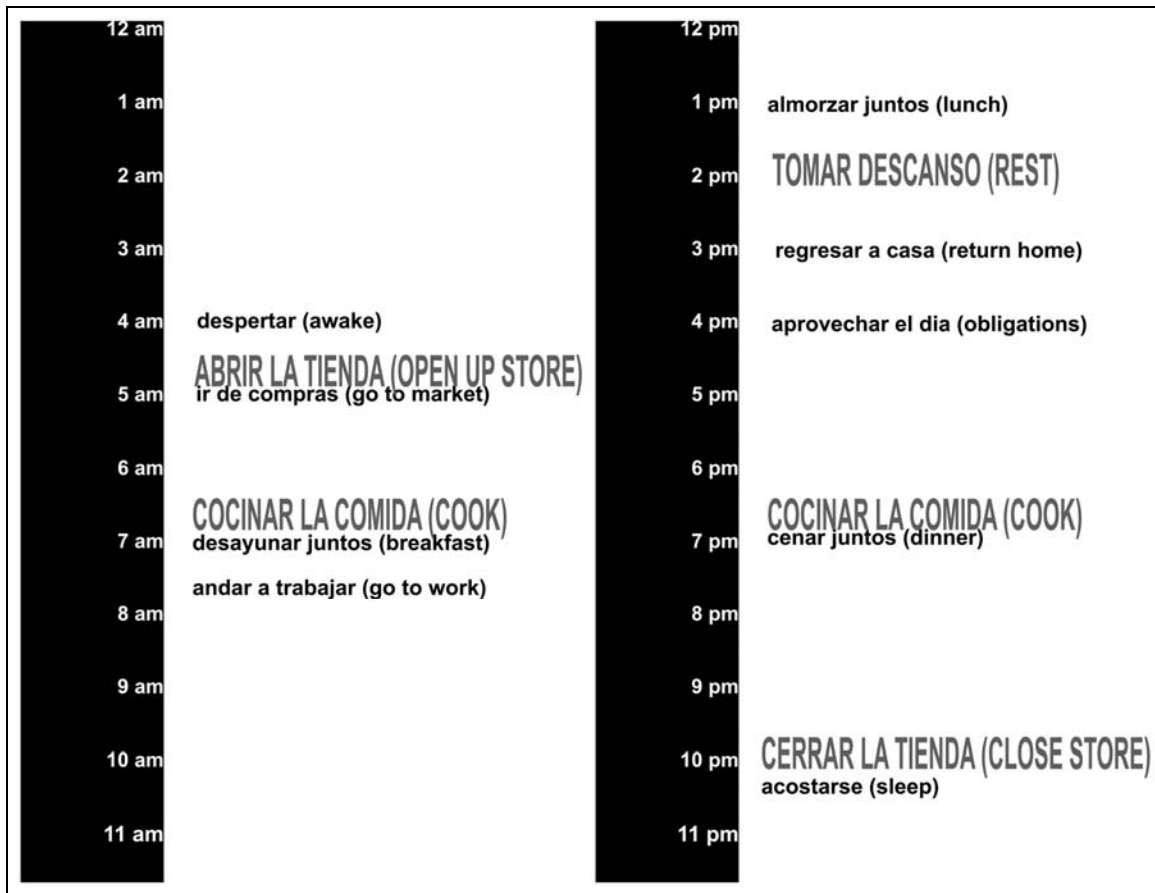
done so by sitting or watching. Walking is another option; however, walks are usually to reach a destination as opposed to for leisure. Children will play on the street. It is dangerous and children are usually out of sight from the parents' view. Storefronts become points of quick conversation as one purchases goods from the vendor. If neighbors are recognized, this may result in a small group conversation. Being that storefronts are connected to the home, vendors pass time waiting for customers by watching television or finishing up domestic duties. They make sure to take breaks at lunch, siesta, and dinner hours.



**Figure 26: Family life and activities that revolve around the house**

[author]





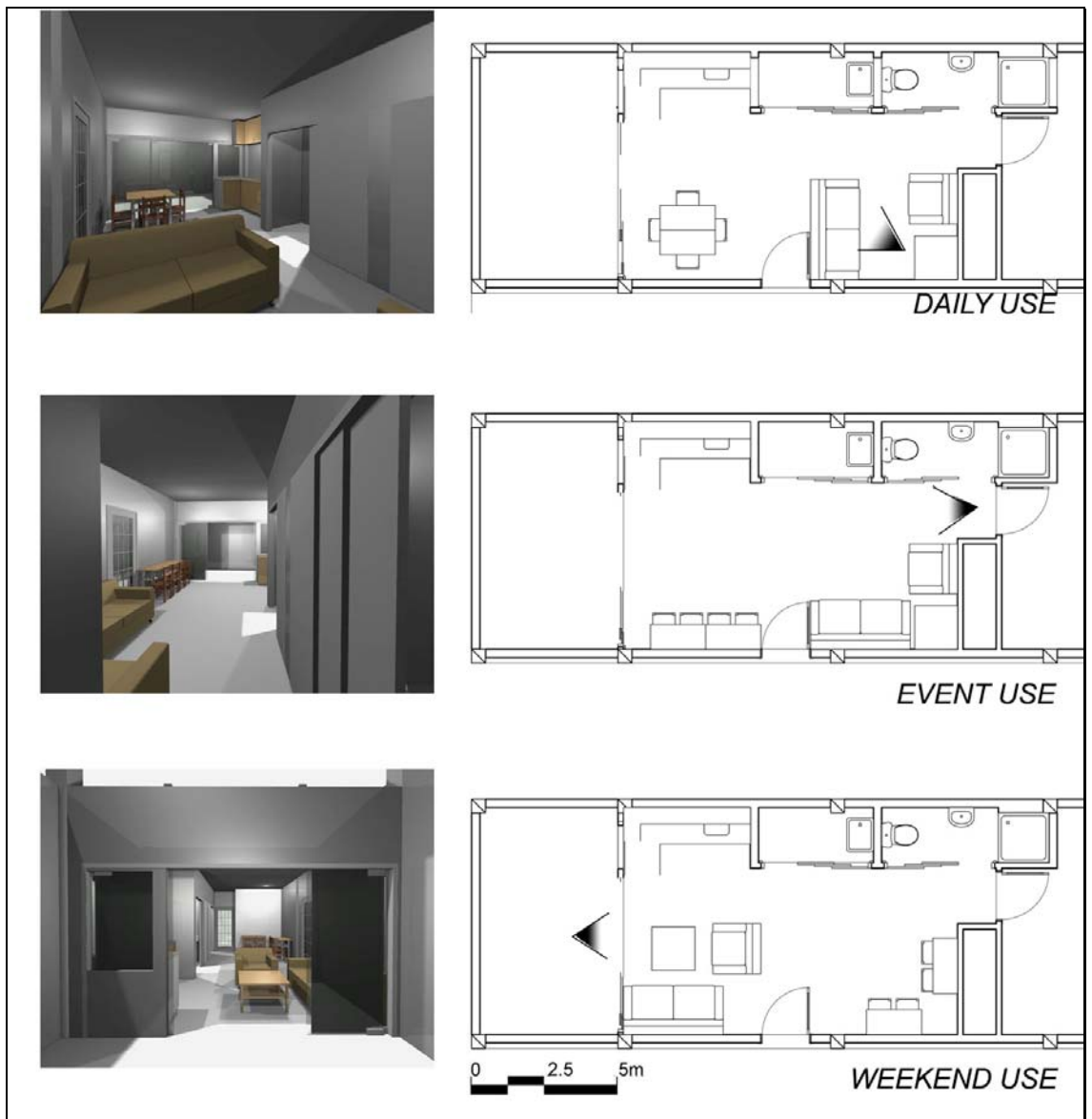
**Figure 27: Timeline of activities throughout a typical day**

[author]

Activities that take place within the home range in participation of the family members. Regardless of family size, it is common for all members to dine together and participate in conversation. On many occasions the conversation precedes dinner in the kitchen while dinner is being cooked. It remains custom for women to cook in the kitchen. On some occasions dinner is followed by more conversation involving sharing a glass of Peruvian beer. This usually is the case with adults. Although, children do not usually partake in this, they are either playing or having their own chats. On special occasions for birthdays or celebrations, dancing is typical regardless of the significance of the occasion.

A home that accommodates these activities does not translate into larger square footage. Rather, the notion that space is flexible and many functions and

activities can occur in one particular area introduces the concept of the multi-use space. This room will reduce the amount of wasted space and poor planning evident in some Peruvian houses. It will allow residents to plan out their activities so as to maximize space needed and rearrange furnishings as necessary.



**Figure 28: The multi-use space and various use layouts**

[author]

The multi-use space is not an uncommon concept in Peru. For those of lower income levels, residents must resort to an inefficiently dimensioned spaces that crams uses in one room, rather than distribute them accordingly. Evidence

shows that people live in these conditions and accustom to it, although are not necessarily happy with the condition. Bathrooms and kitchens that share the same plumbing are placed side by side in the same room. Kitchens and bedrooms are just inches apart in the same room (refer to figure 29). These notions of multi-use and flexibility must be reinterpreted to accommodate for healthier and a much wanted desirable lifestyle.

Christopher Alexander stresses the aspect of the house and “the building site as a fundamental human experience; the process of the house construction as a fundamental part of human life”<sup>1</sup> is lacking in today’s society. The current forms of construction practice that take place, leave the builder and user alienated from the object and place which it is built for. This disconnect could be true of Rimac residents who take little pride in their shelters.

Where Rimac differs from other poorly maintained cities is not in their living condition but in their common interest. It is evident that given certain economic conditions and factors, Rimac residents cannot individually initiate a program of reform. How does one engage and activate the community? How does one introduce a method by which the Rimac resident is the participant in the process? The social homogeneity in Rimac is in the act of involvement and participation in the construction or renovation of one’s home which can produce reform to the issue of civic pride and community. This can be executed through the self-help process. This process proposes engaging the community not only in its individual construction projects but also to the community itself.

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<sup>1</sup> Alexander, Christopher, *The Production of Houses* pg. 297



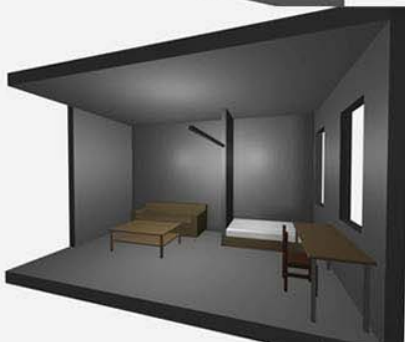
*Bathroom, kitchen*



*Bathroom, kitchen, shower,  
dining table*



*Kitchen, bed, table*



*Bed, living, table*



*Bed, living, table*

**Figure 29: Existing multi-use spaces as recorded in Rimac homes** [author]

This thesis acknowledges that one property is just as valuable as the next. To execute proper rehabilitation, a community consensus is conducted that allows the necessary resizing of lots and building construction to take place. A step by step process will instruct and address the following: the materials used, the actual construction practices, the reliability of the builder's yard, a schedule of tasks, and a guidebook/handbook to demonstrate these criteria. These criteria generate the building and inspire the pride of ownership and community engagement that is necessary for reform.

## Chapter 3: Urban Design Agenda



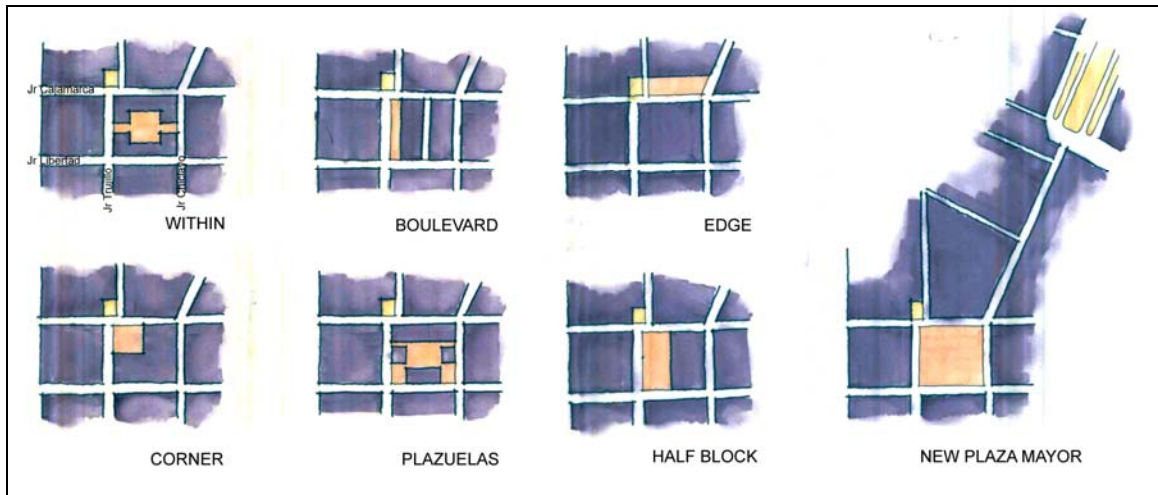
**Figure 30: Plaza Mayor of Cuzco and Lima, Peru**

*[google earth]*

The lack of open space in Rimac presents an issue for community interaction in Rimac. The presence of a community does not exist here. Most of the open spaces are government owned. For protection against vandalism and for better maintenance, these open spaces are gated and fenced in. The public open spaces created in Cuzco and Lima's Plaza Mayor embrace the community as a strong center. It is a place for interaction, enjoyment, and experience. It offers a multitude of uses throughout the day: a place for vendors, events, and gatherings. Therefore, a new center for Rimac offers the opportunity for a concentration and growth of community.

The open space for Rimac may take a variety of forms. Rimac may not necessarily need an entire block for an open space since Lima's Plaza Mayor is within close reach of the city limits. The open space study for Rimac has opportunity to be unique (see figure \_\_\_\_). These studies are then applied to

specific blocks with their own unique circumstances/conditions that promote a site for an open space. Three blocks were tested as potential sites for the new open gathering space.



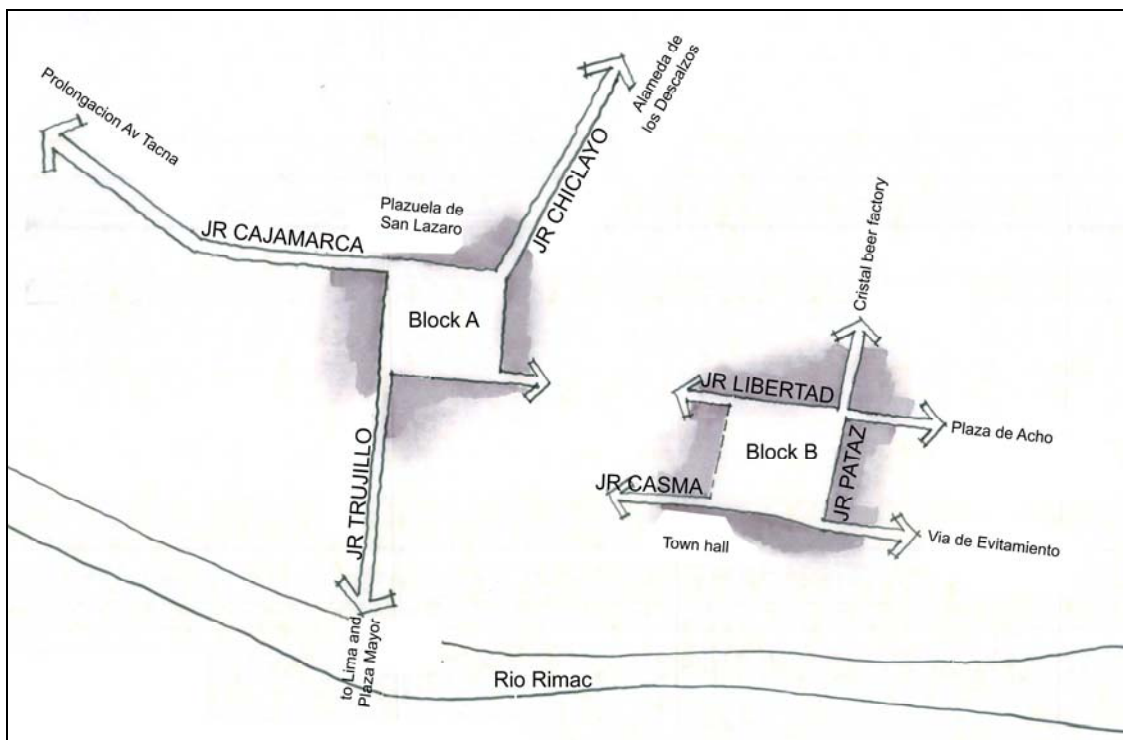
**Figure 31: Open space studies** [author]  
 These studies use the block at the intersection of Jr Trujillo and Jr Cajamarca as a test site for the proposed open space in Rimac. The yellow tone is a current plazuela. The orange tone is the amount of open space to cover the site.

Block A is bounded by Jiron Cajamarca, Jiron Turjillo, Jiron Chiclayo, and Jiron Libertad. Its proximity to the major roads, landmarks, and local markets makes it ideal. It is approximately 90m<sup>2</sup> being that it is the closest to a regular block. There is a direct connection to Central Lima via Jiron Trujillo. The schemes presented acknowledge that this new open space is within reasonable walking distance from the Plaza Mayor of Lima. The activity and land use along Jiron Trujillo is significant compared to other streets in Rimac. It is full of shops, stores, and cafes which have the potential to offer more activity directed toward the open space proposed for Block A.

Block B suggests dividing or breaking up the idiosyncratic block bounded by Jiron Libertad, Jiron Casma, and Jiron Pataz. As a result, the super block becomes less overwhelming creating better walking distances between blocks

and creates opportunity for connection to the town hall and Plaza de Acho. The density of activity is increased and places more emphasis on the community in connection to the town hall. The super block is approximately 90m x 180m.

Block C is bounded by Jiron Cajamarca, Jiron Hualgayoc, Jiron Libertad, and Jiron Pataz. An open space here would open up a gathering space immediately in front of Plaza de Acho making that correlation to activity that occurs at bullfighting events. A plaza here would embrace the historic landmark and slow down traffic that uses Jr Hualgayoc to access the highway. It can also address a new center that uses the strength of Jr Libertad as a cross axis terminating at the bullfighting stadium.



**Figure 32: Landmarks within proximity of test blocks**

[author]



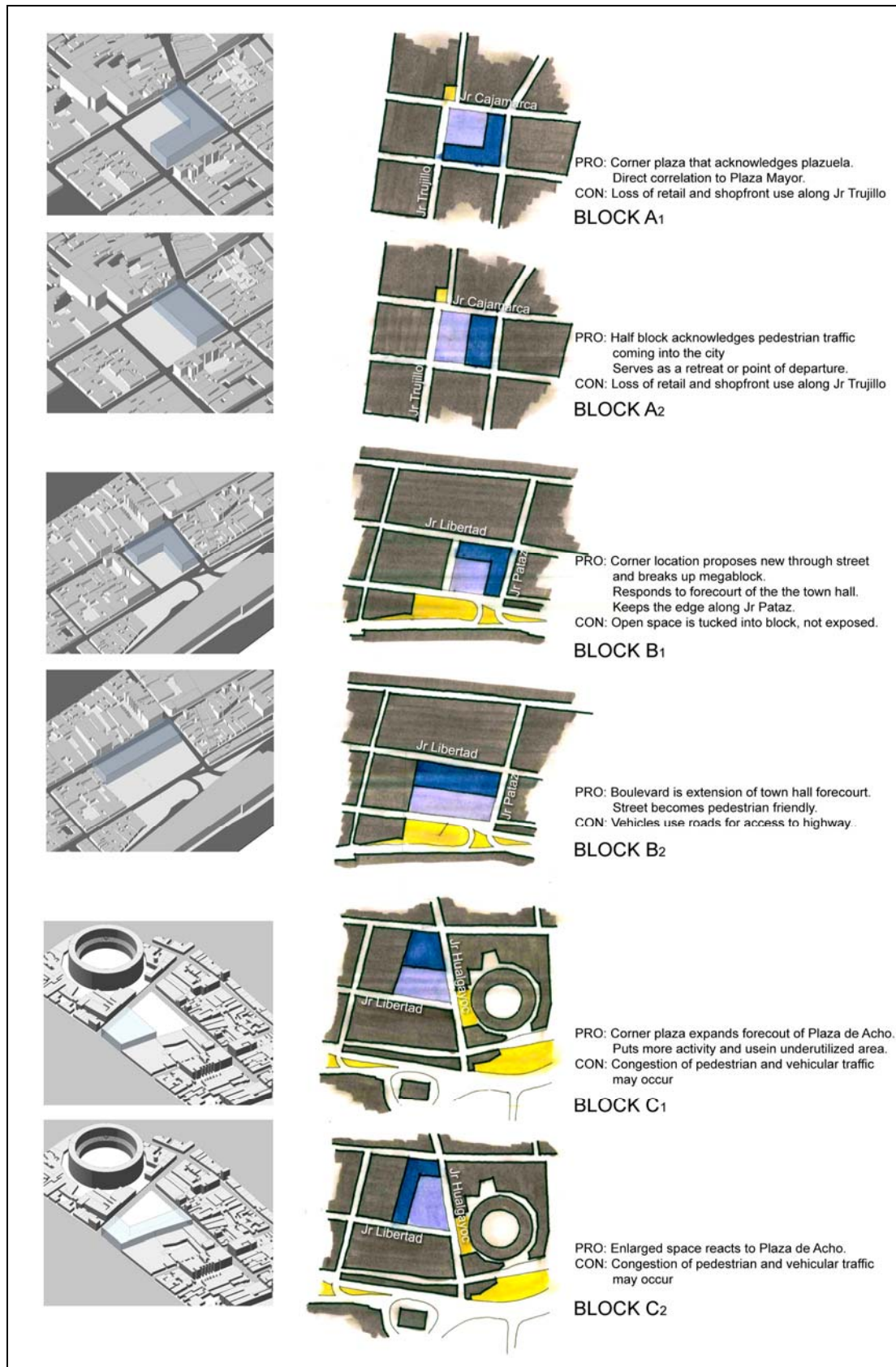
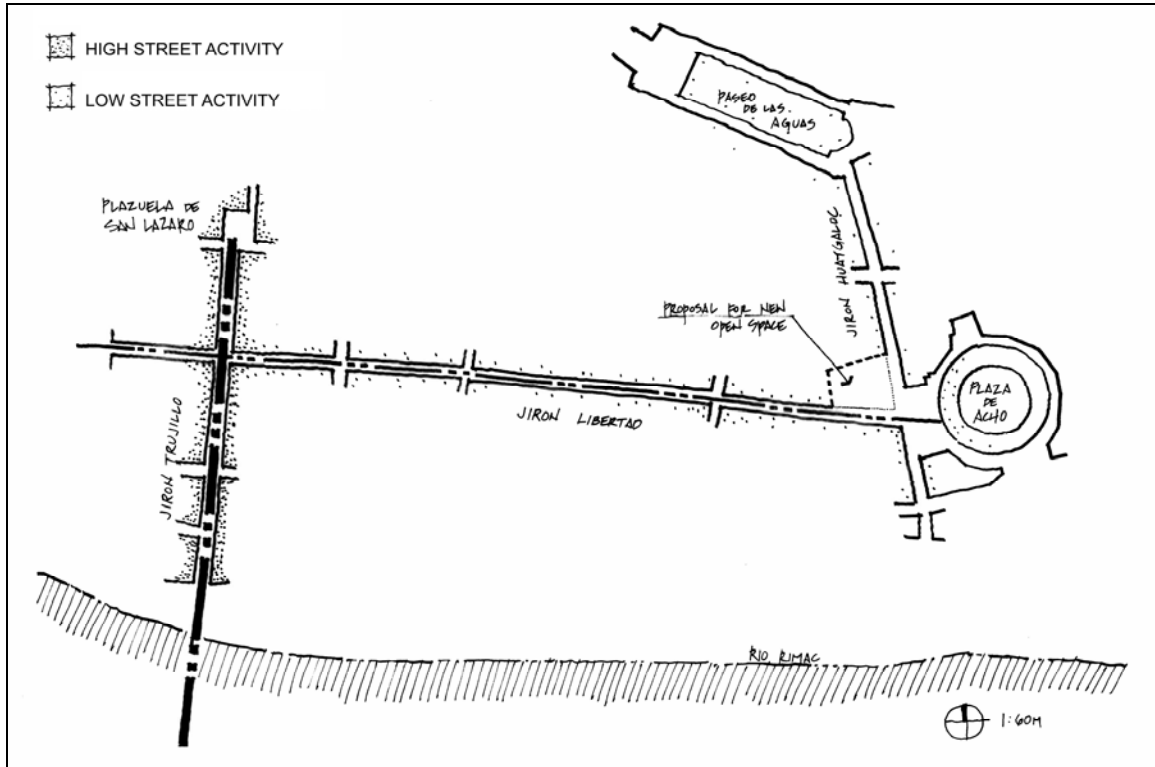


Figure 33: Test sites for open space proposal in Rimac.

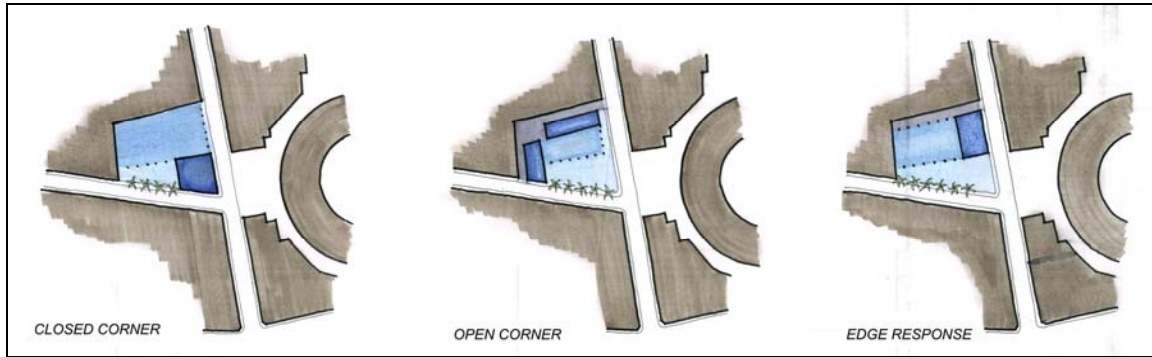
[author]



**Figure 34: Diagram demonstrating open space site selection**

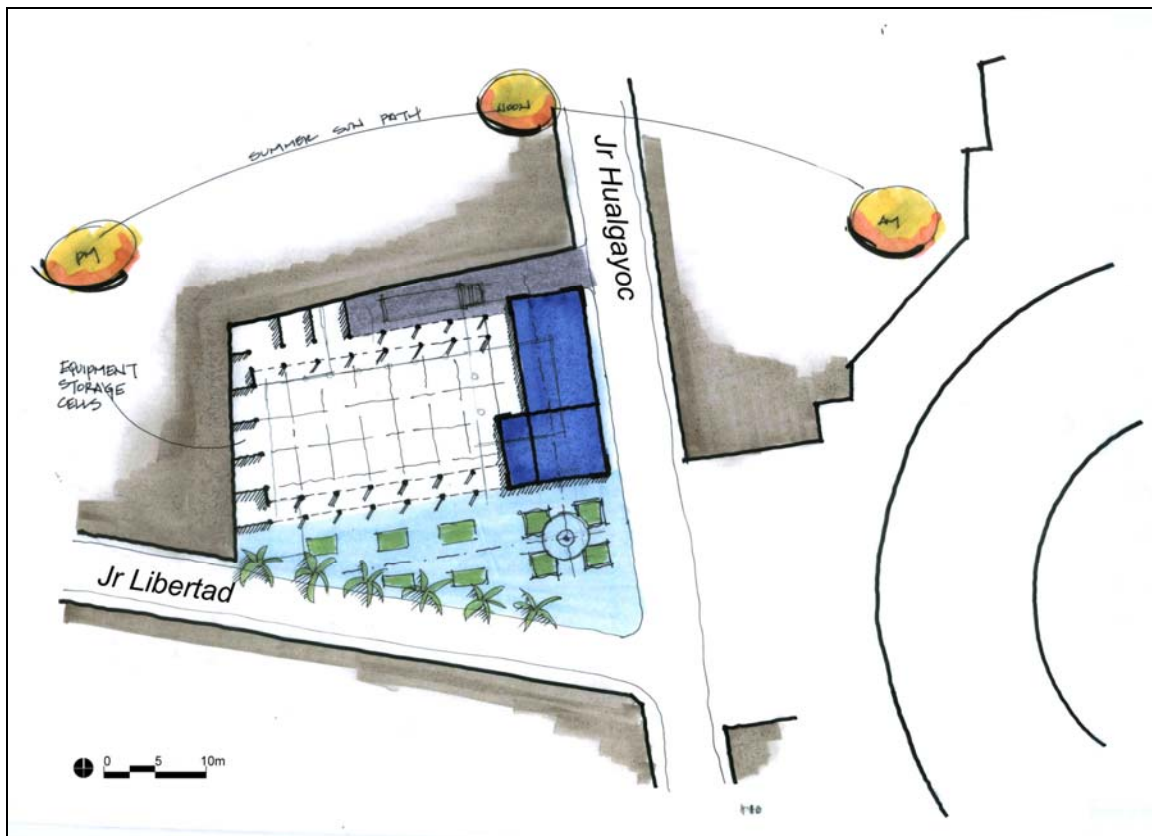
[author]

Block C is selected for the open space site. The site will be programmed to accommodate a builder's yard of approximately  $850\text{m}^2$ , a training institution of approximately  $420\text{m}^2$ , and storage cells in which equipment will be kept at approximately  $180\text{m}^2$ . Service is accommodated as necessary to bring in materials and equipment via truck. These figures were calculated by determining the allowable ratio of corner lot area ( $2355\text{m}^2$ ) to individual program pieces. The training institution should be 1:2 of the builder's yard area. The area of public open space ( $650\text{m}^2$ ) is determined by the edge condition carried across from the Plaza de Acho. This corner can enhance the importance of the Plaza de Acho as a landmark by bringing more meaning and activity to that area of Rimac.



**Figure35: Block C initial schemes**

[author]



**Figure 36: Block C investigation for edge response**

[author]

An arcade allows for visibility into the builder's yard for observation of construction taking place.



**Figure37: Schemes for building institution main elevation** [author]  
 Initial sketches demonstrating crafted elements on main façade and uniqueness of the arcades.  
 Archway is reminiscent of those found at the Plaza de Acho.

The self help process is facilitated and taught at the institution. Meanwhile, understanding the city typologies and their benefits and disadvantages is also taught. Exploration of the double courtyard (solariega type) and the pedestrian alleyway (callejon type) provide a foundation to lot organization. Introduction of typologies outside of Peru, such as in Los Angeles, CA can inform approaches to the irregular lot configurations that exist in Rimac city blocks.

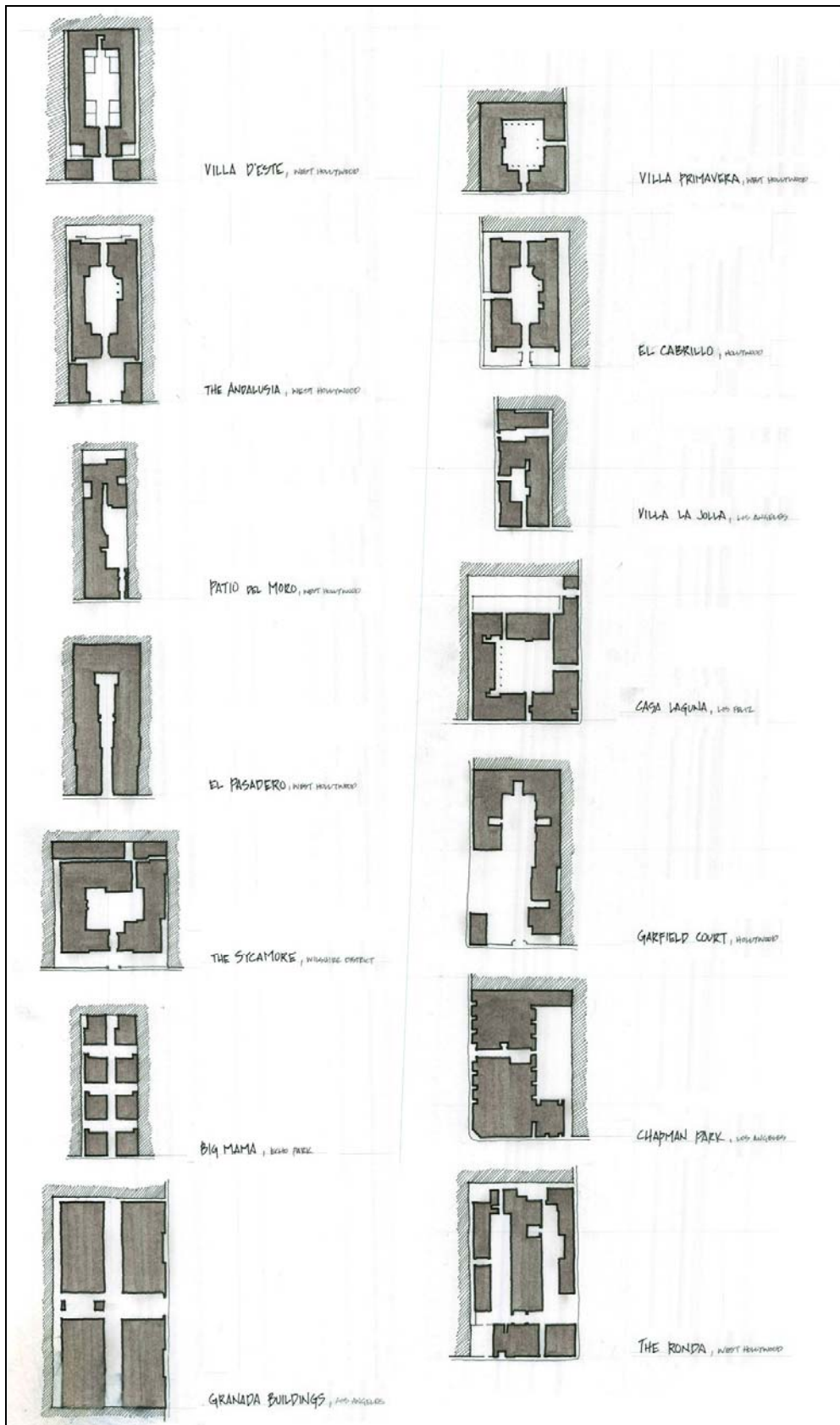


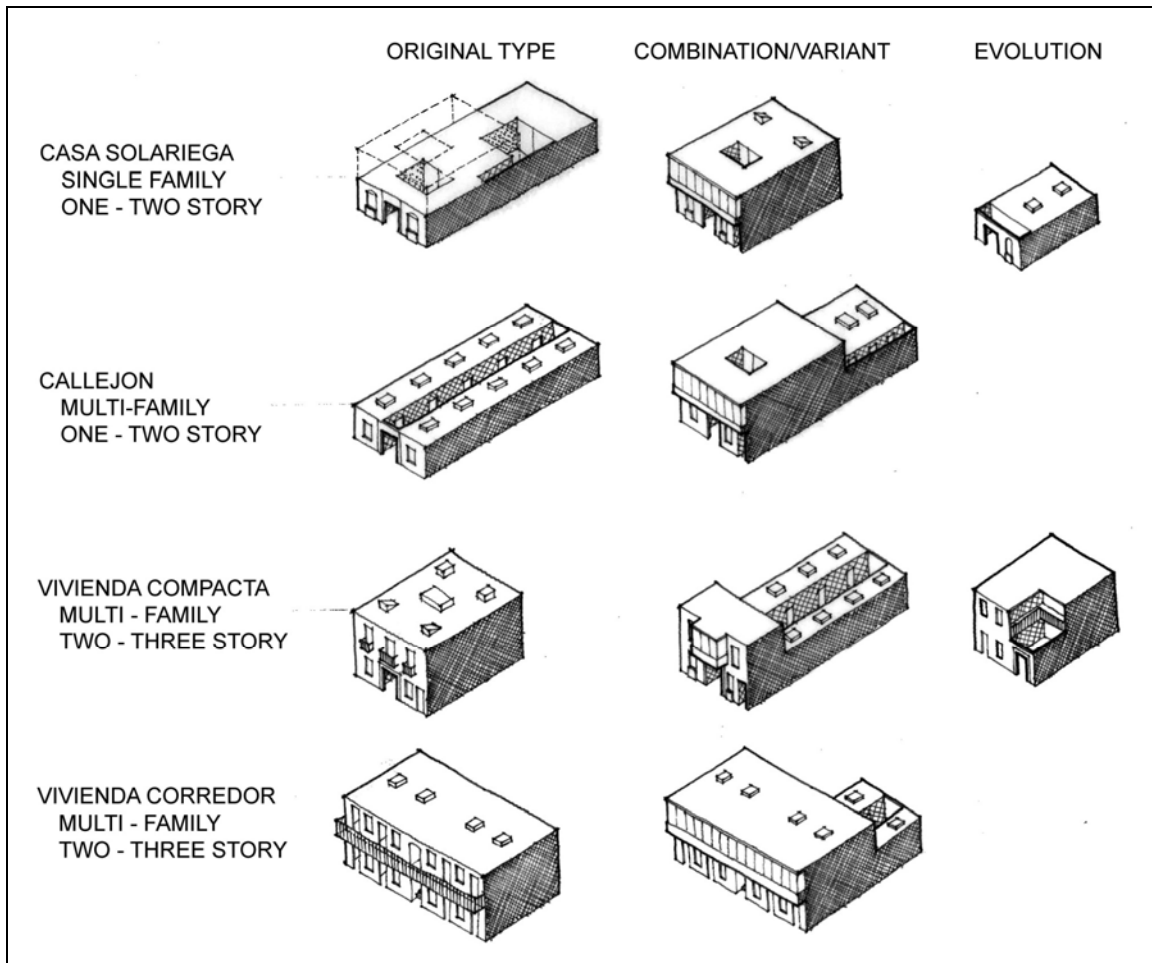
Figure 38: Los Angeles courtyard housing types

[author]





**Figure39: R.M. Schindler and Moule and Polyzooides courtyard housing in LA** [author]



**Figure 40: Existing typologies in Rimac** [author]

# CASA SOLARIEGA

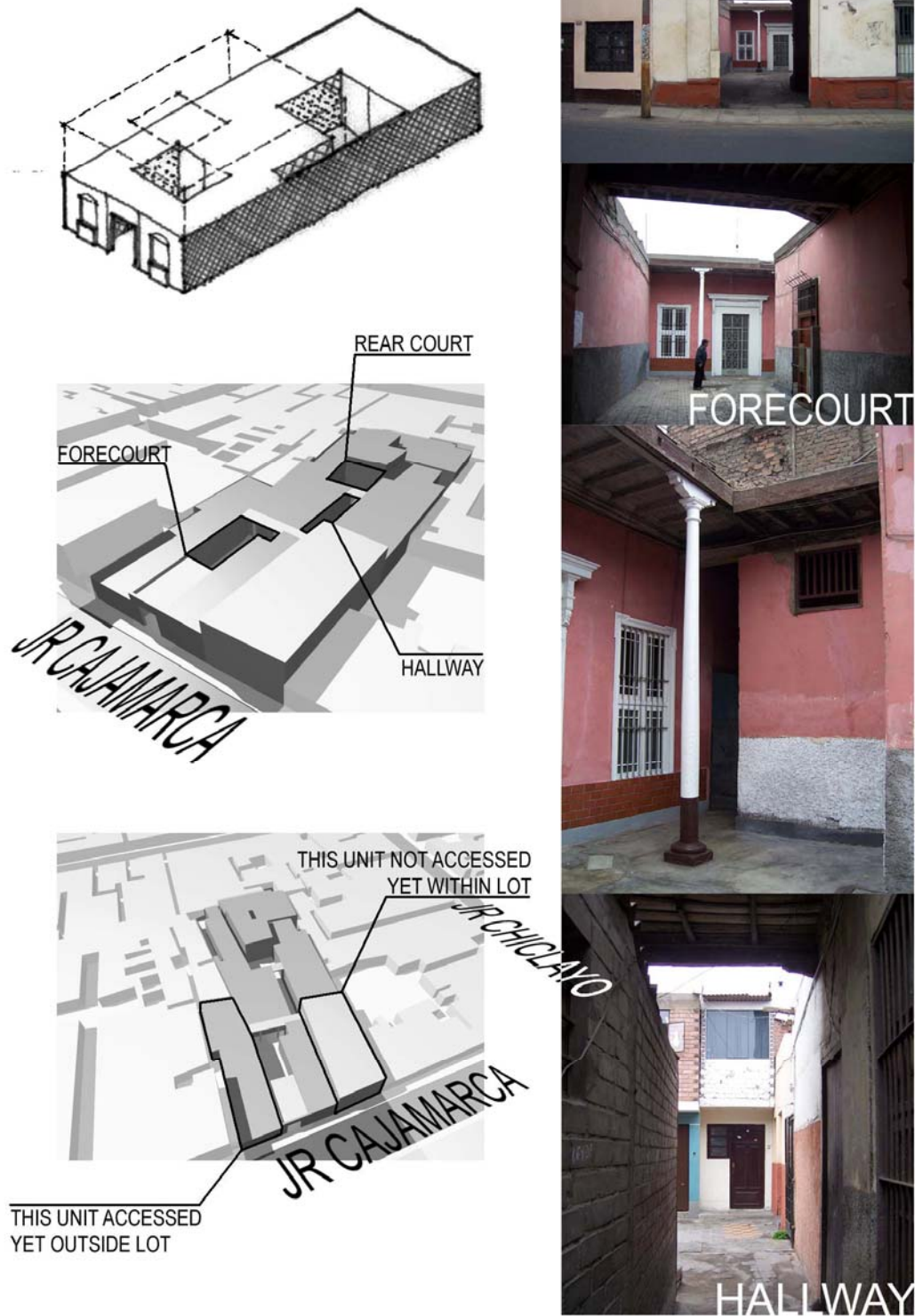


Figure 41: Solariega type

[author]

PROS:

SHARED PRIVATE PATIO

ACKNOWLEDGE YOUR NEIGHBOR

THRESHOLD & TRANSITION SPACE

SINGLE FAMILY

CONS:

UNFINISHED CONSTRUCTION

ACCESSIBLE TO OUTSIDERS

ONE TO TWO LEVELS

INCONSISTENT CHARACTER  
THROUGHOUT

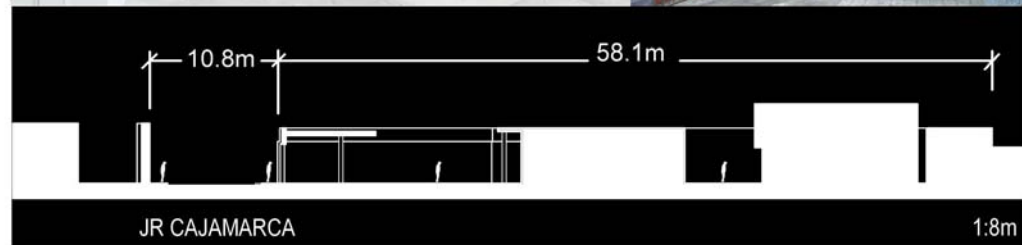


Figure 42: Solariega type

[author]



The lot arrangement in all blocks is irregularly defined. There is no organization or system to what a typical lot size is. Christopher Alexander, in his design for the PREVI, Proyecto Experimental de la Vivienda (Experimental Housing Project), analyzed that the typical lot size for a single family is 5.2 m wide by 13 to 27 m deep. Of course, the depth is dependent upon various factors and the needs of the family. In Rimac, the most regular lot size is ..... and can accommodate ....building types.

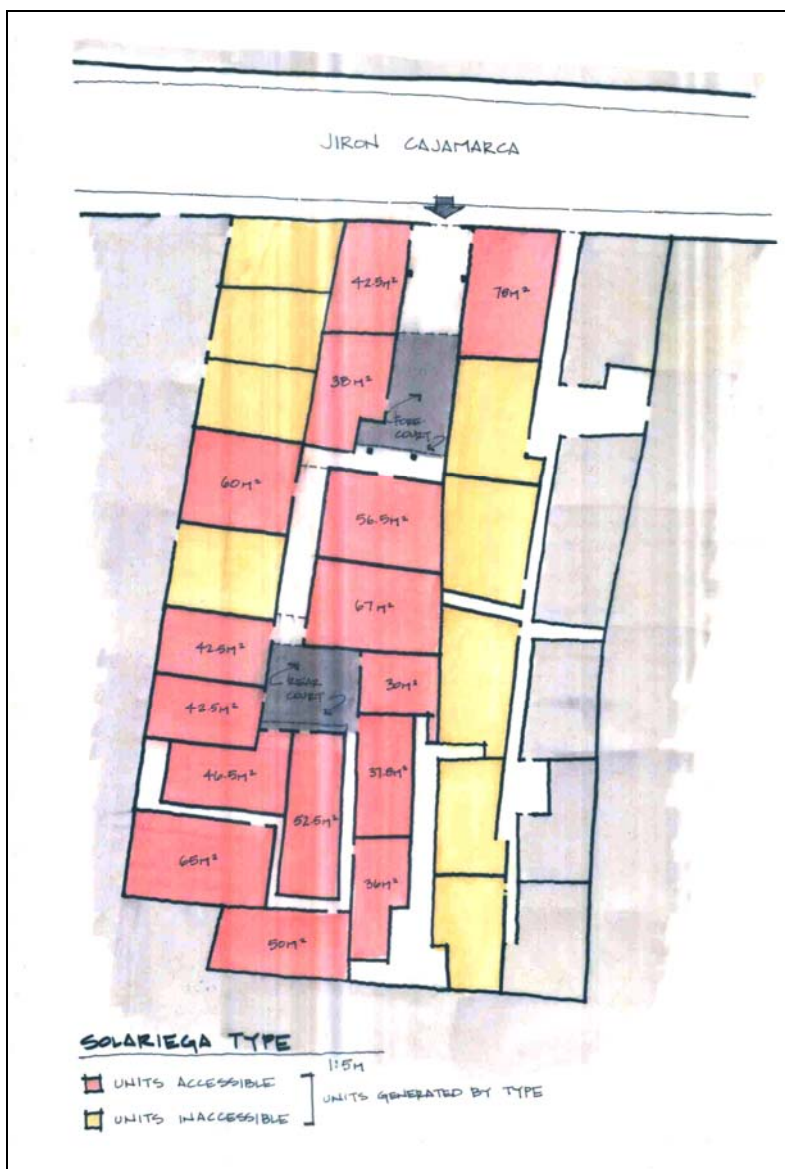
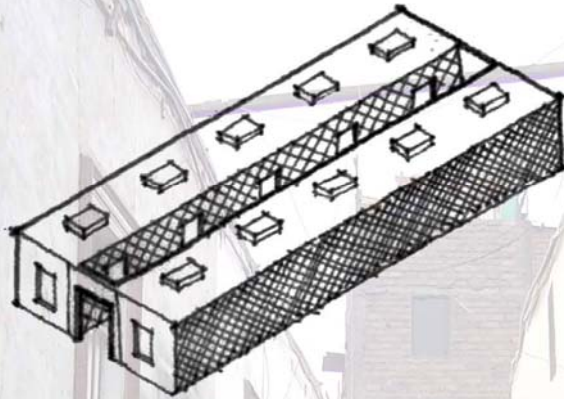


Figure 43: Solariega units analysis

[author]

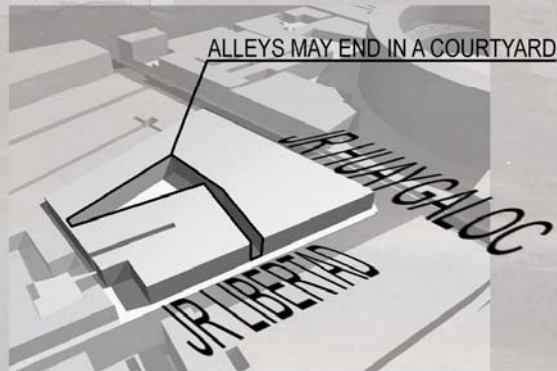
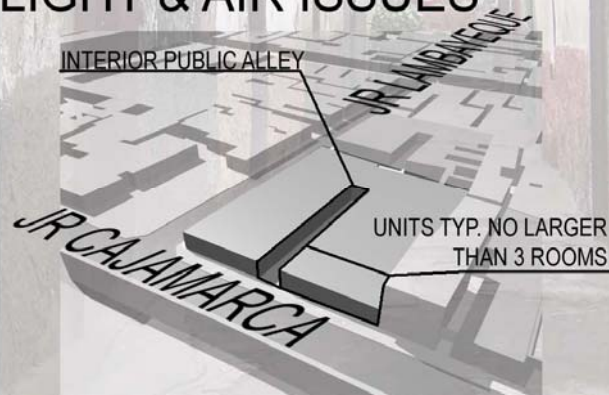
# CALLEJON



TYPICALLY ONE LEVEL

NO PRIVATE THRESHOLD

LIGHT & AIR ISSUES



SHORT CORRIDOR



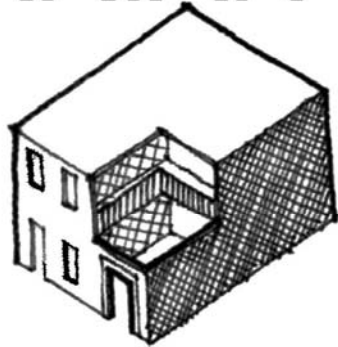
DEEP CORRIDOR

Figure 44: Callejon type

[author]



# VARIANT



ATTEMPT TO MAKE  
LIGHT & AIR MORE  
ACCESSIBLE

TWO LEVEL

COMPACT UNITS

MULTIPLE ACCESS  
INTO TYPE

LOST CHARACTER?

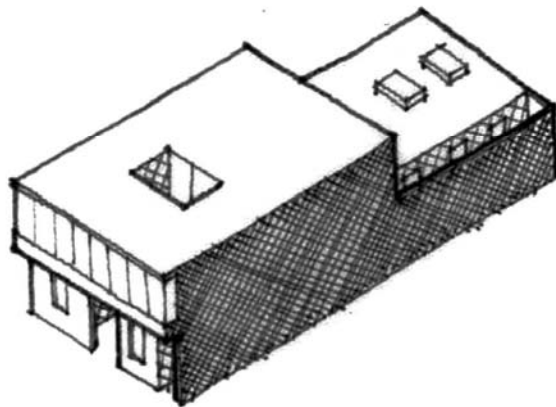


Figure 45: Variant types

[author]

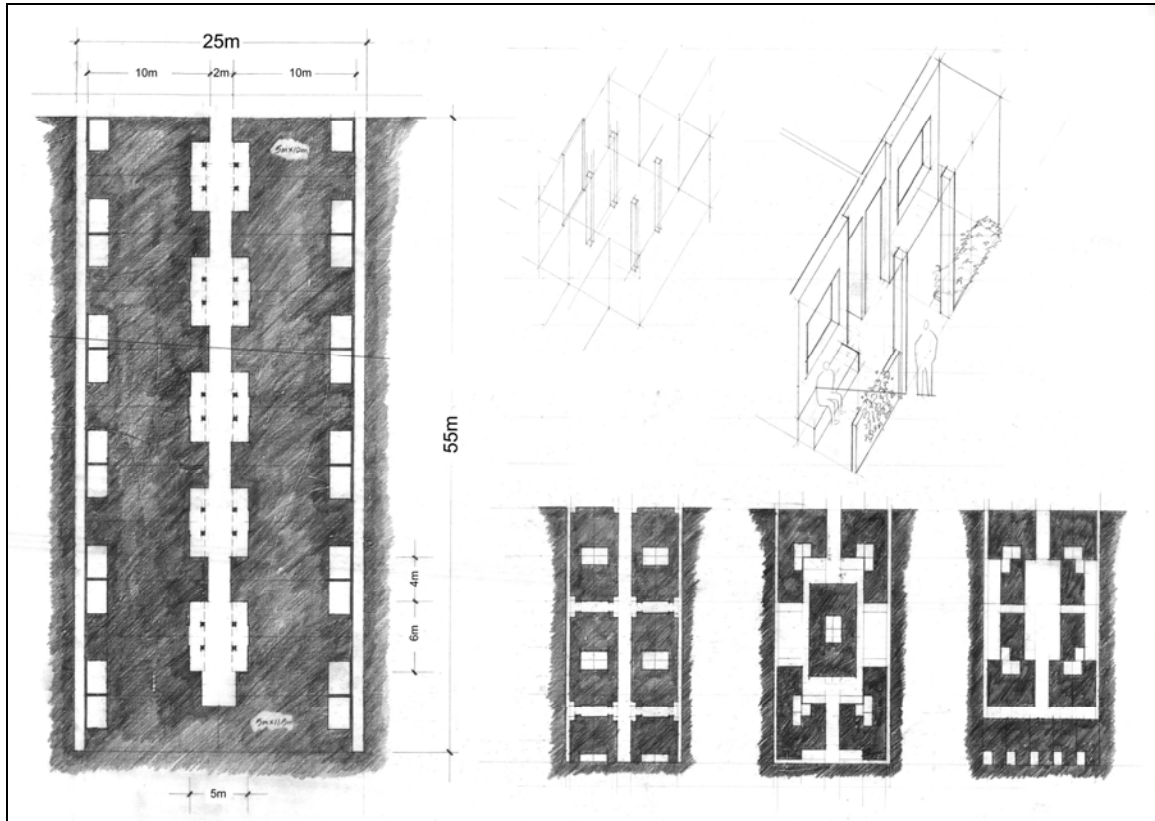


Figure 46: Deep lot figure ground studies

[author]

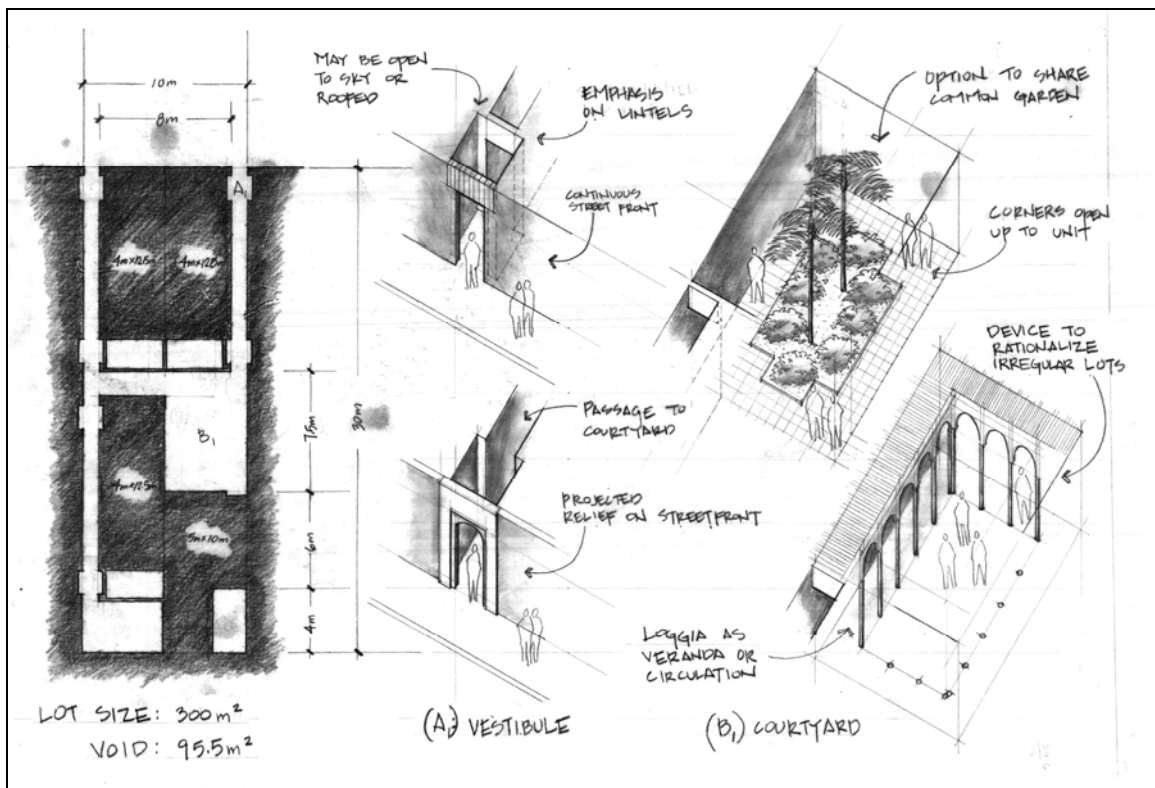
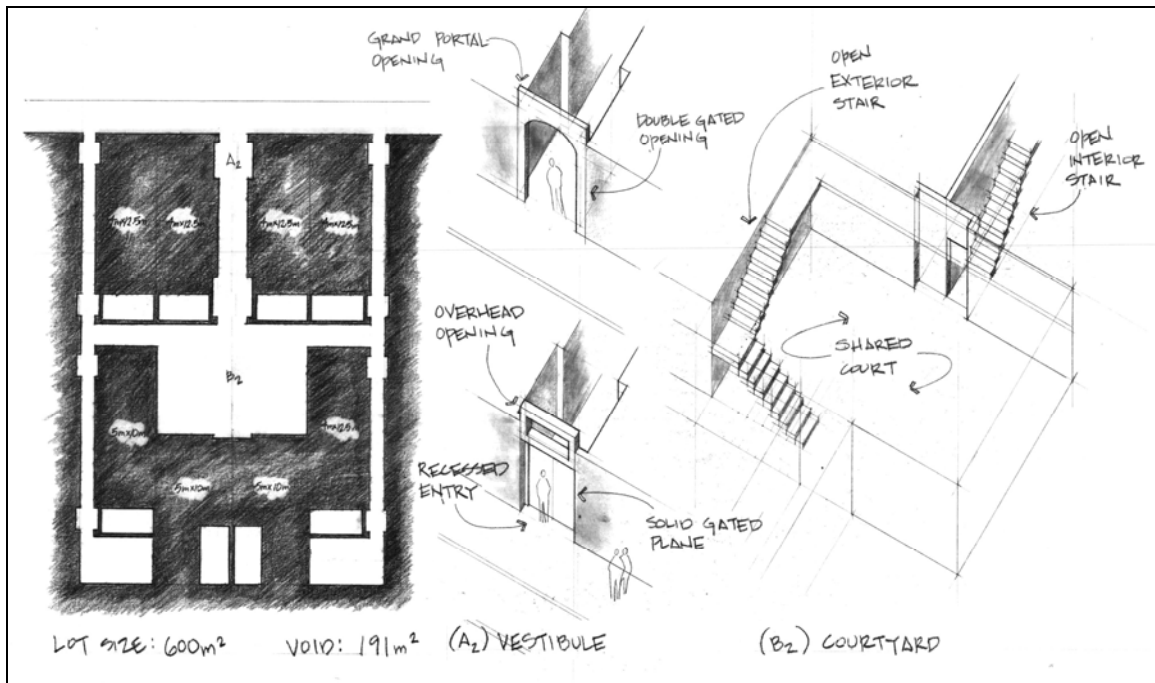


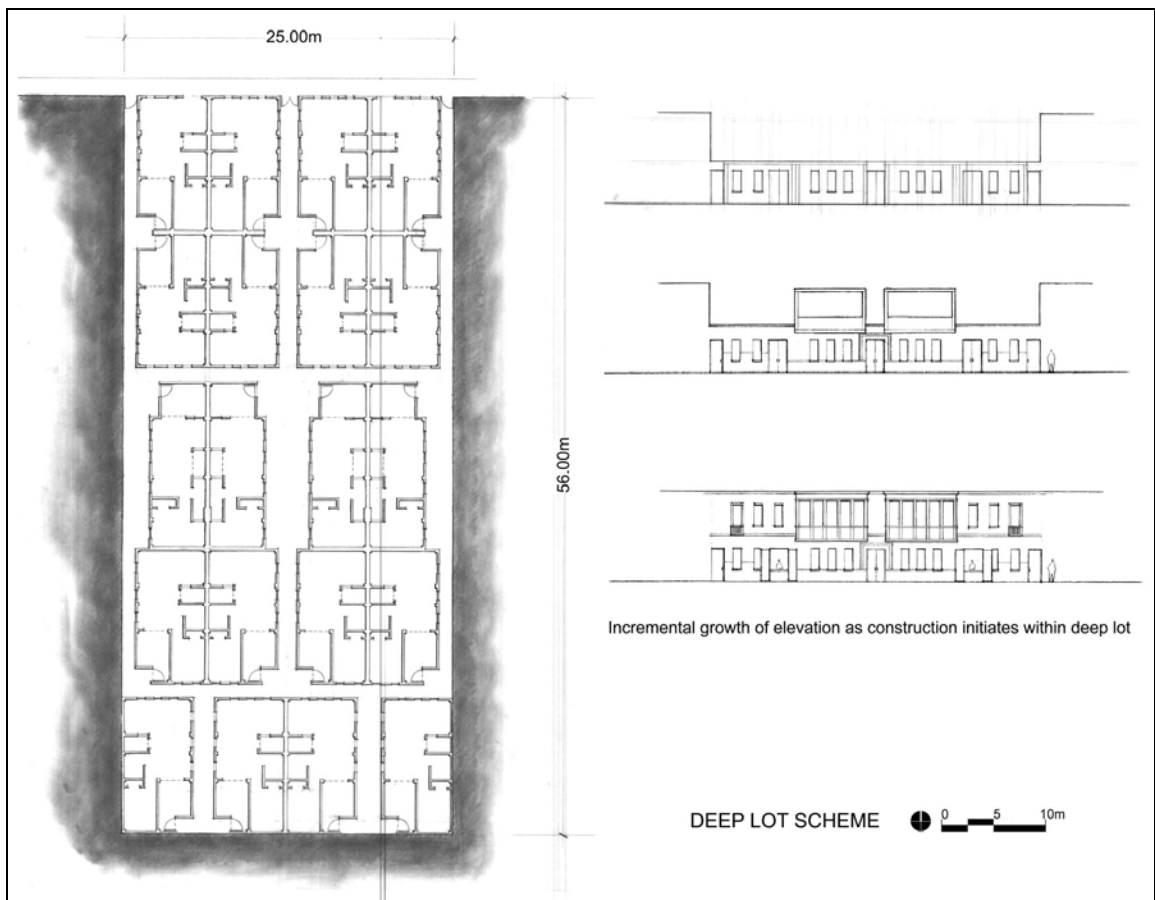
Figure 47: Shallow lot organizational elements

[author]



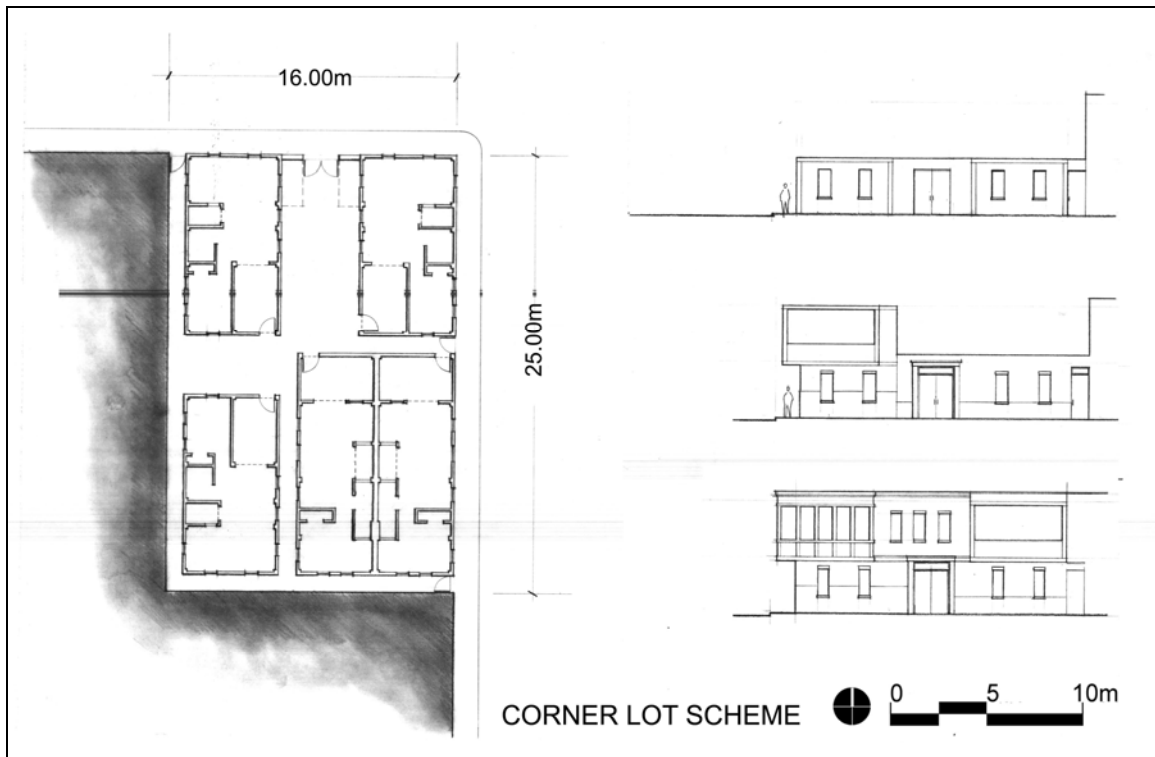
**Figure 48: Double shallow lot organizational elements**

[author]



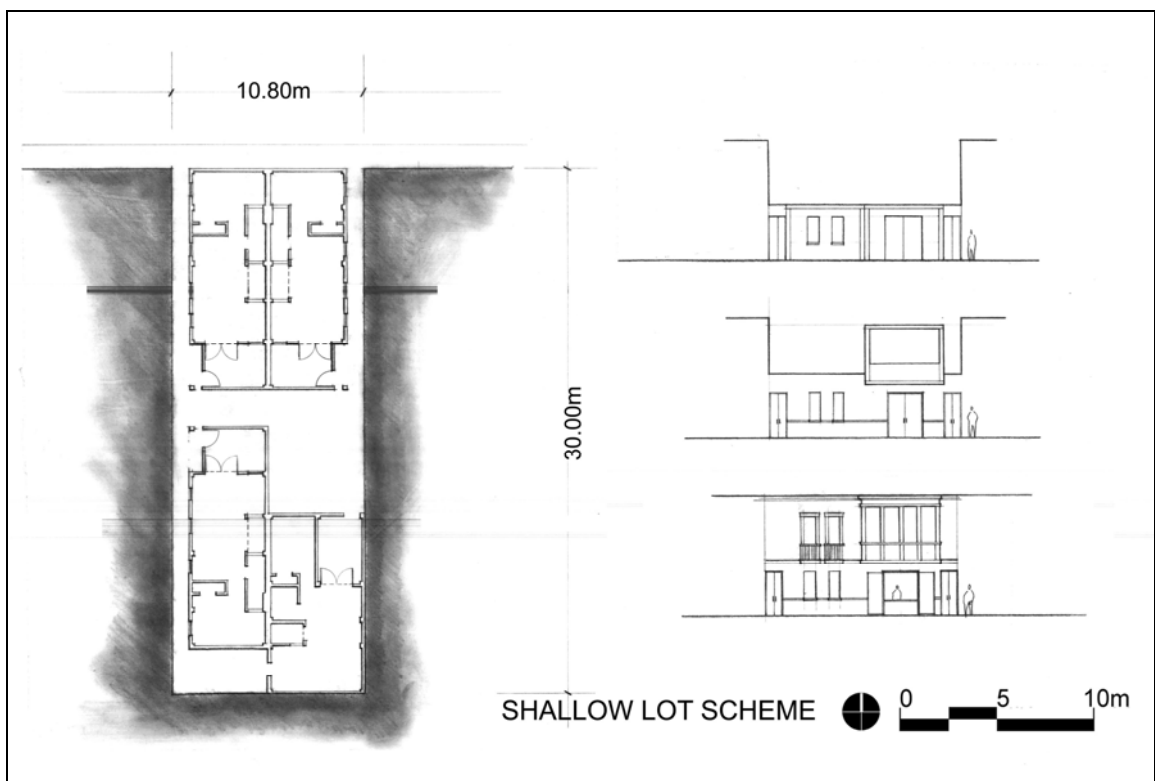
**Figure 49: Initial scheme for deep lot with elevation**

[author]



**Figure 50: Initial scheme for corner lot with elevation**

[author]



**Figure 51: Initial scheme for shallow lot with elevation**

[author]

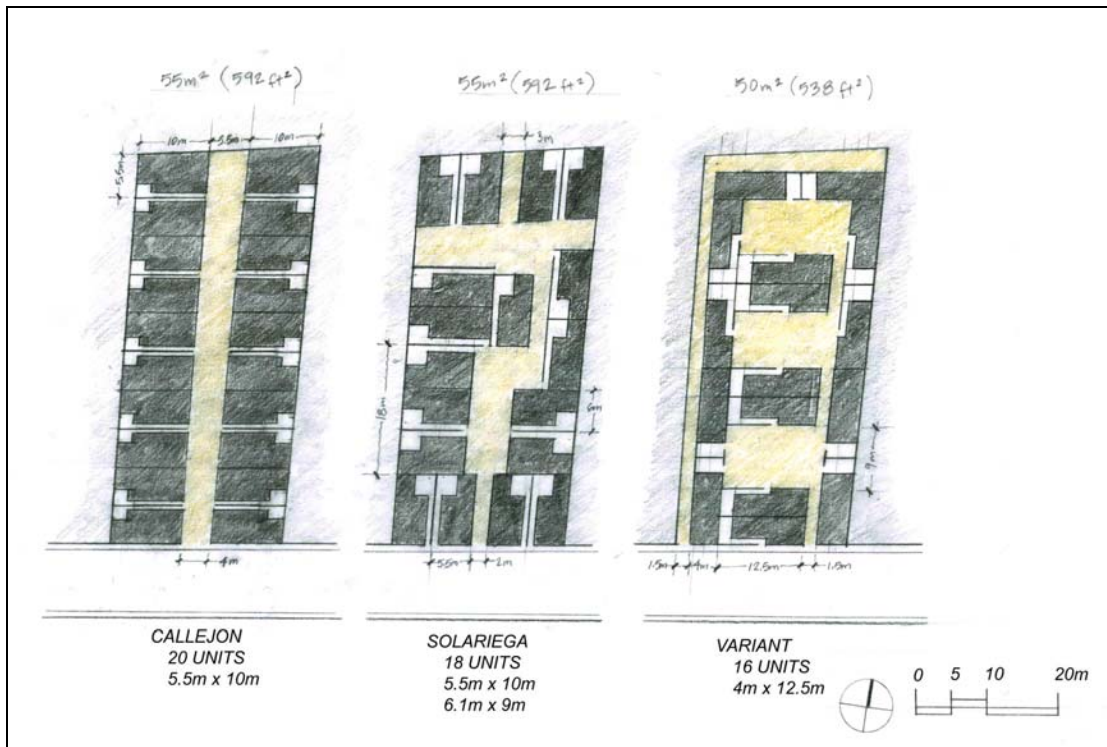


Figure 52: Applying prototypes to vacant deep lots

[author]

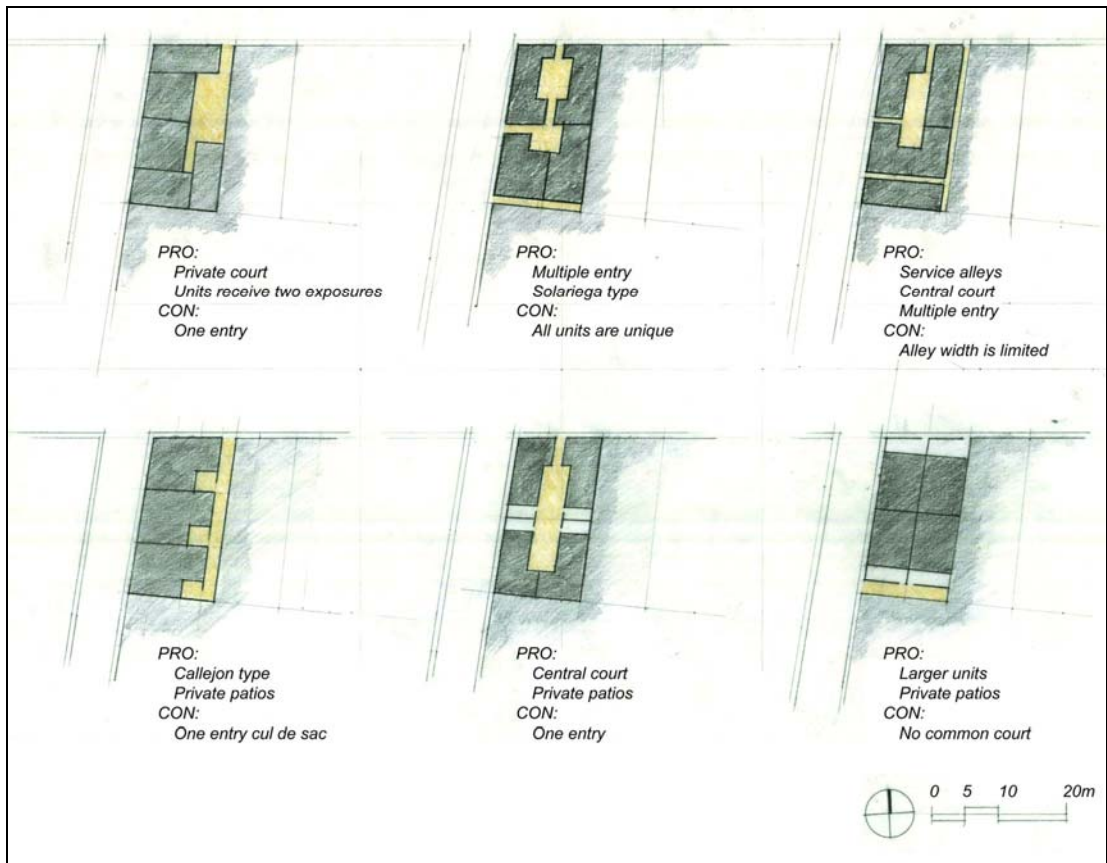


Figure 53: Applying prototypes to vacant corner lots

[author]





**Figure 54: Applying prototypes to vacant shallow lots**

[author]

The image of the city affects how one perceives their street, their block, and their neighborhood. It is dependent on the individual. However, the present conditions tell us one fact: Rimac's image is fragmented. Land use to activate the street is sporadic. Streets used as detours for access to major roads are unsafe. Damaged sidewalks provide a minimum width for walking. A lack of open space that is recognized and respected is necessary. A distinct urban fabric is maintained by continuous facades [see Fig. 17]. These facades are characteristic of the typical two stories found throughout Rimac. In the majority of cases, buildings did not exceed two stories because their construction material was primarily quinchá [refer to glossary]. Loads could tolerate two stories at most.

The idea behind the “builder’s yard” is to become a gathering center, rather than a yard, that invites all residents of Rimac to share in the collaborative process of housing rehabilitation through an institution and common open space. The learning institution serves as an educational component and counterpart to the new public gathering center. Its investment in the community has potential to put into effect the practices and methods behind self-help construction.

It becomes necessary to guide the community in this endeavor of rehabilitation and renaissance. The learning institution is to be directed by

professionals, volunteers of the field, and professors/students from local universities. Workshops and seminars are ideal methods of communicating the information regarding self-help. The foundation of this institution is embedded in the training facilitated inside and outside the classroom. The open space will serve multi-use functions, of which the public gathering space and the actual space for building and construction will take place. Outdoor class sessions and demonstrations will serve as visual displays for the community to encourage participation.

Understanding the residential typologies of Rimac requires interpreting the nature of their floor plan layout, their climatic implications, their spatial conditions, and their adjacency to other types. It requires understanding the needs of the resident. It requires understanding the type that configures their house. It requires understanding the lot that accommodates those types. It requires understanding the nature of the blocks that fill the block.

## Chapter 4: Architectural Agenda

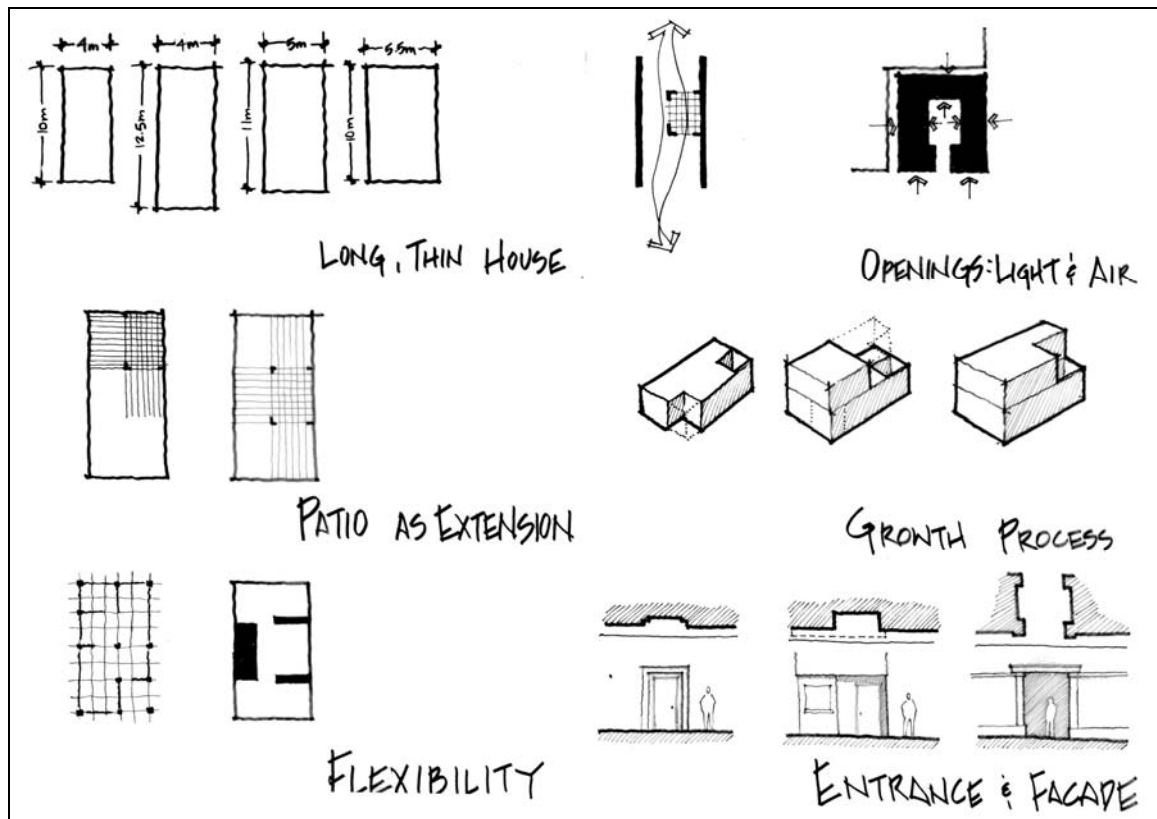


Figure 55: Design principles and guidelines

[author]

To facilitate the self help process and ensure each resident's unit design can properly accommodate their individual needs, guidelines for design will be addressed. They will satisfy the appropriate comfort level within the unit because they address what current housing in Rimac lacks. The long and thin house ensures a well proportioned home that functions internally as well as maximizing the density of units that can exist per lot. The inclusion of the patio allows rooms to feel deeper and extend out into the outdoors for ventilation and light. Additional openings in the form of windows, doors, and a light well also benefit the unit.

### **SINGLE STORY HOMES IN RIMAC 16 – 80m<sup>2</sup>**

|                                       |   |
|---------------------------------------|---|
| SALA (living room):                   | n/a   |
| COMEDOR (dining room):                | n/a   |
| COCINA (kitchen):                     | 2.50 x 2.80 = 7.00m <sup>2</sup><br>3.55 x 1.90 = 6.75m <sup>2</sup> (6.875m <sup>2</sup> )   |
| COMBINED (L, K, D):                   | 5.30 x 3.00 = 15.90m <sup>2</sup><br>5.15 x 5.15 = 26.52m <sup>2</sup> (21.21m <sup>2</sup> )   |
| (S, C):                               | 3.75 x 4.20 = 15.75m <sup>2</sup><br>3.00 x 5.90 = 17.70m <sup>2</sup> (16.725m <sup>2</sup> )  |
| PATIO:                                | 3.25 x 2.75 = 8.93m <sup>2</sup> (8.93m <sup>2</sup> )  |
| DORMITORIO (bedroom):                 | 2.75 x 3.80 = 10.45m <sup>2</sup><br>2.50 x 4.20 = 10.50m <sup>2</sup><br>3.25 x 3.45 = 11.22m <sup>2</sup><br>3.25 x 3.75 = 12.18m <sup>2</sup> (11.0875m <sup>2</sup> ) |
| ESTUDIO (study):                      | n/a   |
| CUARTO EXTRA (room for specific use): | n/a   |
| STORAGE:                              | n/a   |
| BAÑO (bathroom):                      | 2.53 x 3.85 = 9.74m <sup>2</sup><br>2.20 x 1.20 = 2.64m <sup>2</sup><br>1.80 x 2.45 = 4.41m <sup>2</sup><br>1.05 x 2.00 = 2.10m <sup>2</sup> (4.7225m <sup>2</sup> )      |
| TIENDA (store):                       | n/a   |
| GARAGE:                               | n/a   |
| HALLWAY:                              | 1.00 x 7.05 = 7.05m <sup>2</sup> (7.05m <sup>2</sup> )  |
| STAIRS:                               | n/a   |

### **TWO STORY HOMES IN RIMAC 41 – 80m<sup>2</sup>**

|                                       |   |
|---------------------------------------|---|
| SALA (living room):                   | 3.10 x 4.40 = 13.64m <sup>2</sup> (13.64m <sup>2</sup> )  |
| COMEDOR (dining room):                | 3.00 x 3.80 = 11.40m <sup>2</sup> (11.40m <sup>2</sup> )  |
| COCINA (kitchen):                     | 2.10 x 2.15 = 4.51m <sup>2</sup><br>2.70 x 3.80 = 10.26m <sup>2</sup><br>4.15 x 2.40 = 9.96m <sup>2</sup> (8.24m <sup>2</sup> )                                   |
| COMBINED (L, K, D):                   | n/a   |
| (S, C):                               | n/a   |
| PATIO:                                | 2.00 x 2.00 = 4.00m <sup>2</sup><br>1.40 x 3.70 = 5.18m <sup>2</sup> (4.59m <sup>2</sup> )  |
| DORMITORIO (bedroom):                 | 3.80 x 2.10 = 7.98m <sup>2</sup><br>4.30 x 3.10 (2 beds) = 13.33m <sup>2</sup> (13.33m <sup>2</sup> )<br>2.70 x 2.70 = 7.29m <sup>2</sup> (7.635m <sup>2</sup> )  |
| ESTUDIO (study):                      | n/a   |
| CUARTO EXTRA (room for specific use): | n/a   |
| STORAGE:                              | n/a   |
| BAÑO (bathroom):                      | 1.65 x 1.05 (no shower) = 1.73m <sup>2</sup> (1.73m <sup>2</sup> )<br>2.10 x 1.95 = 4.095m <sup>2</sup><br>1.10 x 2.70 = 2.97m <sup>2</sup> (3.53m <sup>2</sup> ) |
| TIENDA (store)/ ALQUILER (rental):    | 3.82 x 3.28 = 12.53m <sup>2</sup> (12.53m <sup>2</sup> )  |
| GARAGE:                               | n/a   |
| HALLWAY:                              | n/a   |
| STAIRS:                               | 1.10 x 4.40 = 4.84m <sup>2</sup> (4.84m <sup>2</sup> )  |

**Figure 56: Averaged floor area of current houses in Rimac, Peru.**

[author]

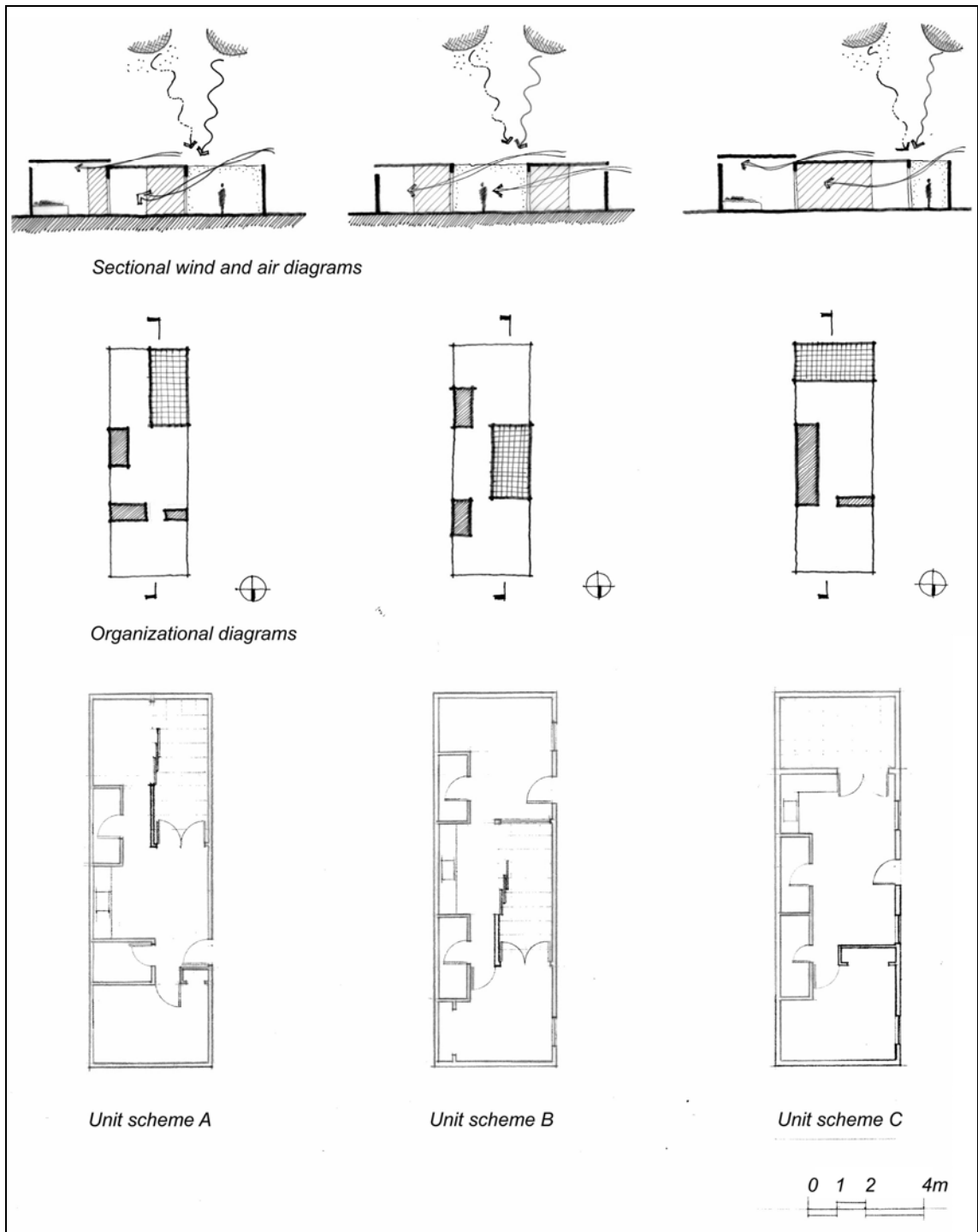
An analysis of current housing dimensions informs how the units are currently programmed and dimensioned. Single family homes differ from the two story units having less floor area. The needs for various rooms vary from household to household and on their financial status. The observation here is to acknowledge the fact that a family of two can live comfortably in a 50m<sup>2</sup> unit. This thesis proposes that self help encourage residents to stack an additional floor on their property as their cash flow increases and their family needs grow.



**Figure 57: Schemes demonstrating space-making within 5m x 10m units**

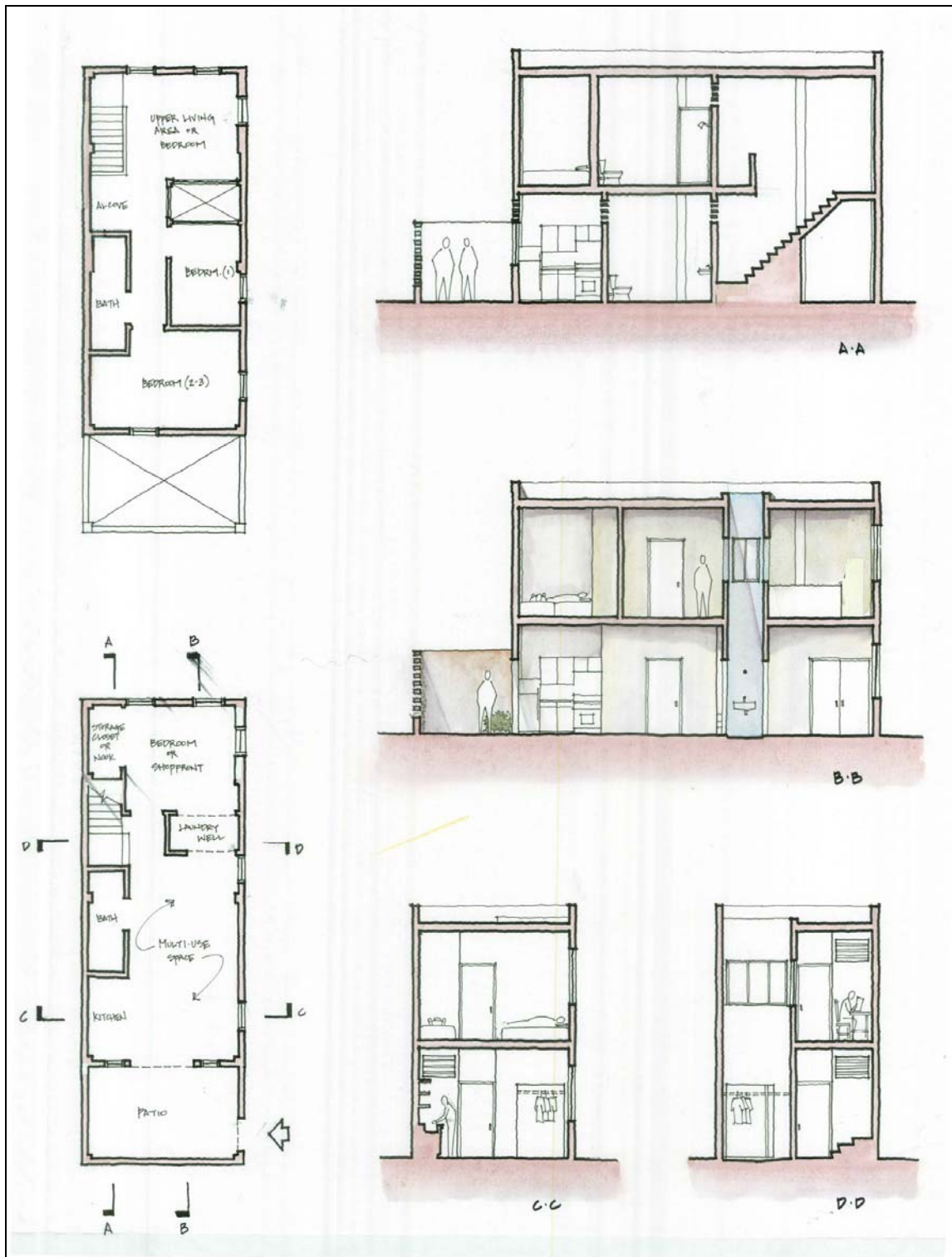
[author]





**Figure 58: Schemes demonstrating space-making within 4m x 12.5m units**

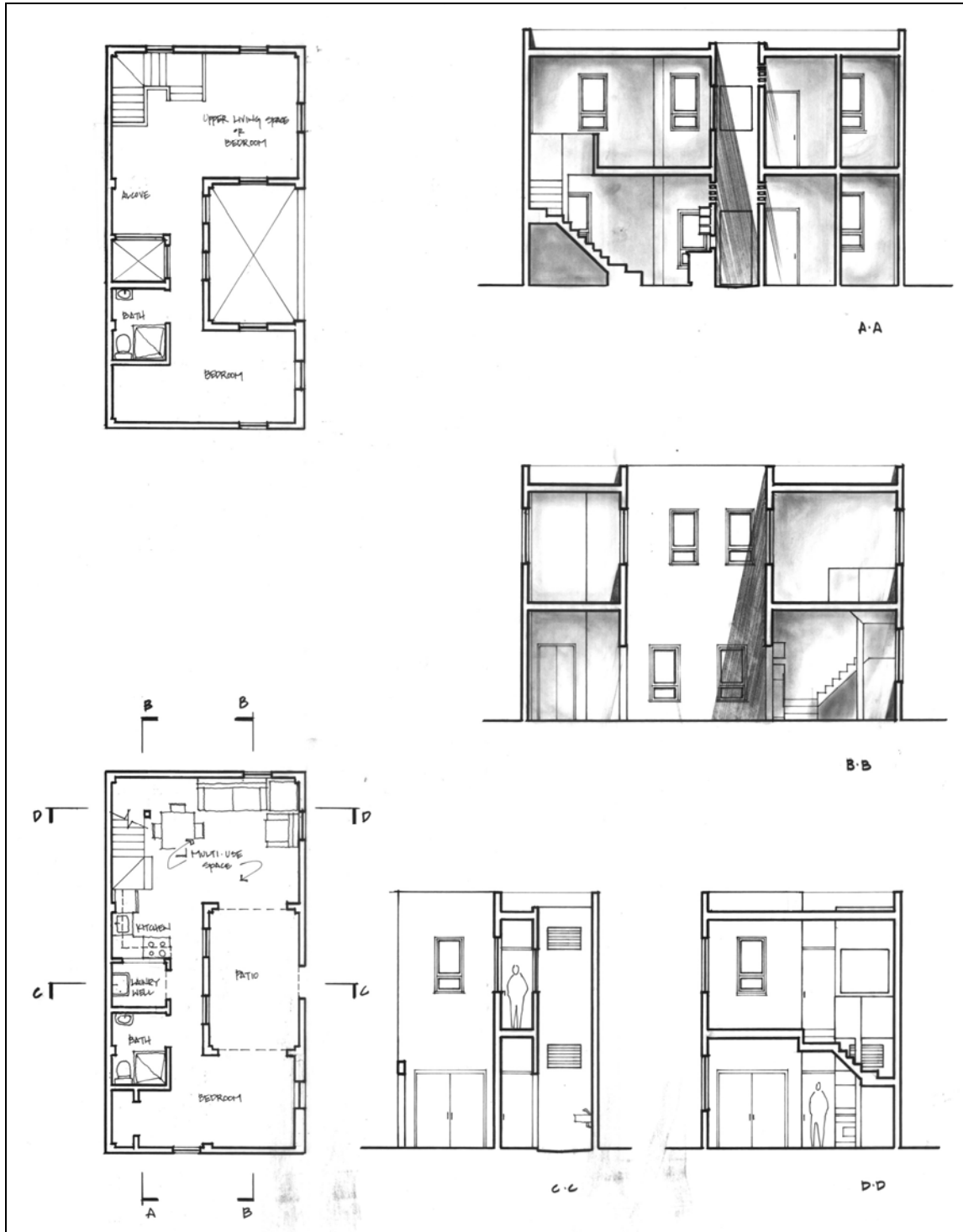
[author]



**Figure 59: Further study of the 4m x 12.5m option**

[author]

This unit demonstrates the efficiency of the spaces and the attention to sunlight as it enters the house.



**Figure 60: Further study of the 4m x 12.5m option** [author]

This unit demonstrates the efficiency of the spaces and the attention to sunlight as it enters the house.



**Figure 61: Elevation studies**

[author]



**Figure 62: Detail of typical casement window**

[author]



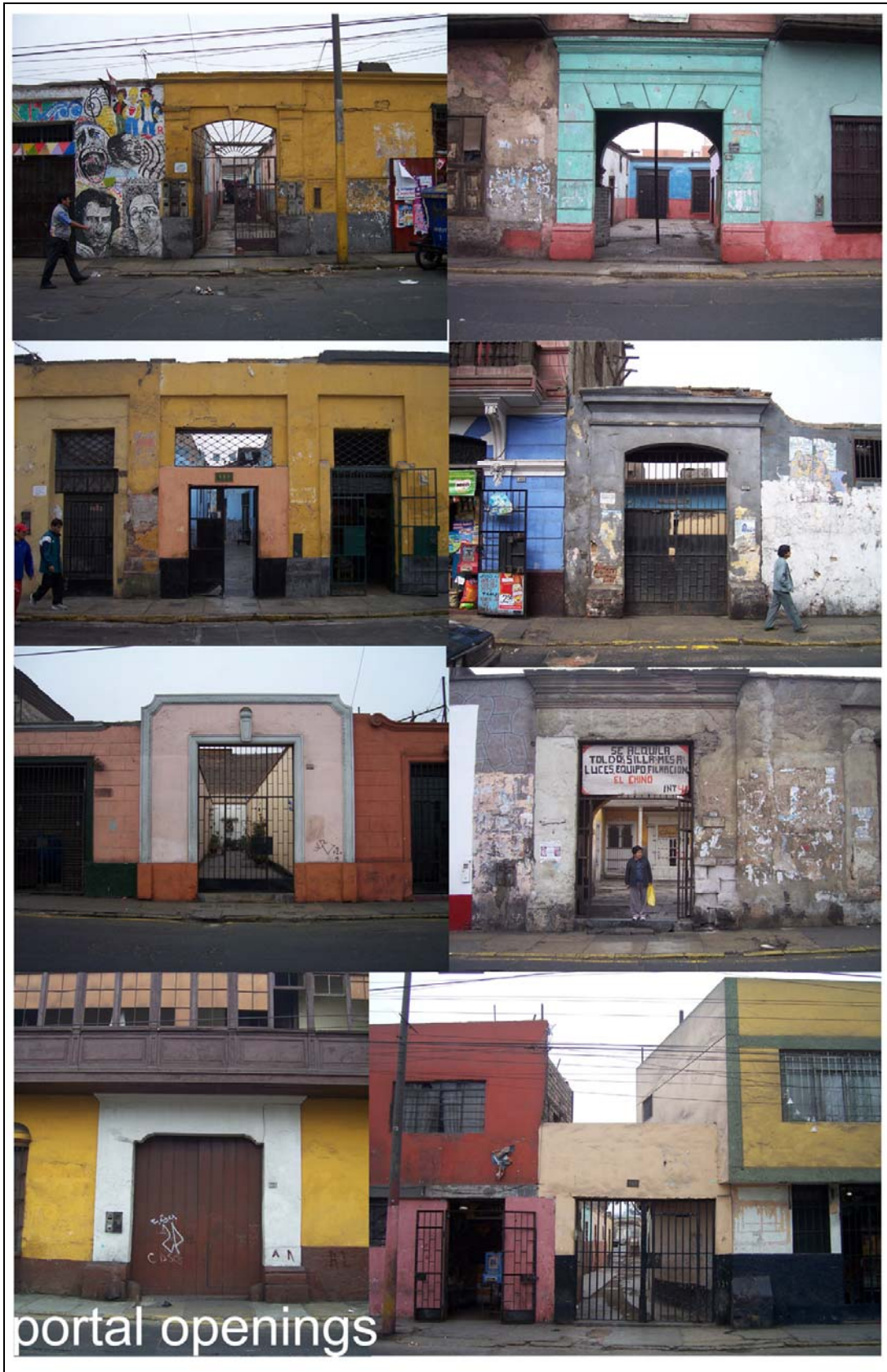


Figure 63: Typical portal openings

[author]





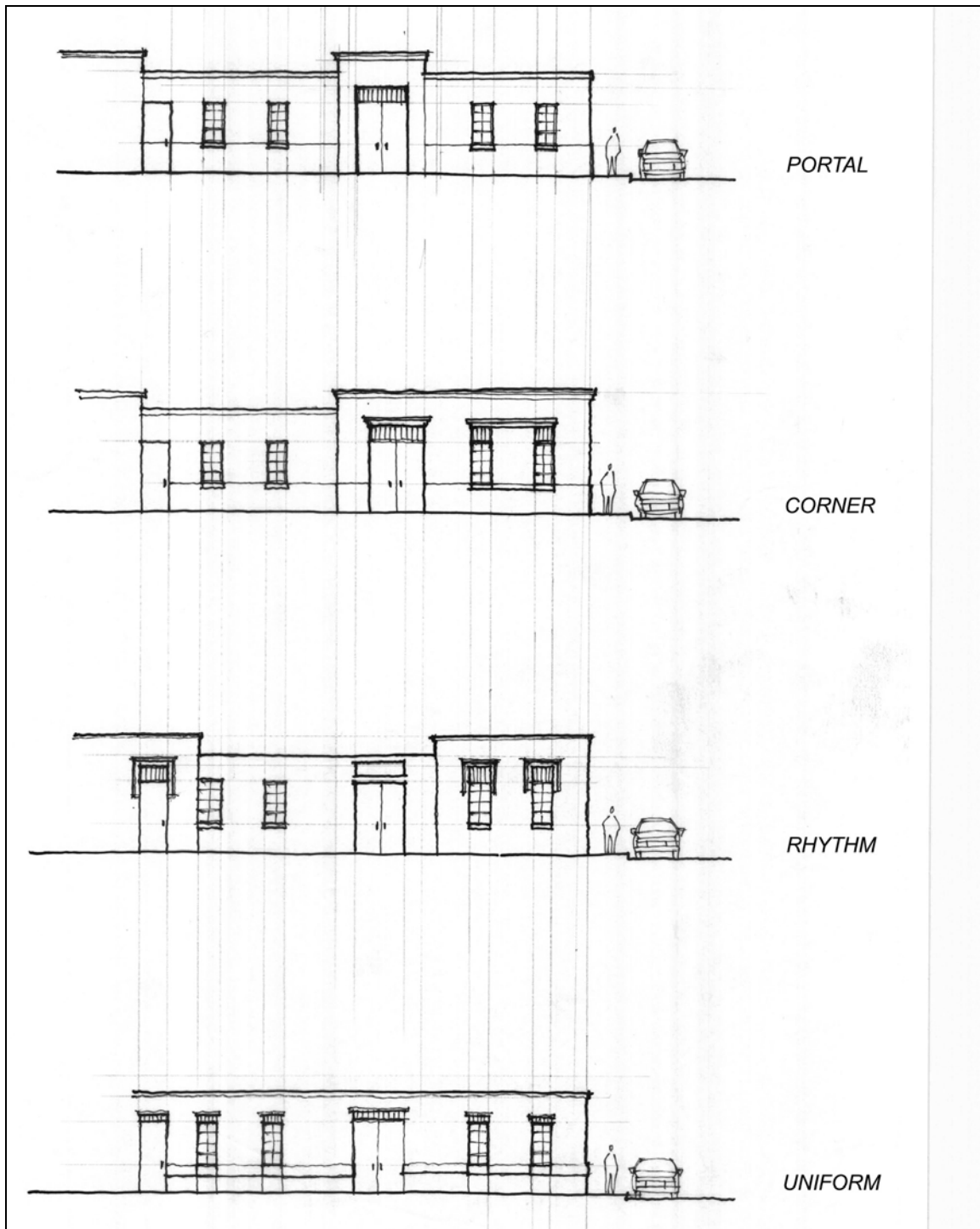
Figure 64: Typical window and door openings on a single story façade

[author]



Figure 65: Typical window and door openings on a double story façade

[author]



**Figure 66: Elevation studies for infill lots** [author]  
 The following schemes place emphasis on façade elements that give Rimac street elevation its particular character.

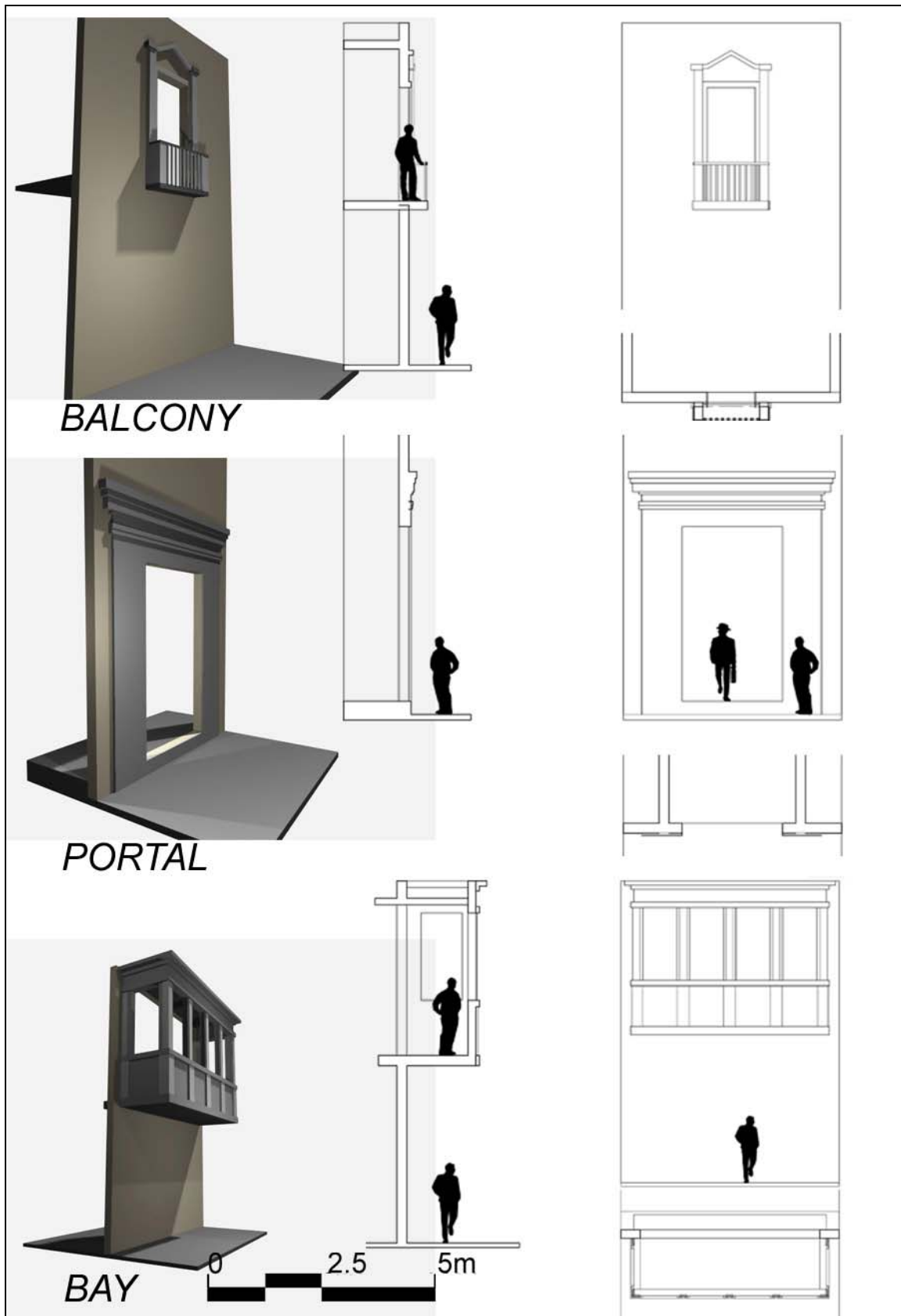


Figure 67: Selected elevation kit of parts

[author]

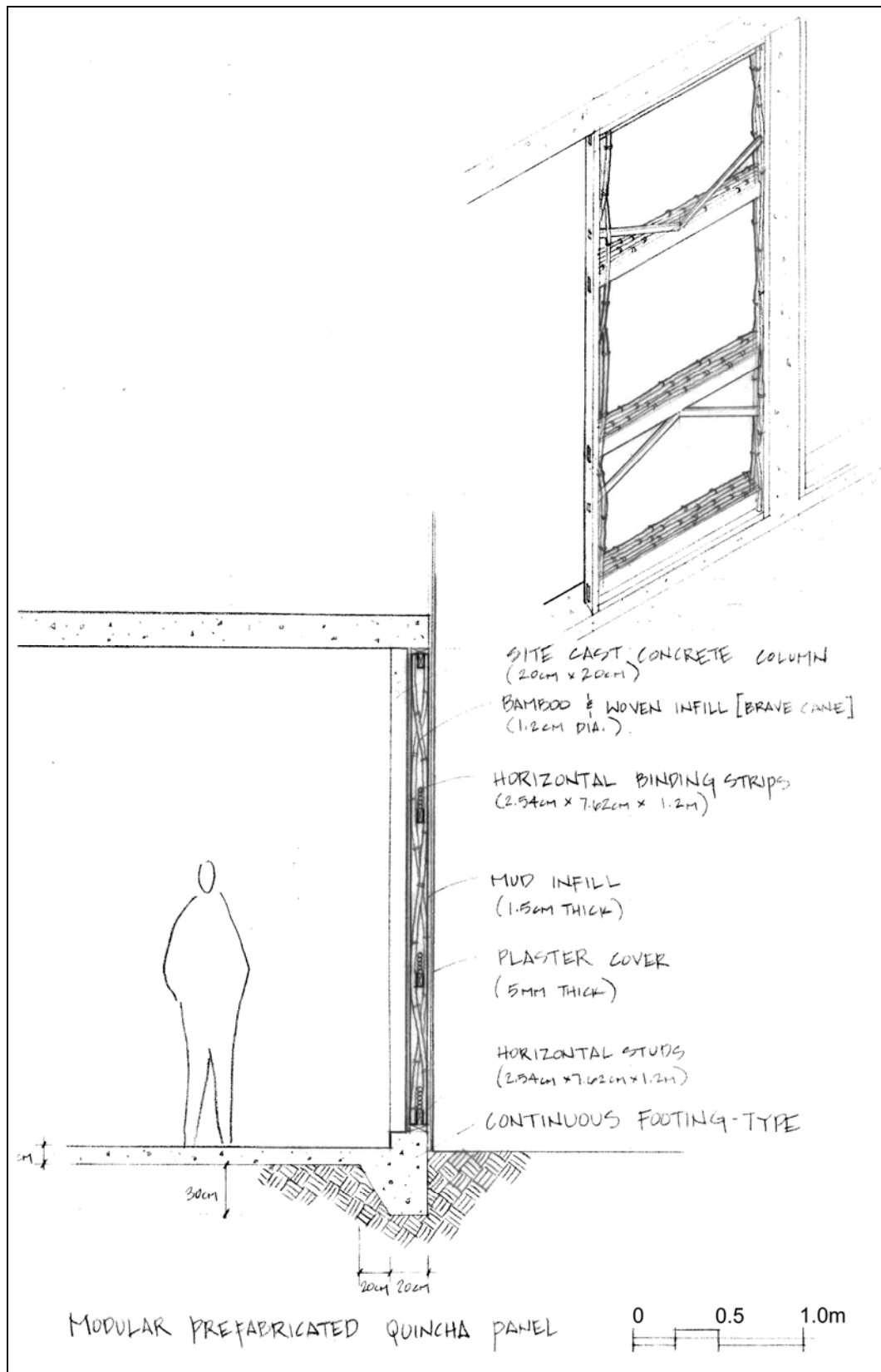
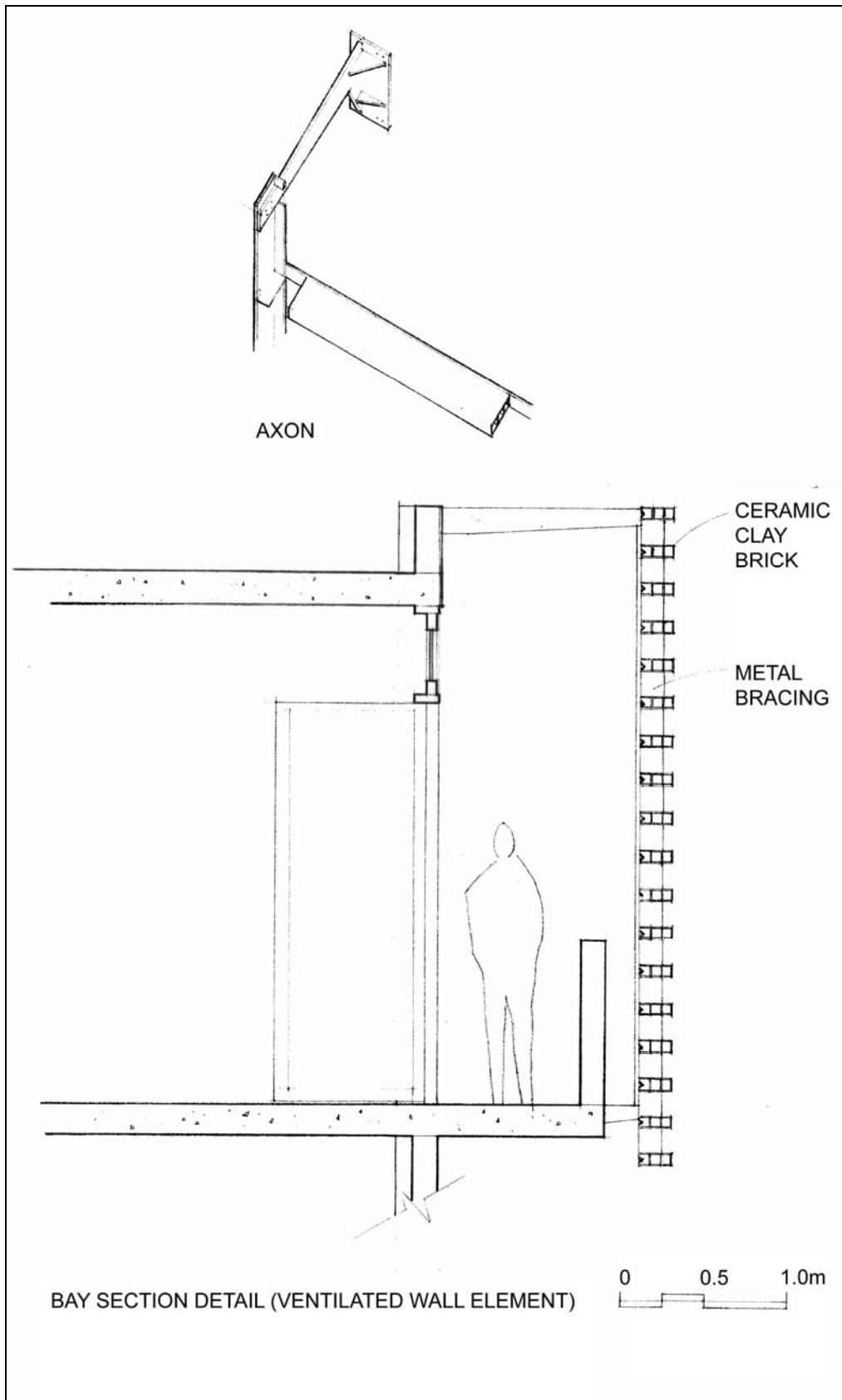


Figure 68: Modular prefabricated quincha panel

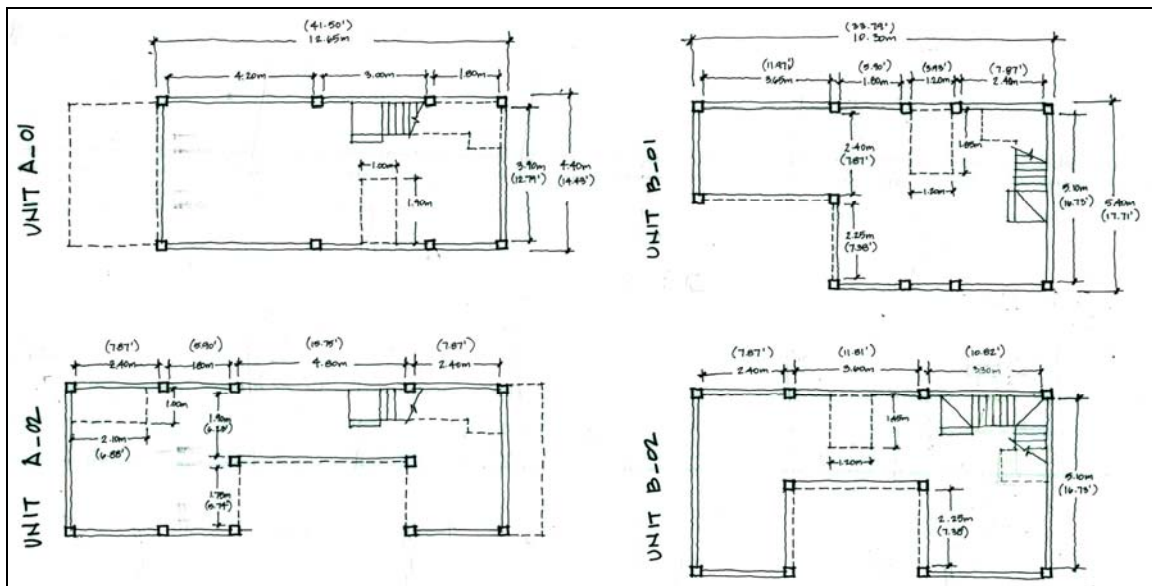
[author]





**Figure 69: Ceramic clay brick screen**

[author]



**Figure 70: Structural grid for the 4x12.5 (A01, 02) and 5x10 (B01,02) units** [author]

This thesis promotes the design of two types of units. A unit dimensioned 4m x 12.5m and one dimensioned 5m x 10m. The need for light and air will be supplied by the addition of private patios and light wells into each unit. Each unit will be organized about these voids making use of a centralized patio scheme and an end patio scheme. Services and utilities will be arranged along a common wall so that floor area is maximized and undisturbed.

Quincha panels will be introduced in the construction of the units. Each quincha panel is essentially a mass of adobe mud reinforced with bamboo canes. It is a very local material, sustainable, and has made significant improvements in resisting seismic forces that occur as tremors in Rimac. They are prefabricated in modules of 2.4m in width. Diagonal bracing help reinforce the lateral loads while the natural elasticity and flexibility of the bamboo canes experience less damage against the forces.

adobe



bamboo



concrete



brick



quincha

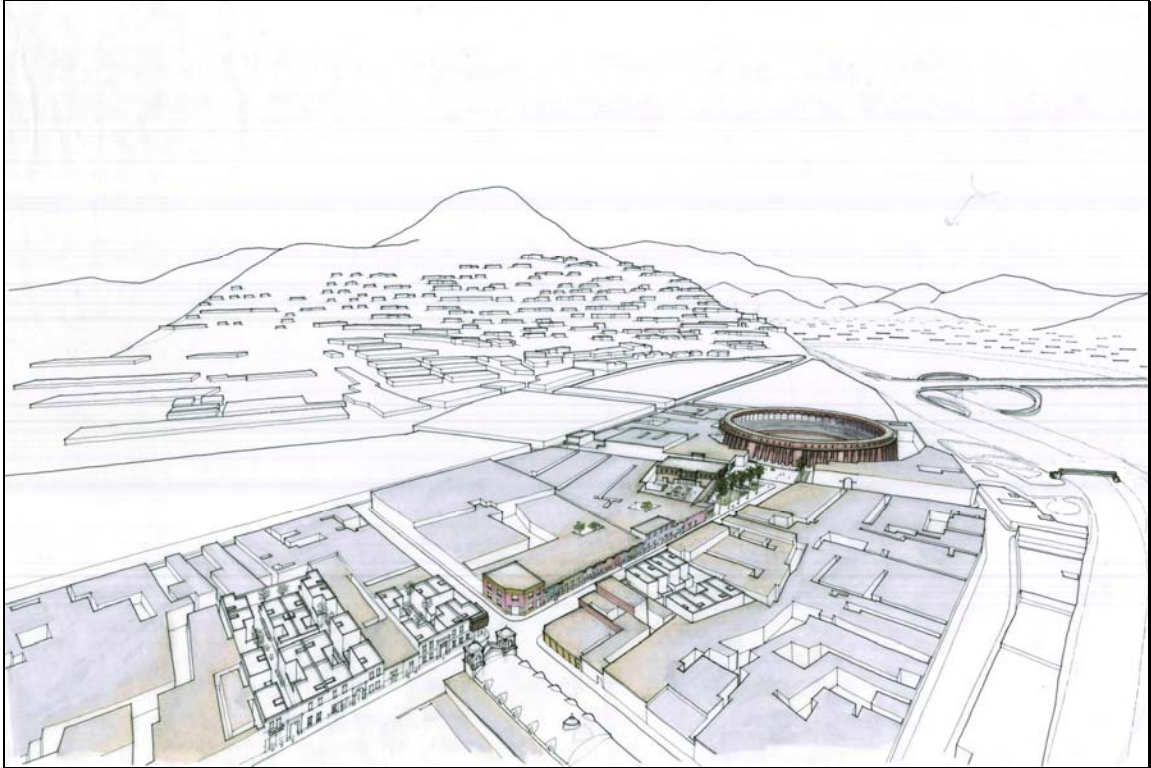


Figure 71: Construction materials palette

[author]



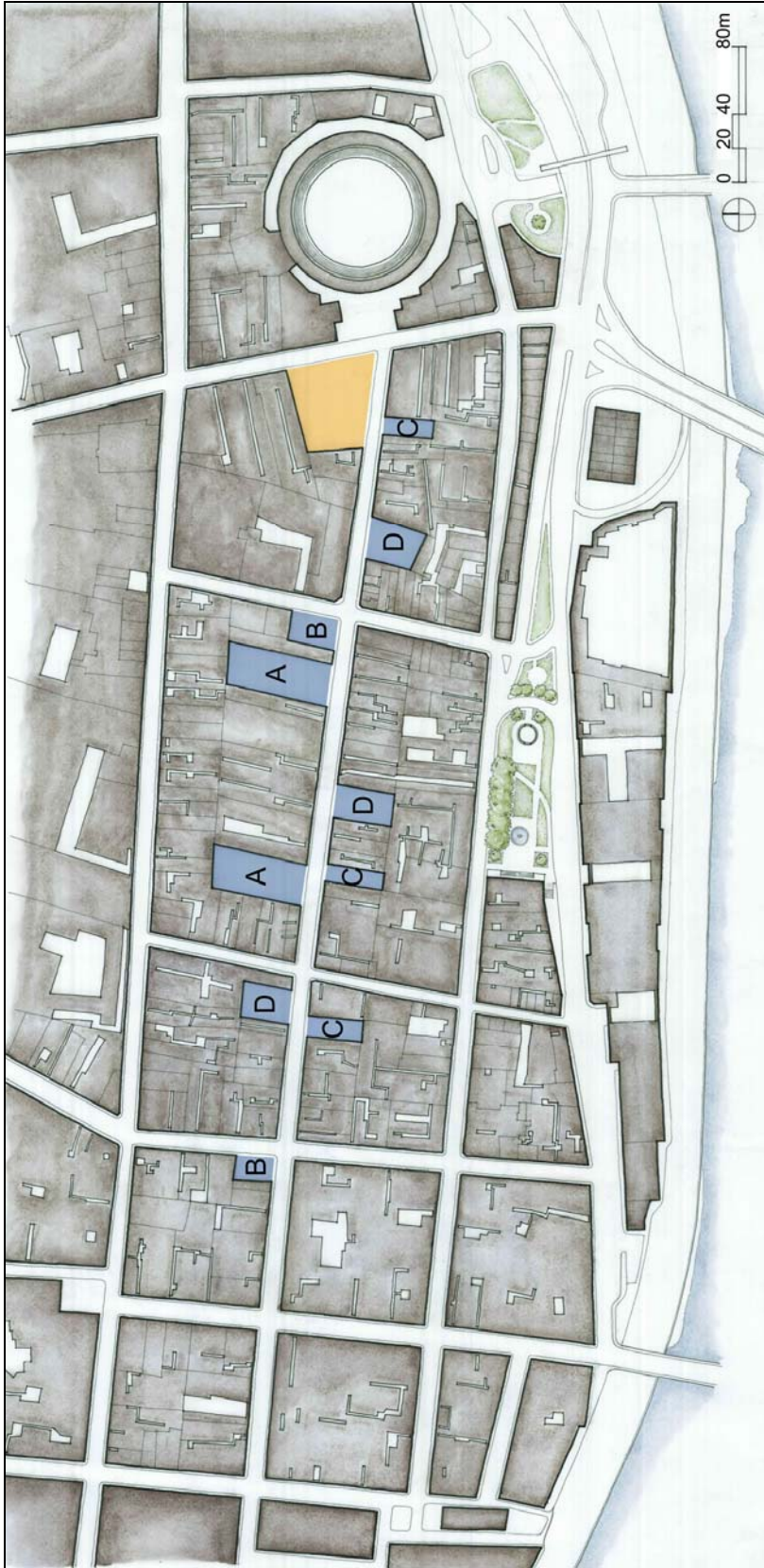
## Chapter 5: Design Response



**Figure 72: Aerial perspective of intervention along Jr Libertad**

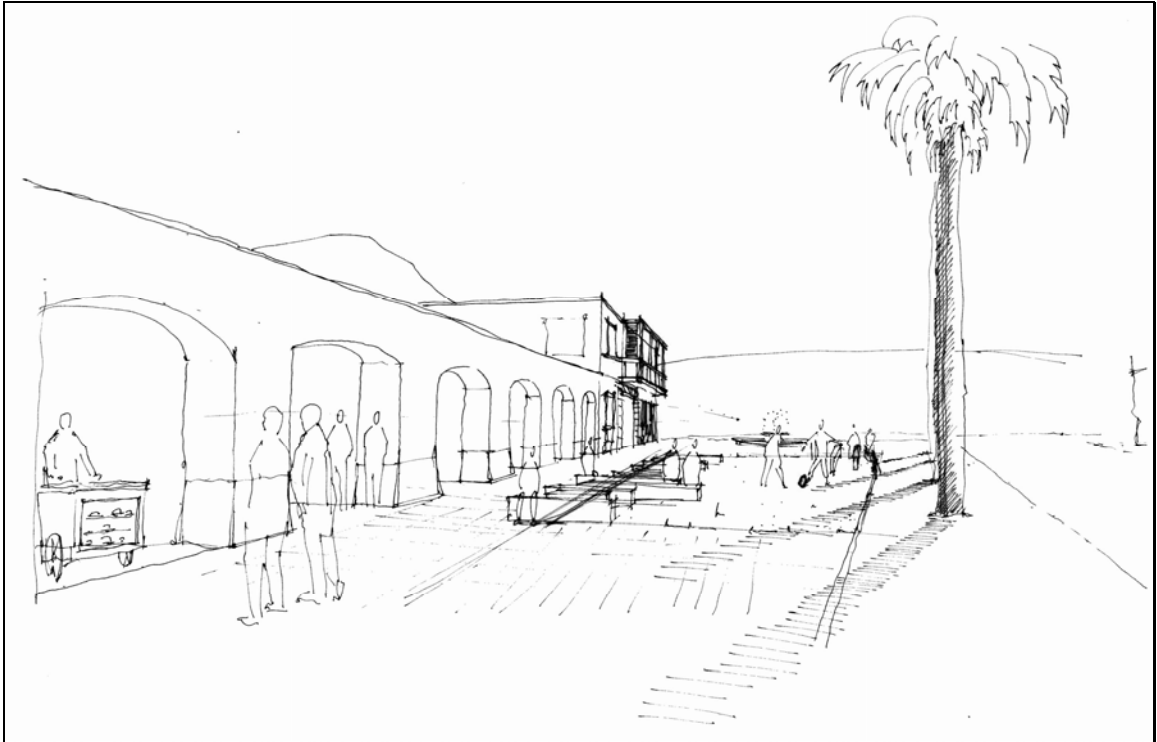
[author]

The final design solution concentrated on the three closest infill lots to the Plaza de Acho along Jr Libertad. The focus of the design demonstrated the prototypes for lot types and unit types. The builder's yard reinforces the need for development to occur within its immediate context. The infill lots for intervention are drawn on the site plan demonstrating the impact development all along the street would have on that immediate context of the city.



**Figure 73: Site plan identifying intervention lots** [author]  
 A. Deep lot    B. Corner lot    C. Shallow lot    D. Double shallow lot





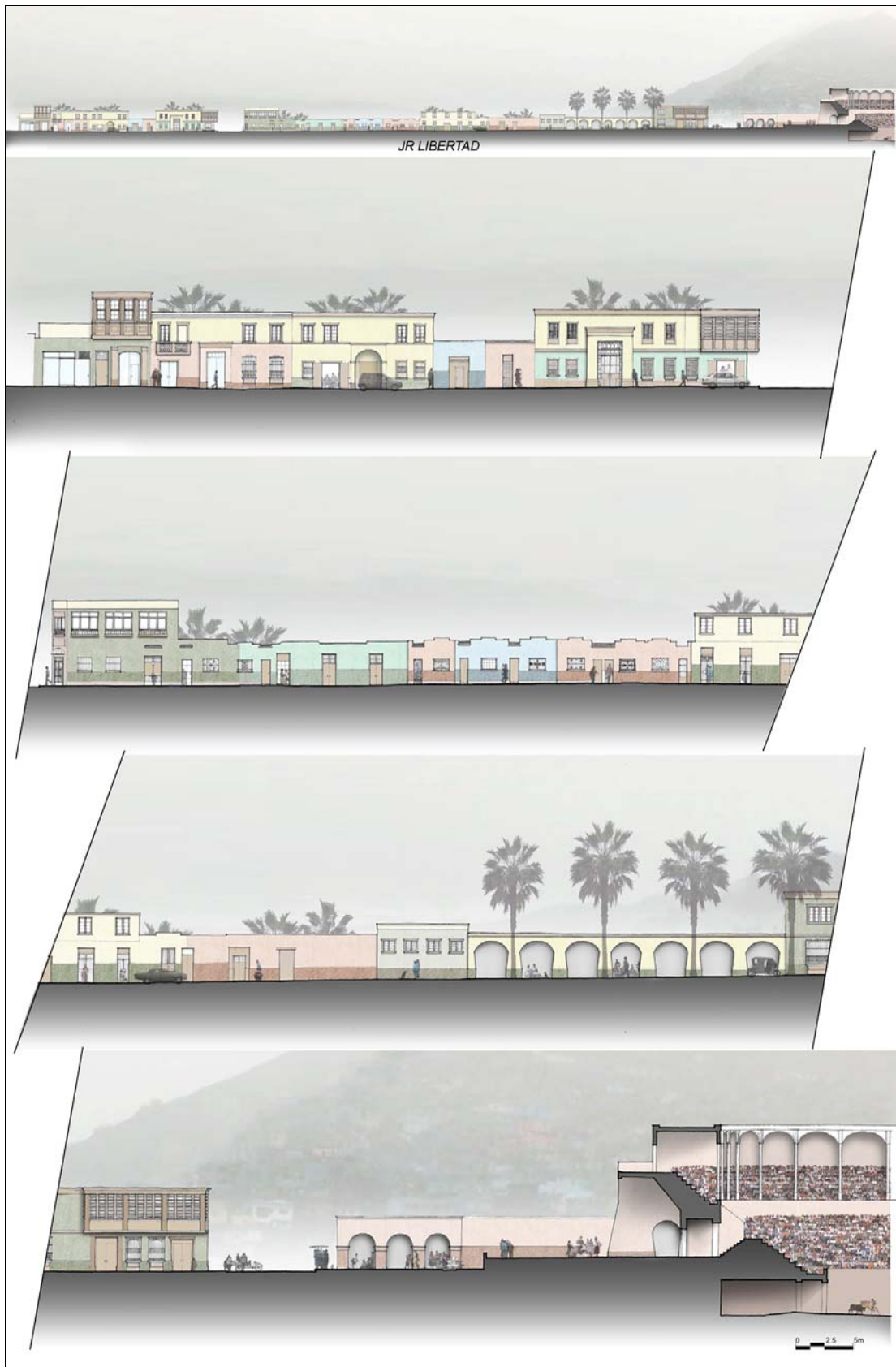
**Figure 74: Perspective of public open space facing Plaza de Acho**

[author]



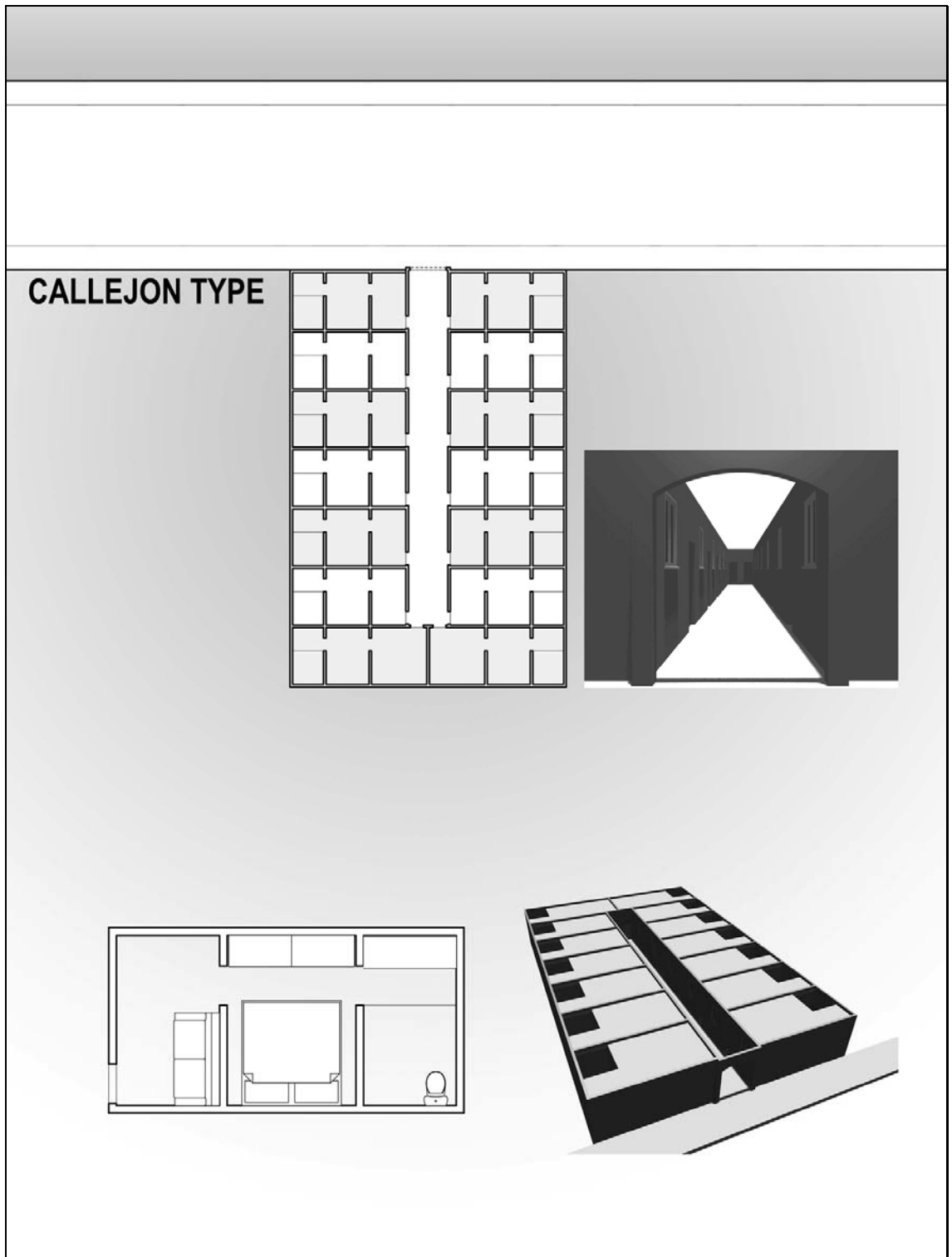
**Figure 75: Perspective of activity in builder's yard**

[author]



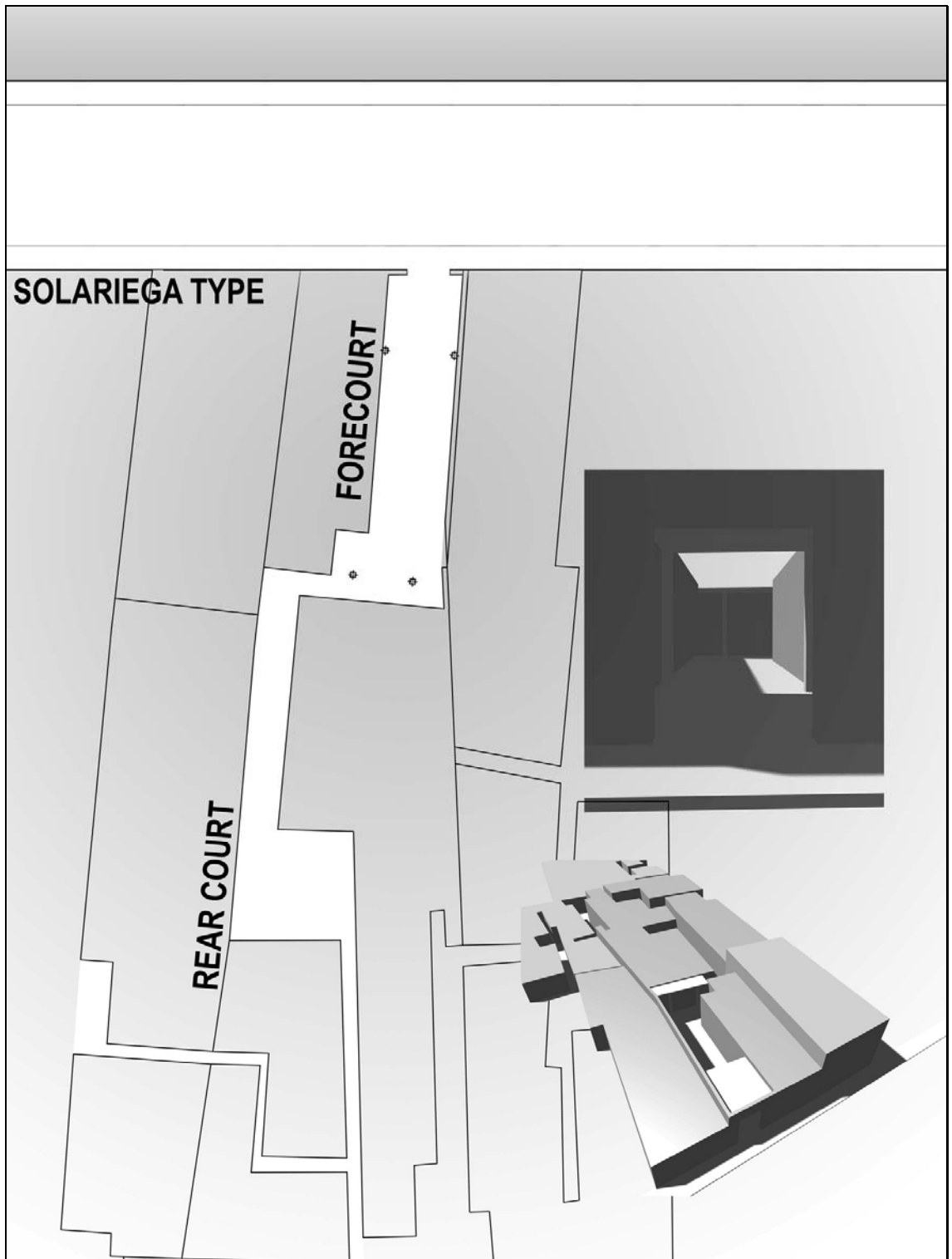
**Figure 76: Proposed elevation along Jr Libertad facing North**

[author]



**Figure 77: Typical callejon typology and unit distribution**

[author]



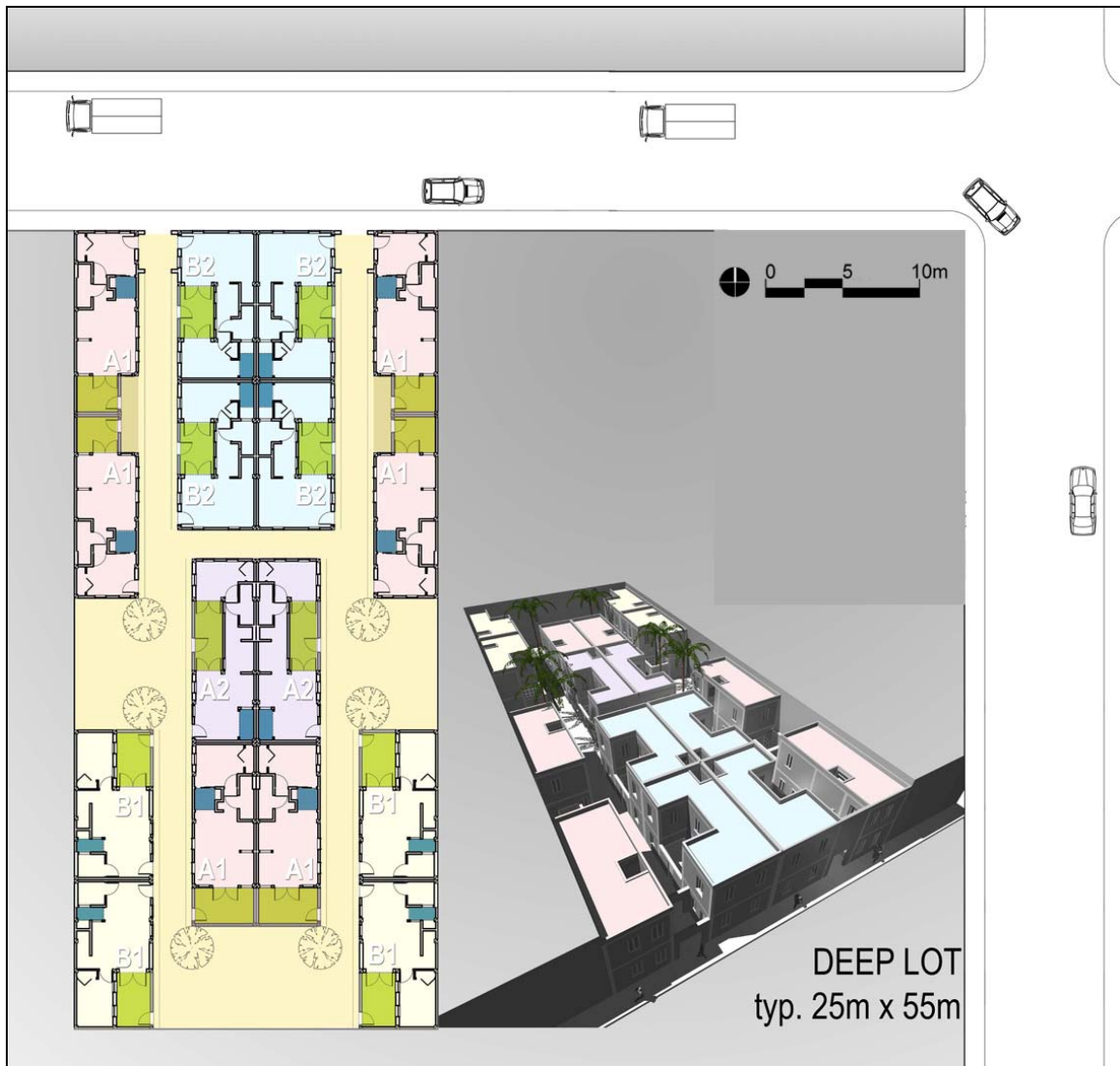
**Figure 78: Typical solariega typology**

[author]



**Figure 79: Lot prototypes for intervention A**

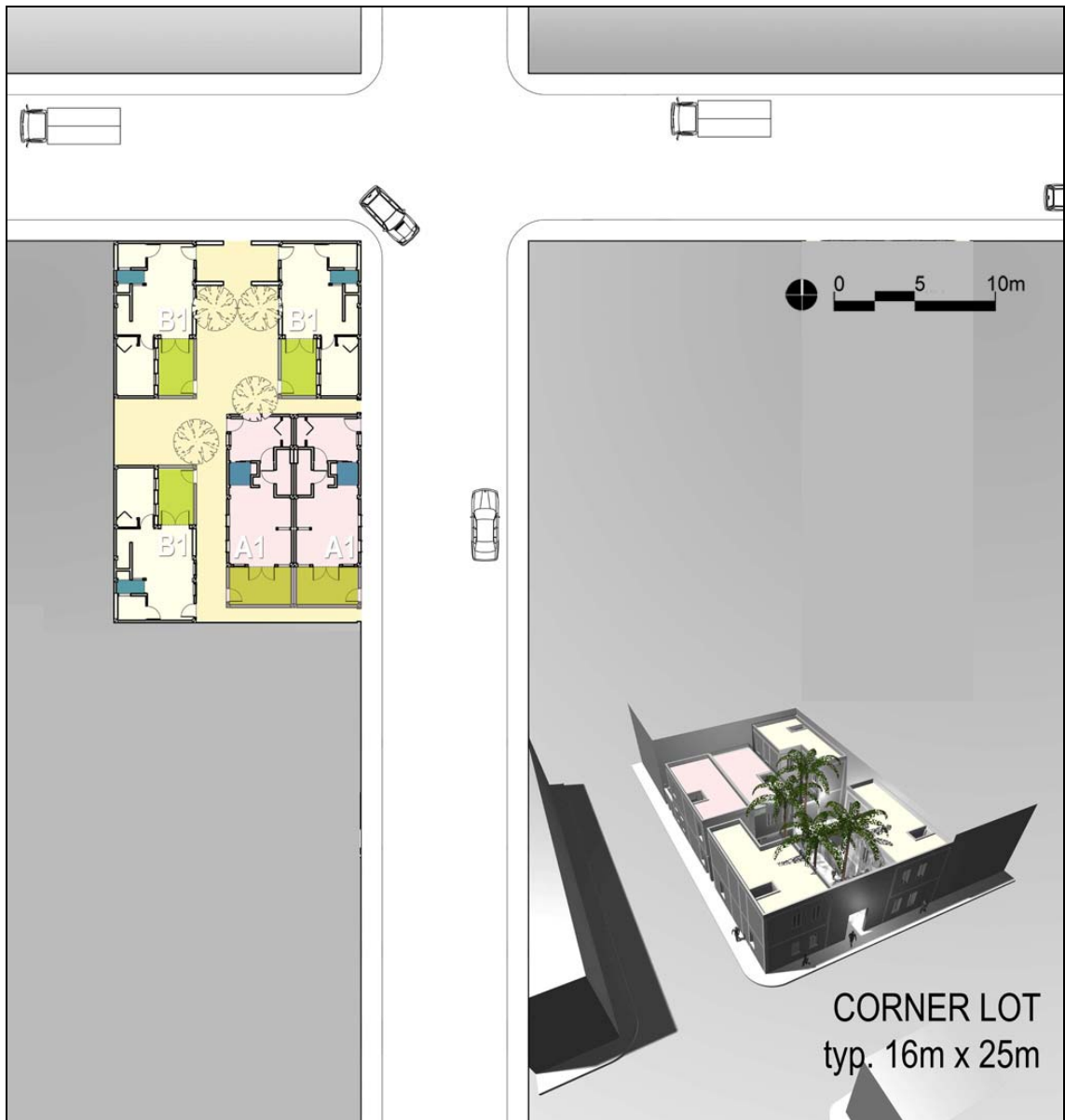
[author]



**Figure 80: Deep lot A**

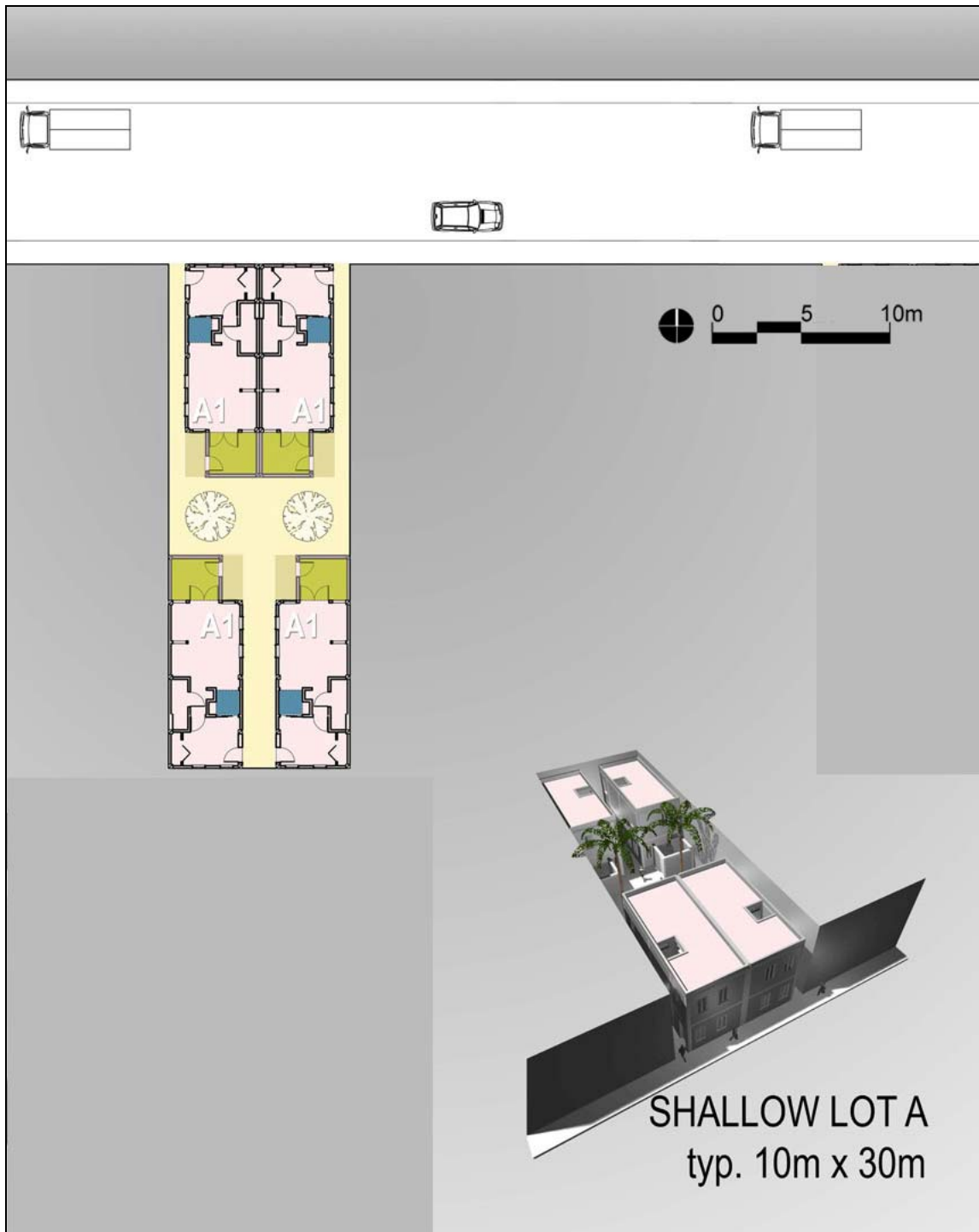
[author]





**Figure 81: Corner lot A**

[author]



**Figure 82: Shallow lot A**

[author]

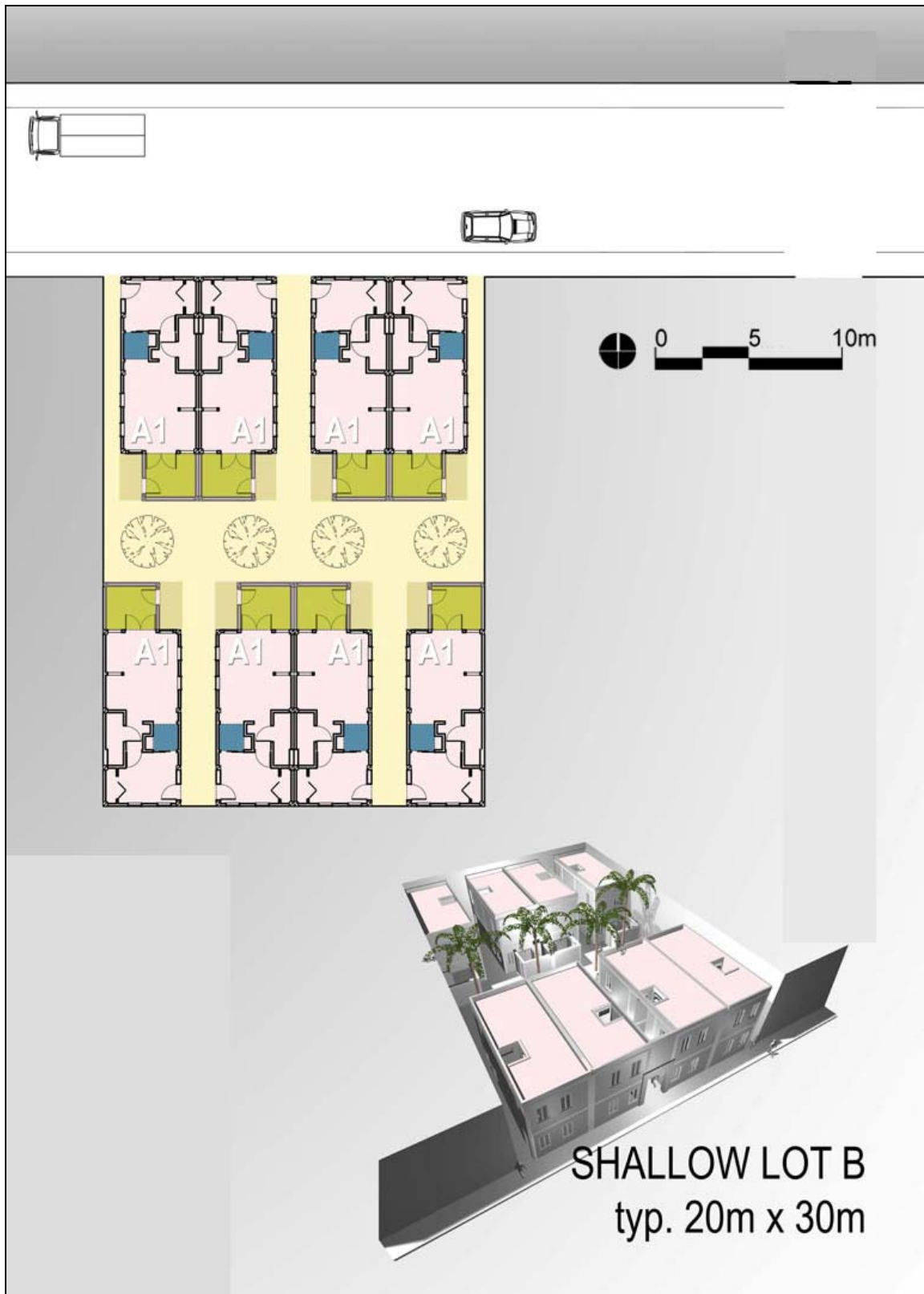


Figure 83: Double shallow lot A

[author]



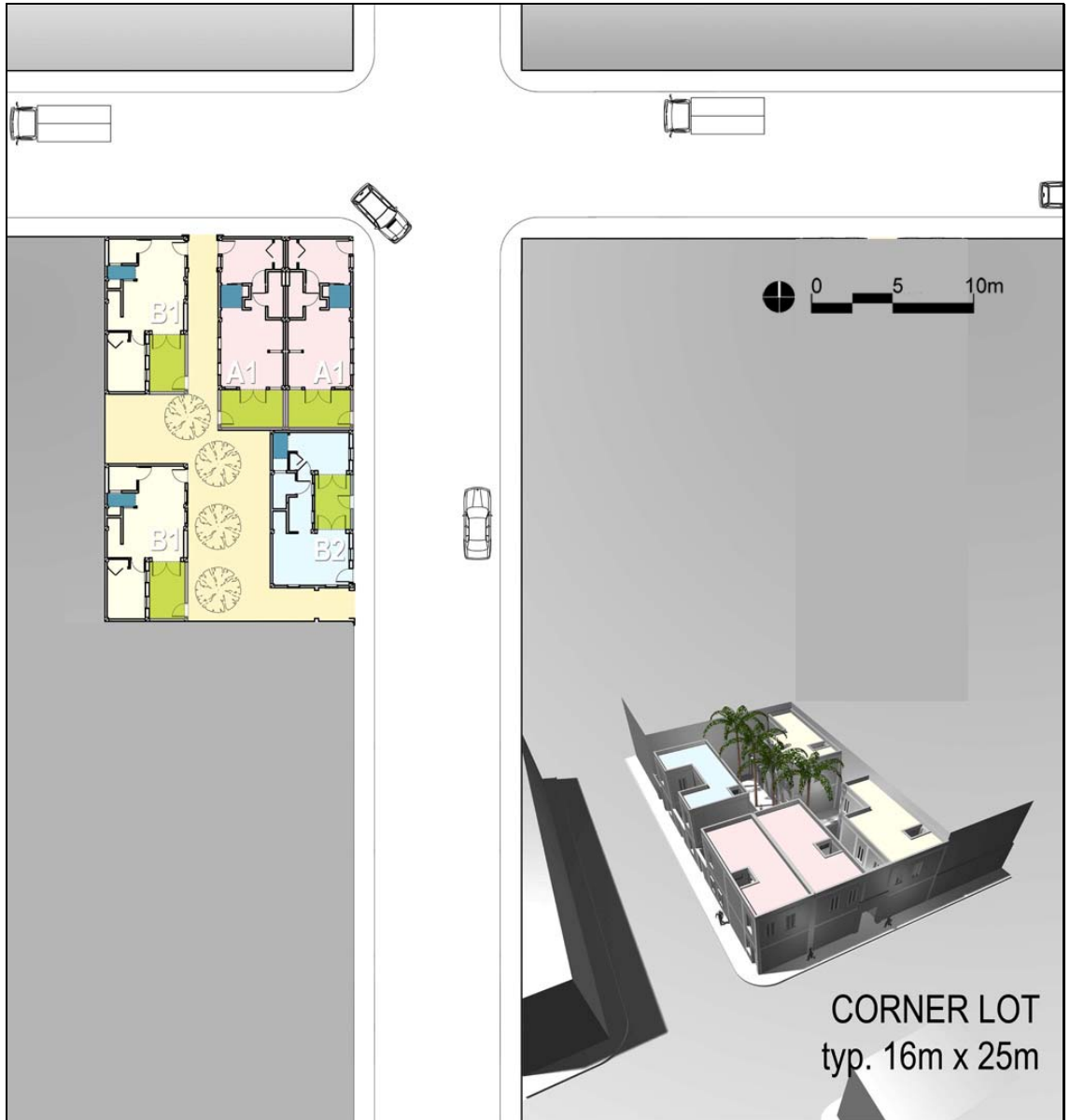
**Figure 84: Lot Typologies B**

[author]



**Figure 85: Deep lot B**

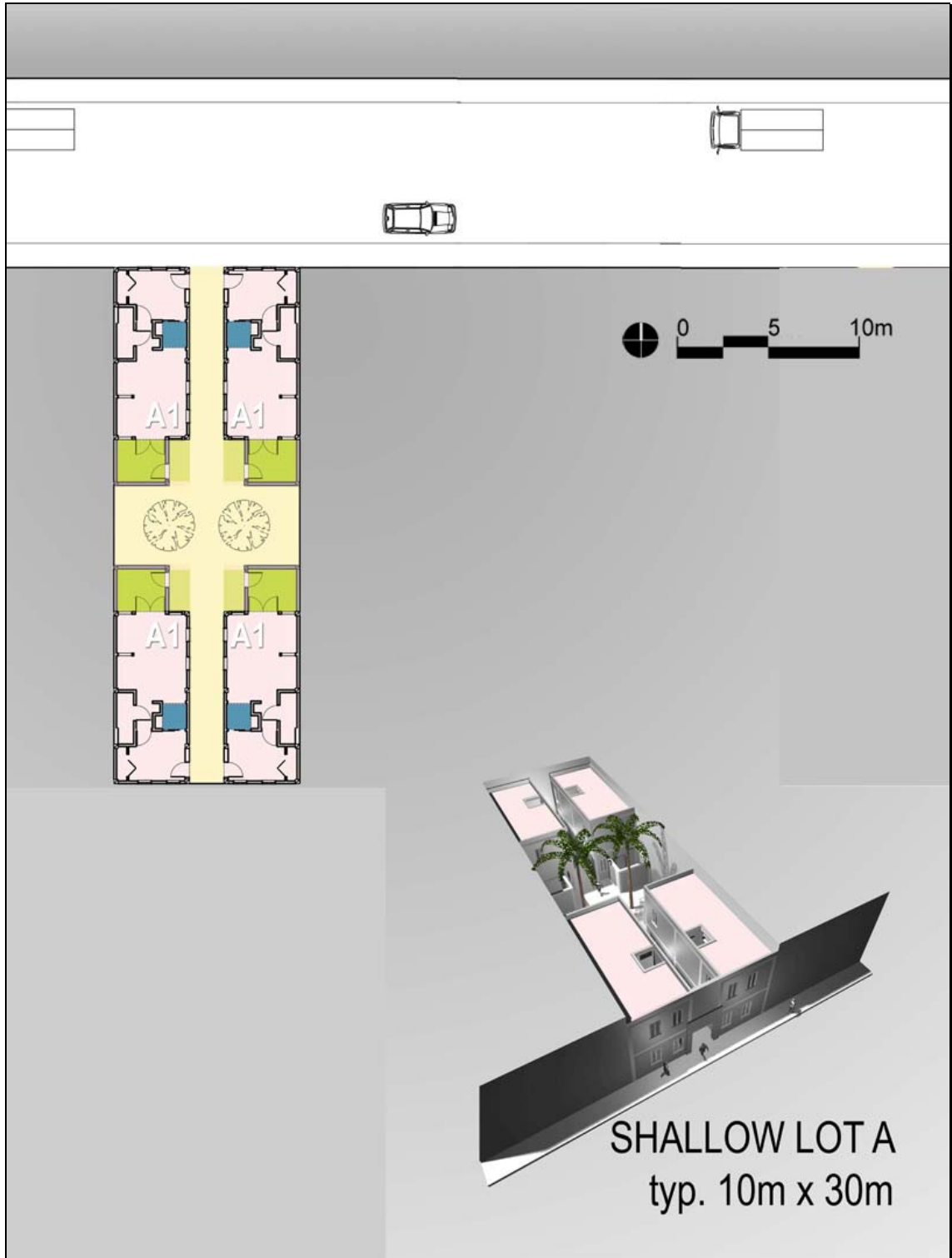
[author]



**Figure 86: Corner lot B**

[author]





**Figure 87: Shallow lot B**

[author]

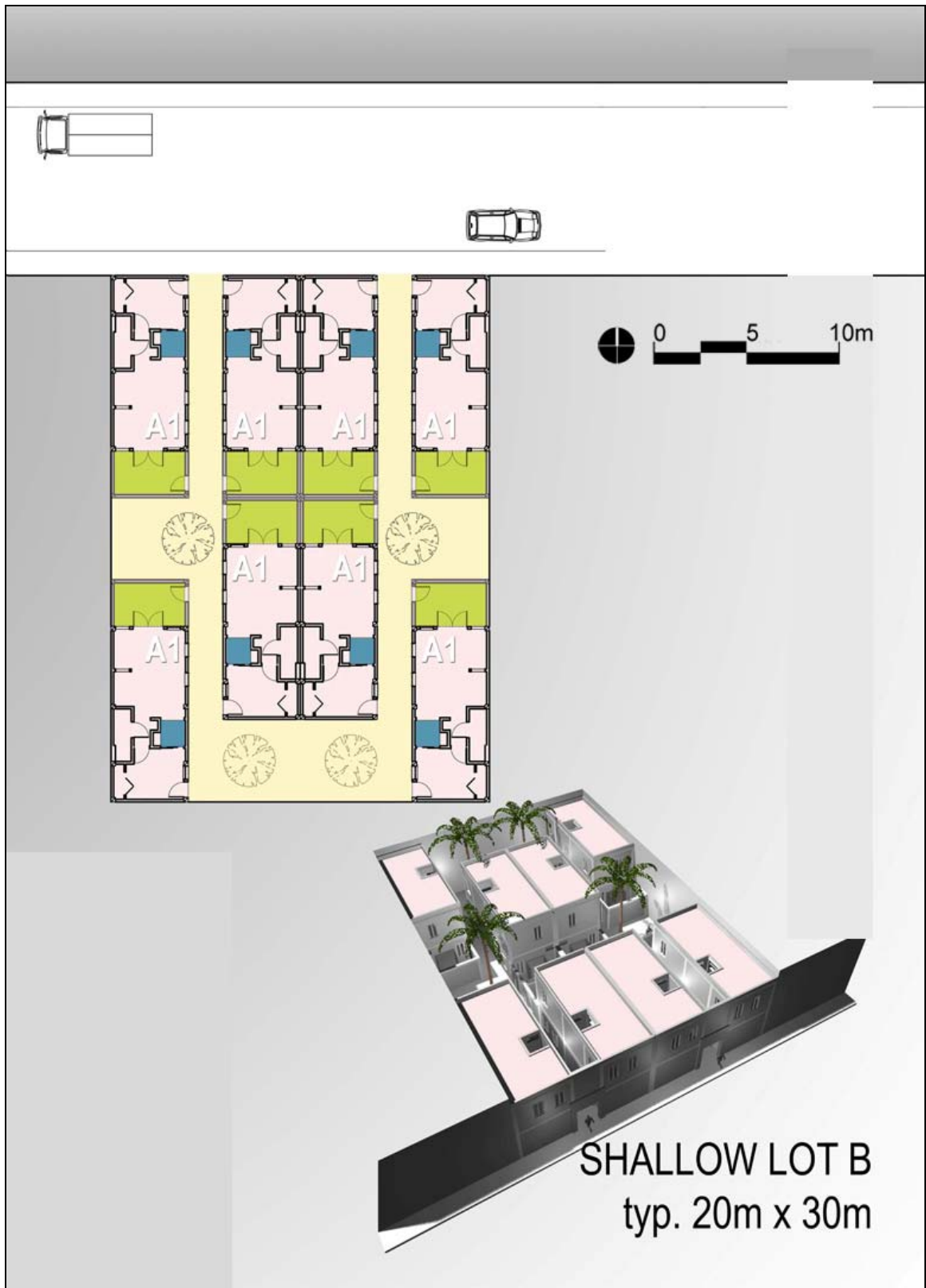
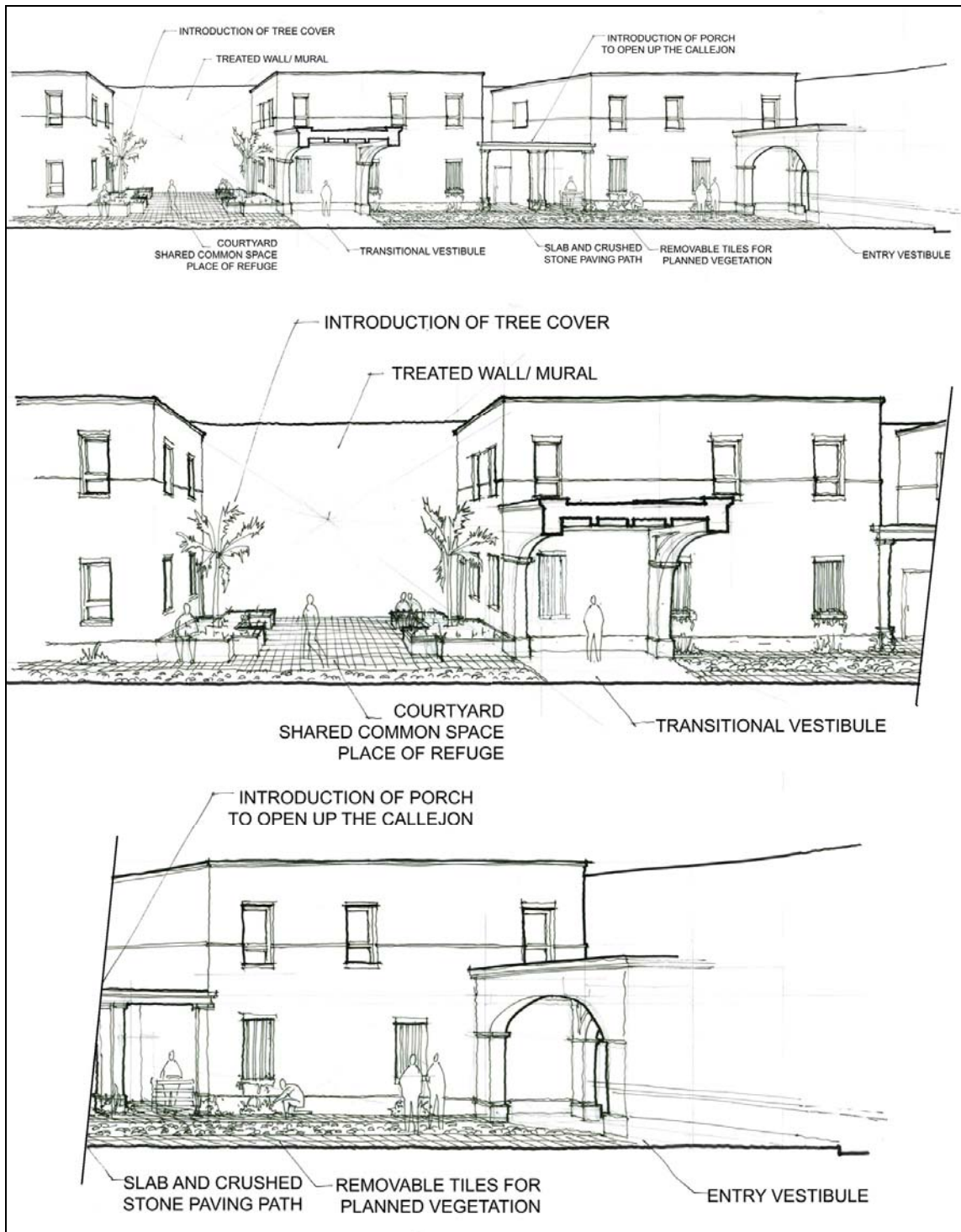


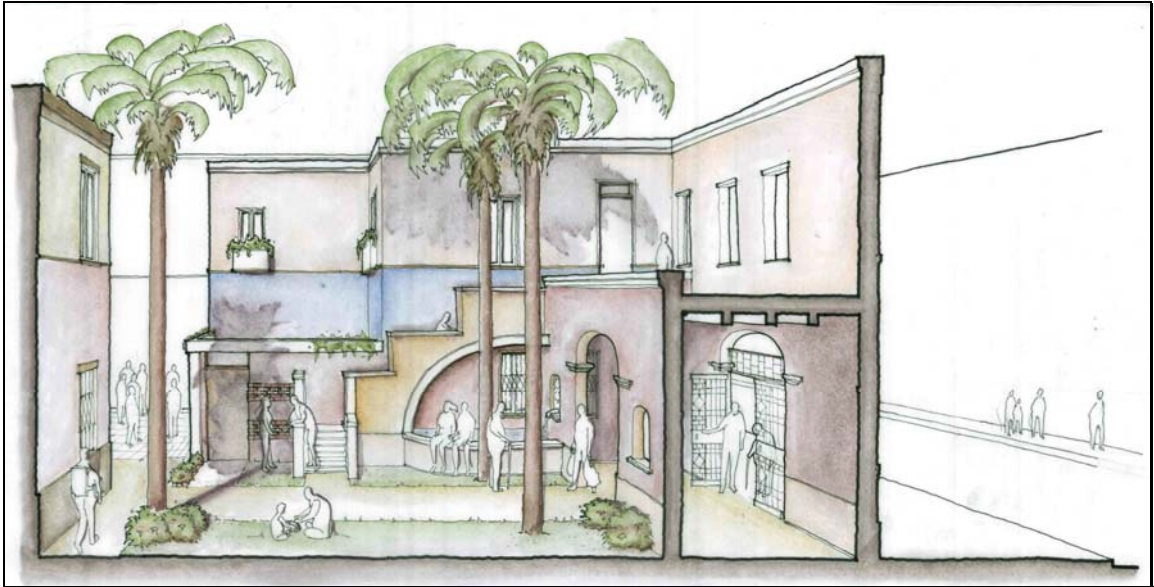
Figure 88: Double shallow lot B

[author]



**Figure 89: Section perspective of deep lot common spaces**

[author]



**Figure 90: Section perspective of corner lot common space**

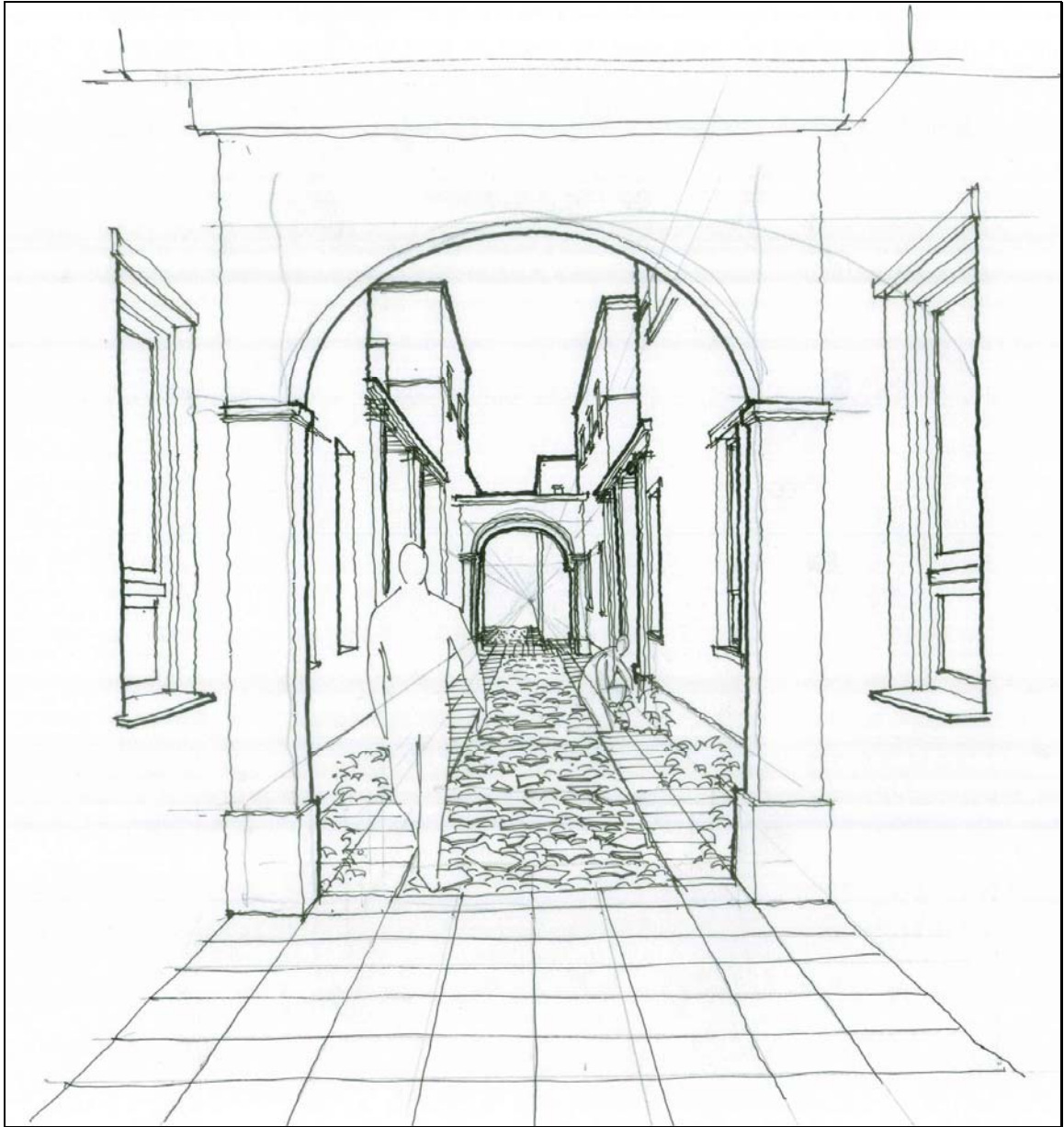
[author]



**Figure 91: Section perspective of shallow lot common space**

[author]

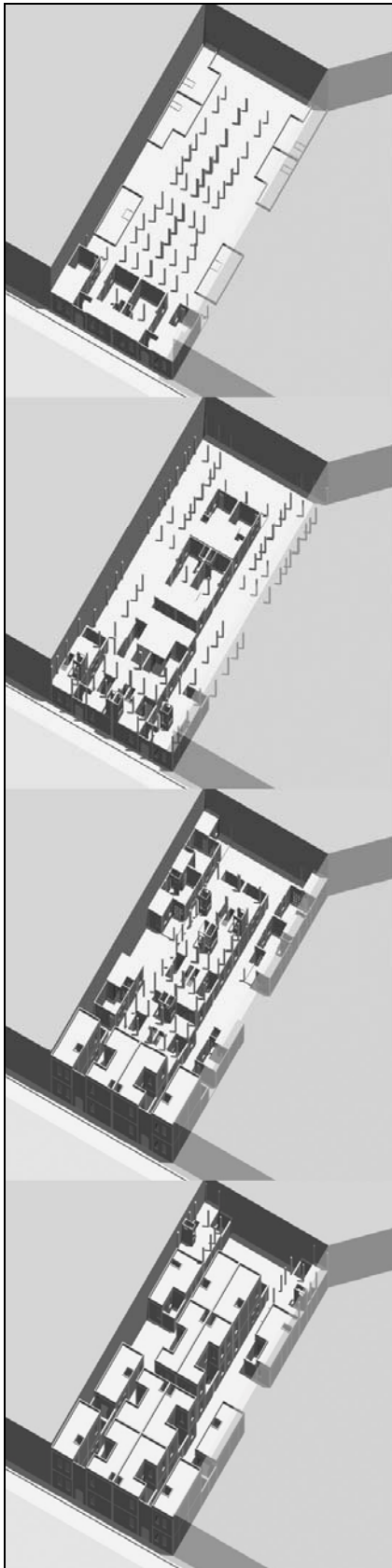




**Figure 92: Perspective from entry vestibule of lot type**

[author]





**PHASE 1:**  
*Build up units along street  
 Outline units as organized  
 by type using perimeter walls*

**PHASE 2:**  
*Continue to build up along  
 street front  
 Build units that create central  
 spine in lot type*

**PHASE 3:**  
*Complete facade along street  
 Build remaining units to  
 identify shared common  
 spaces within lot type*

**PHASE 4:**  
*Complete units as permitted  
 by unit growth pattern  
 Include plantings, paving, and  
 other features that characterize  
 common spaces within lot type*

**Figure 93: Incremental growth of lot type**

[author]

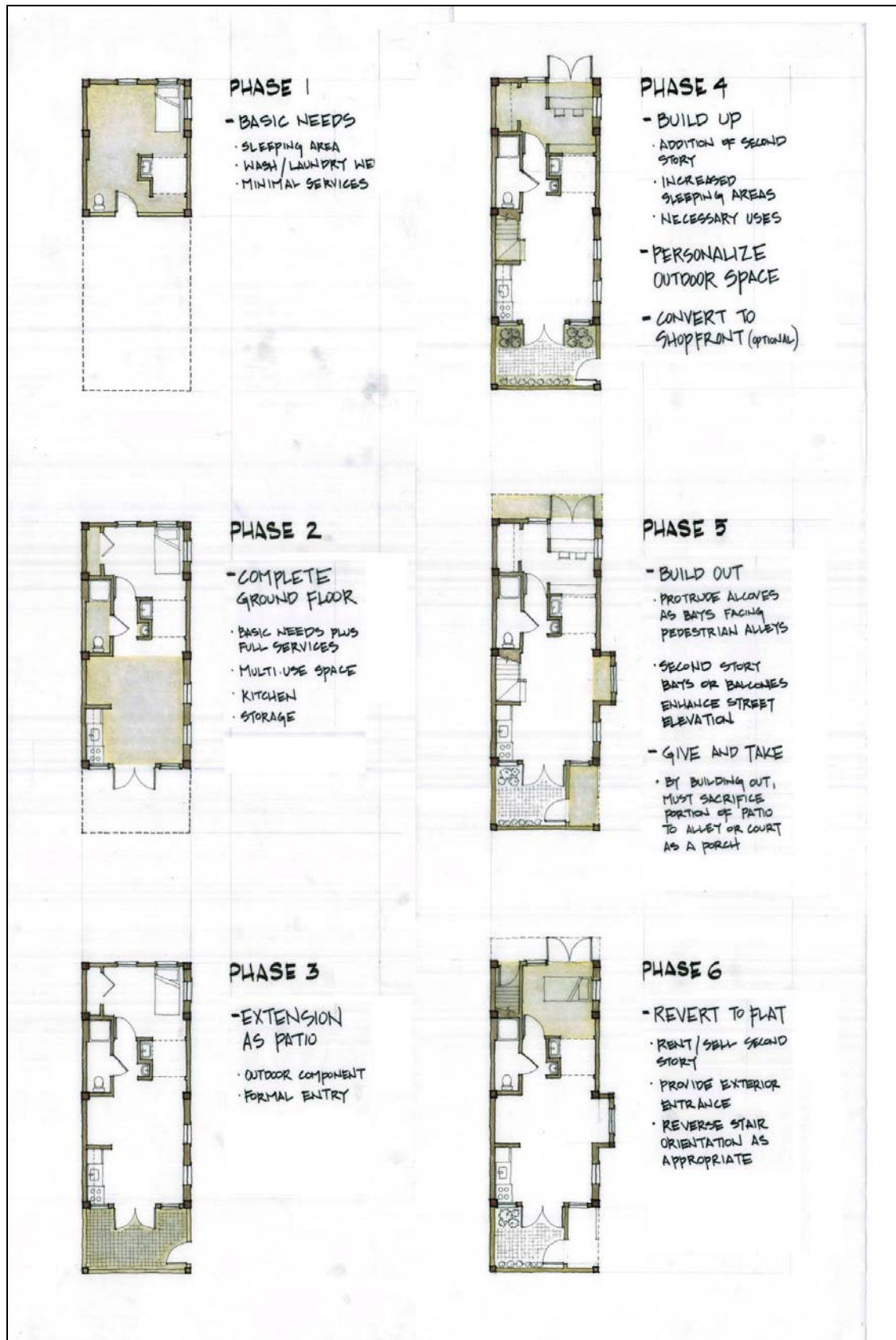


Figure 94: Incremental growth of a resident's unit

[author]

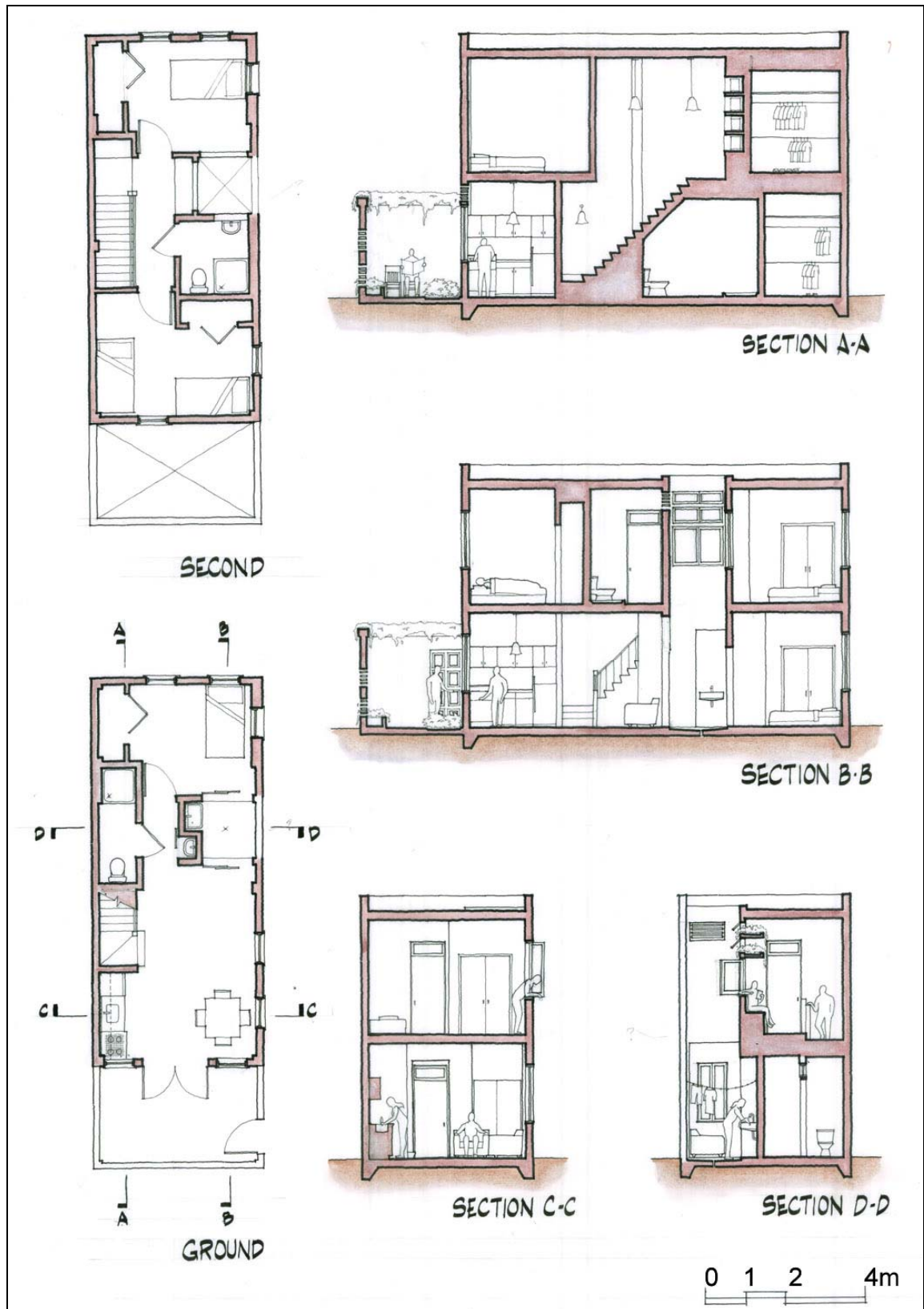


Figure 95: Unit option A1

[author]



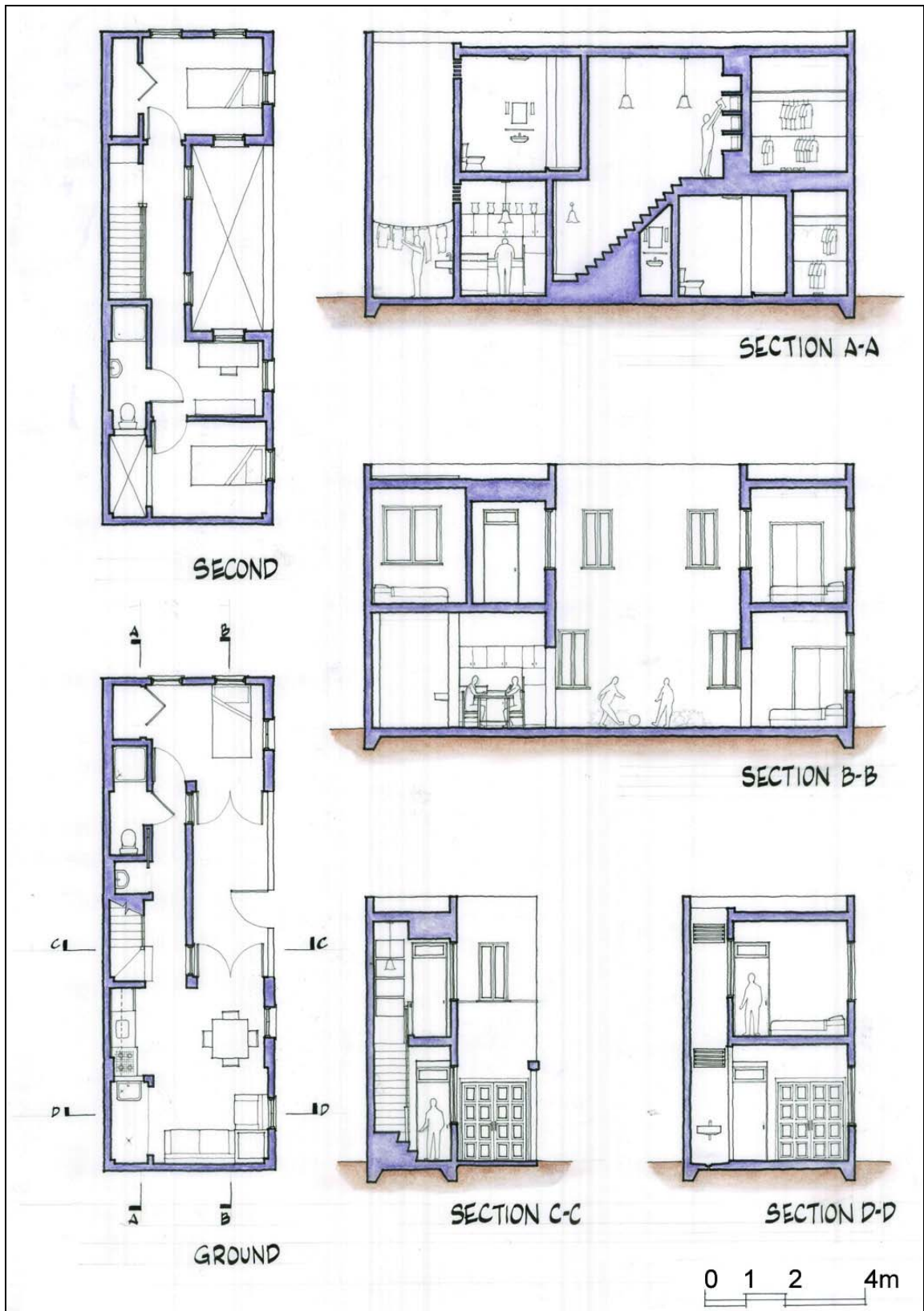


Figure 96: Unit option A2

[author]



**Figure 97: Unit A1 light sources in multi-use space**

[author]



**Figure 98: Unit A2 light sources in multi-use space**

[author]



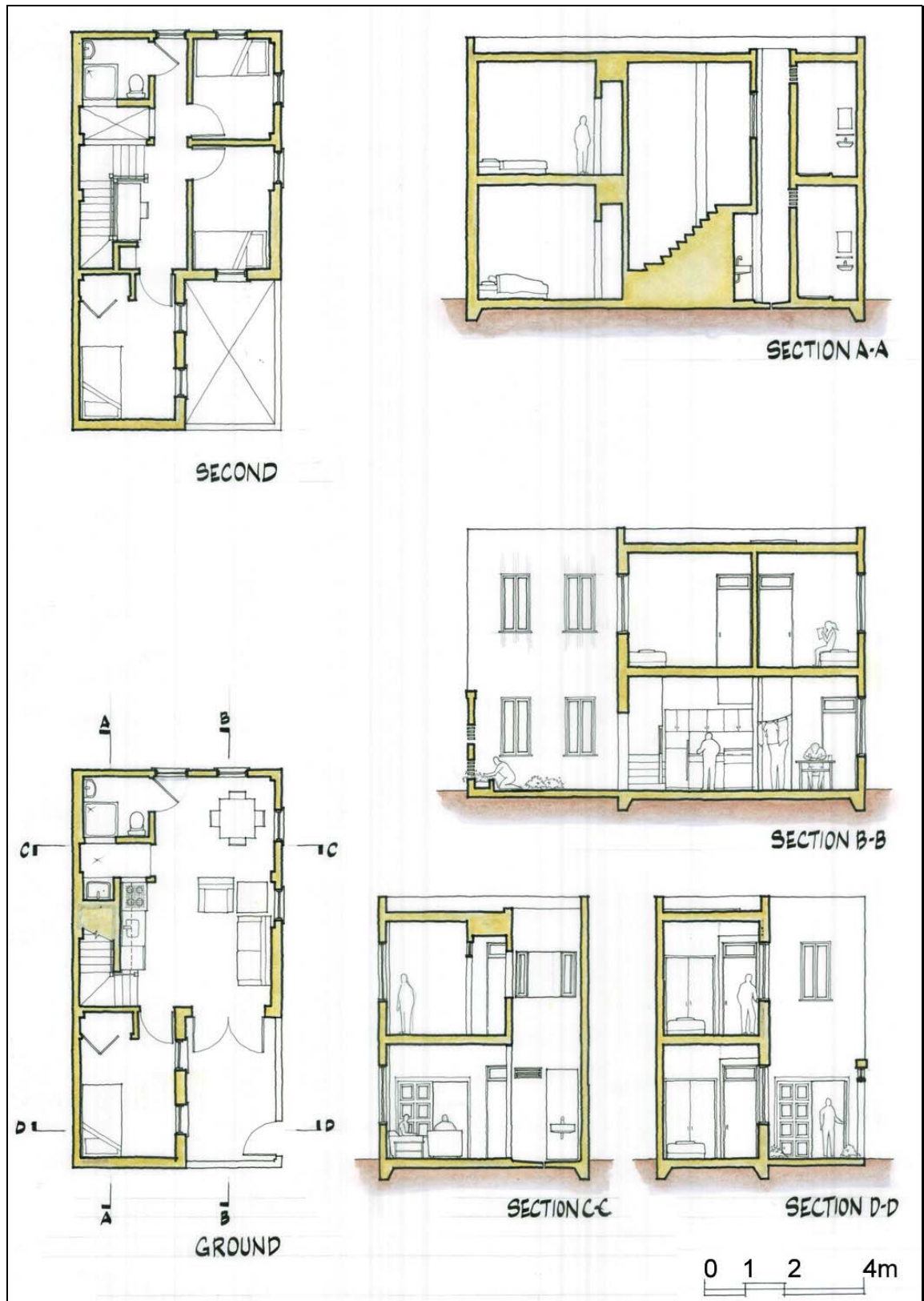


Figure 99: Unit option B1

[author]

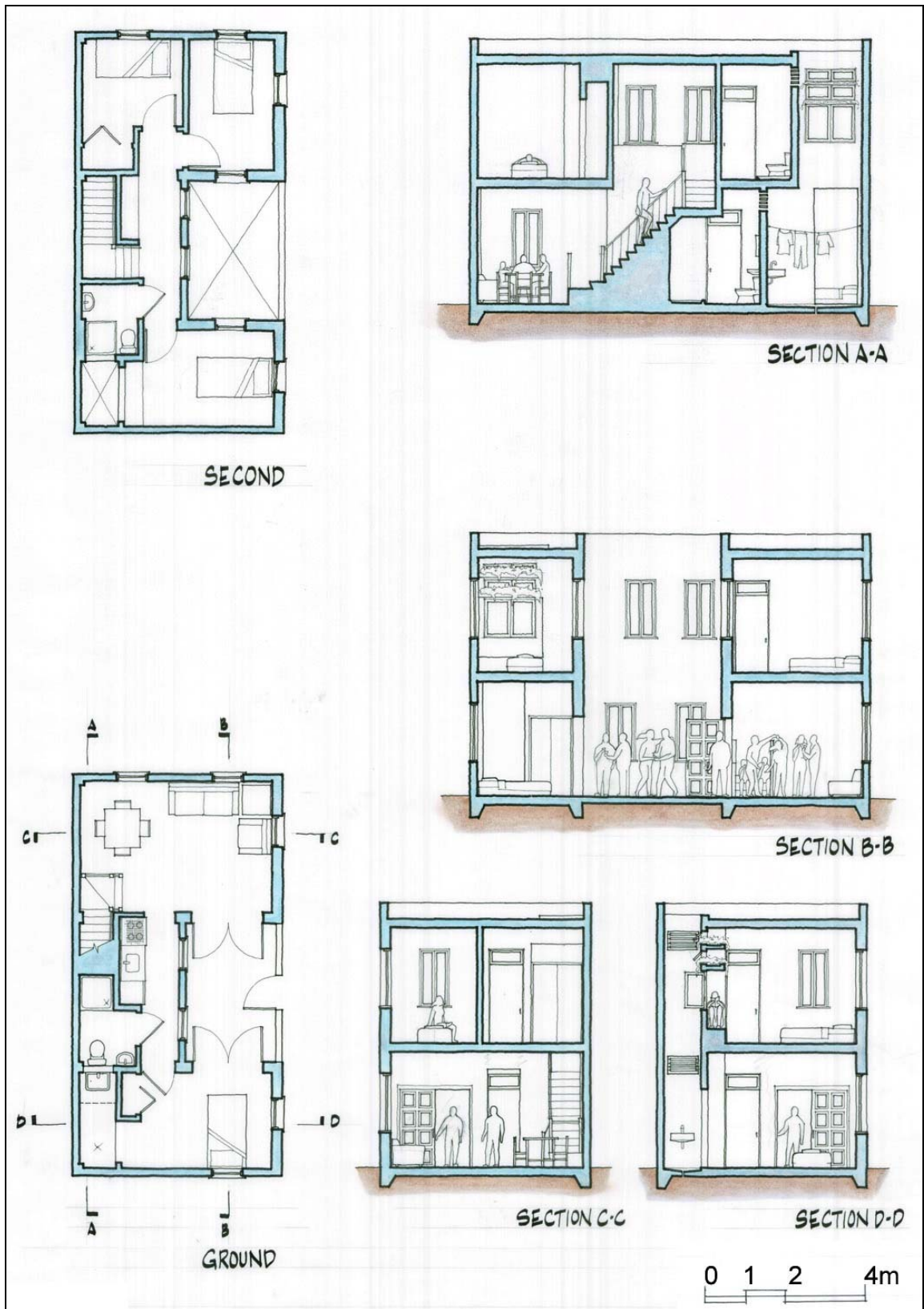


Figure 100: Unit option B2

[author]



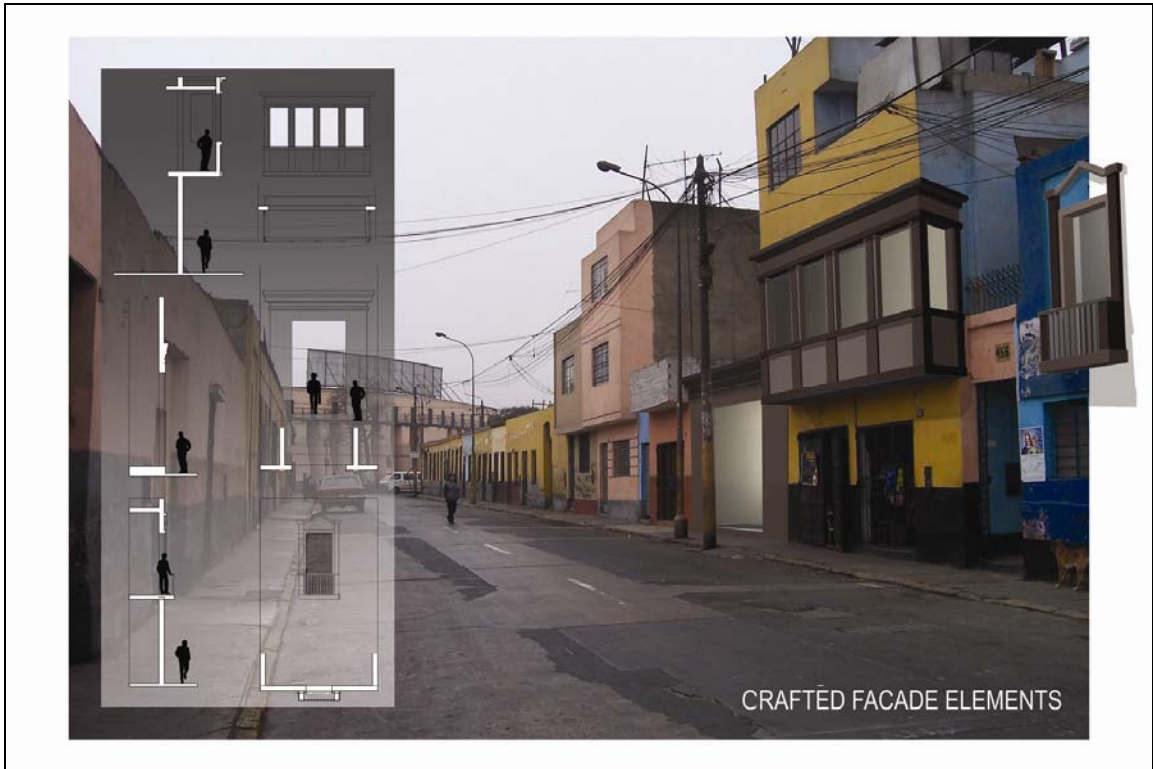
**Figure 101: Unit B1 light sources in multi-use space**

[author]



**Figure 102: Unit B2 light sources in bedroom**

[author]



**Figure 103: Crafted façade elements**

*[author]*



## Chapter 6: Conclusion

“Given a certain climate, the availability of certain materials, and the constraints and capabilities of a given level of technology, what finally decides the form of a dwelling, and moulds the spaces and their relationships, is the vision that people have of the ideal life.”

Amos Rapoport

The aspirations set forth in this thesis sought to develop a program of development in which the community was engaged, that their involvement was mandatory, and that it addressed their concerns. Through analysis, experience, and observation, this thesis managed the direction that this self help program would go. The learning component addresses the construction aspect. The construction aspect addresses the living environment. The living environment provokes the community spirit. In an effort to respond to the cultural needs and current state of Rimac, an aggressive and ambitious approach tied one solution to another in an effort to cover all the processes: facilitation, learning, training, construction, and living.

In every effort to understand the culture and the needs of the individual family, the implementation of all these self help components was reinforced at the public review of the thesis. The enthusiastic support of the jury at the final review encourages approaches to a follow up for this thesis in the form of publication. The information researched in this thesis could promote similar interests for self help programs conducted by trained facilitators, architects, professors from local universities, or volunteers. This research can motivate those in even the harshest conditions to take initiative to house themselves.





## Glossary

**callejon** [kai ye hone] alley way; this housing type was composed of a series of two or three room units in which the poorer workers lived

**casa** [ka sa] house

**jiron** [hee rohn] street

**punte** [poo en tay] bridge

**quincha** [keen cha] a combination of adobe reinforced with bamboo

## Conversions

1 meter = 3.28 feet

5 meters = 16.40 feet

20meters = 65.61 feet

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