Land, Water, Waste and Air

Resource and Promise in the Informal City

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Authors Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Striving for subsistence, the growing population of Caracas has radically transformed the city in the course of the past fifty years. The inability of the city to respond to the accelerated growth that resulted from mass rural migrations left millions to provide land, shelter and basic services for themselves. The barrios, once thought to be a provisional solution to the housing shortage, are now home to more than half the population of the city. The urban poor now live—out of necessity and through improvisation on steep slopes, unstable soil and in flood plains. Overcrowded and remote, this very dense urban fabric receives sporadic or no basic services. Without land titles or addresses, and until recently omitted from most census data and official maps, the barrio's population is excluded from the civic life of Caracas.

Sitting between remediation and anticipation, three asynchronous projects elaborate pragmatic responses to the prevailing scarcity of resources while concurrently attempting to reduce the current cycle of poverty, violence and exclusion. In their ability to be informally adapted, the schemes test the capacity of popular manifestations of civic life to transform basic infrastructure into collective space.

To overcome the precariousness that characterizes the barrios and incorporate them into the existing political mechanisms of the city, the projects are conceived as incremental frameworks that contribute to the physical integration of the 'informal' barrios to the 'formal' city. Working with water and waste infrastructure, I argue through these projects that architecture can build on the universal nature of necessity to frame a model of civic space generated out of the complexity of the barrios and on the auspice of promises.

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Preface

As a way of apology

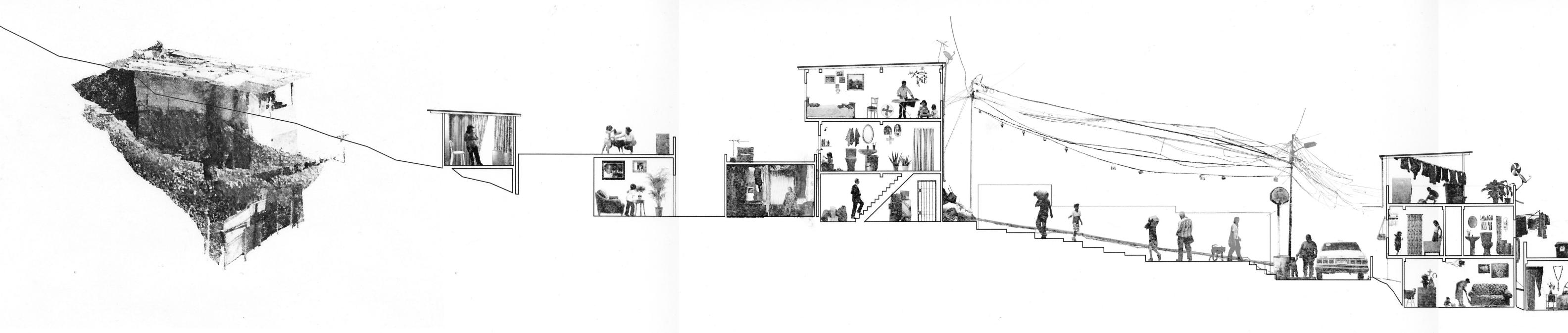
The recent death of Venezuela's president Hugo Chavez marks a major change (it is yet to be seen exactly how major) in a tumultuous political era. While many cry the loss of a leader that represented this century's model of Latin American socialism, many others, myself included, see the end of Chavez' government as a chance to rebuild a country after fourteen years of economic, social and political decline.

National politics in the past decade and a half have divided the country in two, both government and opposition supporters backing their side with a hostility I have never thought possible in a country of people as warm and welcoming as its weather. Differences between the official government and its supporters and the opposition have only radicalized with time, each side willfully ignorant and manifestly dismissive of the other. Politics have become a very personal matter, one that can only be discussed with clenched fists. The divide cuts across classes, but also across families, colleagues and friends, placing everything in one of the two sides: where you work or can work, the newspaper you read, the color of your

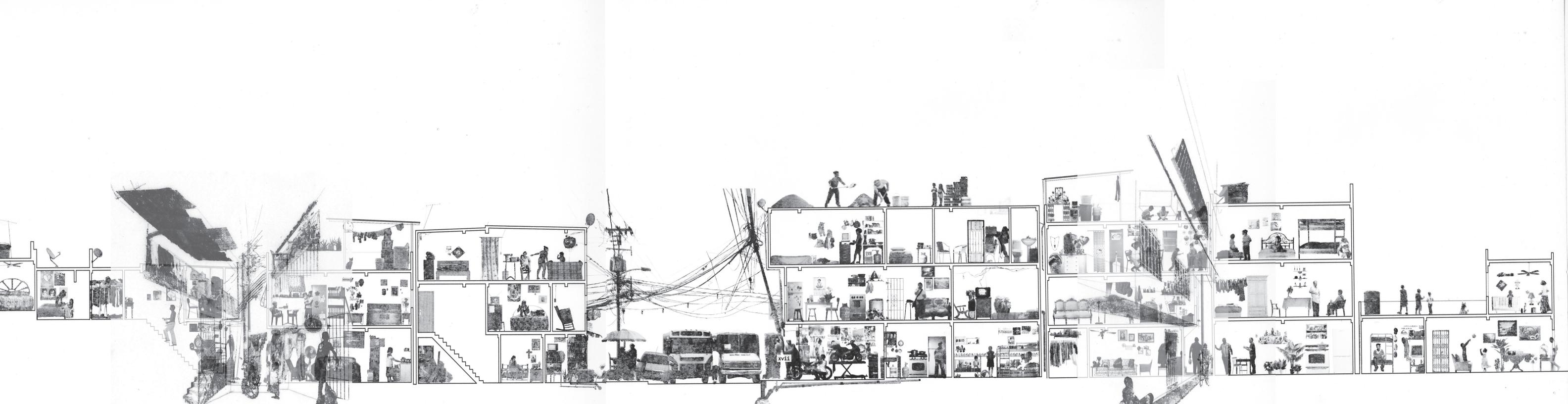
shirt and the brand of milk you buy have all become political statements.

It is for this blatant and ubiquitous presence of national politics and its stifling effects, and because of its proximity in time and my own inability to be as neutral as I deem fair, that I have opted to keep the specifics of Venezuela's political climate as removed from the thesis as my conscious self will allow it. I have knowingly disregarded the belligerent headlines, the continuously changing legal and political institutions and the constant fights for power, wishing for a country that fosters dissent but is not consumed by it. This thesis hopes to transgress the gap between the two sides while harnessing the passion invested in current politics into a more fruitful civic life.

Virginia Fernández Rincón March, 2013



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Between Land and Air

Nicolás leads me through the barrio. He was born here and he waves at everyone, stopping constantly to introduce me to them: the basketball player who tends an abasto; a hairdresser; the local musician, a timbal player; a nurse on her way to work. There are many others without any further description than their names and a friendly handshake cooled by the beer bottles in their hands. We walk the barrio Santa Cruz, one of nineteen barrios located to the south-west end of Caracas. We wander up steep stairs and narrow alleys, above creeks and around garbage dumps, always avoiding one particular street, "that's where all the drugs are" Nicolás says. On my second visit and after some convincing, we walk there. "No tomes fotos aqui". Turning the corner a group of girls play, their pink t-shirts a blur as they run. A few meters away, two men on motorcycles are trading what is probably cocaine. They take a look at us, finish and leave—no pictures are taken and the girls never stop playing. It is a sunny Saturday morning, thirty degrees with a bright blue sky.

With five times the density of the rest of Caracas, low income, and a vastly unemployed population, the informal city condenses and multiplies all the paradoxes inherent to the capital of a developing country. Living in this context is a process of constant negotiation. Barrios are geographically isolated from the formal city, virtually unmapped and ignored by most regulatory entities. In this setting, they operate on implicit rules that are not always followed, among strong but changing personal connections, and in conditions of urgency and improvisation. Beyond the absence of explicit regulations that define these settlements, urban informality has particular physical attributes including spontaneous construction in high-risk areas, overcrowding, lack of infrastructure and a pronounced deficiency of services.

Barrios simultaneously benefit from the infrastructure of the formal Caracas and reject the official systems that govern it, such as taxes, service fees and regulations. With almost magical resourcefulness they have slowly secured their participation in the city, but their placement outside all regulatory systems considerably limits their complete integration into the economic, social and political life of Caracas. With the same resourcefulness, barrios constantly negotiate the scarcity of the informal and the aspirations of the formal city. The most precarious shack, though

lacking sewage or running water, would most likely have a satellite antenna. This ambiguity is a key trait of the informal. Its economic, social and physical networks are never isolated from the predominant culture of the city. Even from the geographic and legal margins of Caracas where informality operates, it is still both physically and logistically connected to the formal. The barrios and the rest of the city are mutually dependent.

Barrios' social and economic life is based on vital community connections. Yet, the power structures that have developed are often more opaque, undemocratic and volatile than formal forms of governance. In this setting, violence in Caracas has reached pandemic levels in the last decade. Institutional disintegration of the judicial system and security forces, along with inflation and unemployment are coupled with the prevailing trade of illegal guns and growing drug trafficking networks to give Caracas the unfortunate title of the murder capital of Latin America.

Humbled by the overwhelming complexity of the barrios, and moved by their capacity to build a city out of shear will, necessity and hope, the thesis operates, lightly but firmly, within these contested spaces of the city. The projects presented in this thesis to occupy sites that were never conditioned for

negotiate the delicate balance that strings this context together with the need to improve the site and the community that lives it.

Taken individually, each project addresses a specific condition in the barrios—existing urban fabric, its potential expansion, and its connection to the formal city—to strengthen service networks, public space and community identity. Together, they work to support the urban poor's claims to the city by challenging their status as temporary and precarious settlements, making them functional and therefore, permanent parts of the city. Moreover, each project improves or extends to the barrios services that are present in the formal city, structures the existing and future urban fabric with addressees and markers, and frames civic space to allow for community organization.

Infrastructure and Informality

When building the informal city, barrio residents not only appropriate a piece of land, but in what is maybe a more remarkable act, they illicitly connect to the infrastructure that makes a plot of land livable. Water, electricity and sewers are mostly accessed illegally and seldom paid for. This has allowed for new settlements

construction. This prevailing arrangement makes utility companies unaccountable for their services and barrios indiscriminate with their use. Moreover, it has kept barrios outside of any citywide infrastructure expansion plans.

Day to day, what separates the formal from the informal city is the degree of adequacy of the existing infrastructure and the means of obtaining basic services. Although they are deficient in the formal city, services like water, electricity and sanitation are sporadic and almost non-existent in remote areas of the barrios. In an attempt to solve this issue, land titles have historically been the preferred legal tool to regularize barrios and their infrastructure. Land titles can in theory be used to apply for water and electricity services, yet regularizing these services does not replace proper aqueducts and sewage, pumps, converters, water filtration, waste collection or emergency services.

Current approaches to barrios vary in scale and scope. Besides a few controversial beautification schemes that involve finishing and painting facades, most projects have a strong focus on providing infrastructure and services at a range of scales.

Narrowly focused projects, although limited in reach,

pragmatically improve people's daily lives. Larger projects that, although not completely without real benefits for the community, use infrastructure for political proselytism, often fail to address the complex environment they are inserted into. In a city built by its own inhabitants, out of necessity and through improvisation, each project inherently becomes an experiment on the limits of infrastructure. They are built within very limited budgets, multiple site constrictions and contested relationships between communities, professionals and local authorities. Despite these tight restrictions, different approaches have recently emerged when intervening in informal settlements. Working in the barrios of Caracas, Arqui5 has a traditional approach to barrio rehabilitation. Their two built projects consist of an extensive stair network that includes stormwater drain, electricity, water and sewage pipes, and small sitting areas in two of the largest barrio areas of the city, La Vega and Petare. In these modest projects, Arqui5 works entirely within the existing dynamics of the barrio to successfully connect them to the formal city while addressing very pragmatic needs for circulation and services. The work of Jorge Mario Jauregui in Rio de Janeiro is representative of a second approach that includes improvement of existing circulation and infrastructure networks paired with

public programme like soccer fields, samba schools or communal laundries. Jauregui's projects are deeply embedded in their context; the programs that are introduced are rooted in the culture of the city and have the potential to holistically improve life in the favelas they serve. A third attitude towards barrios is characteristic of the work of Urban Think Tank. Two projects within barrios in Caracas were recently completed: a sport complex in Baruta and a cable car system in San Agustin del Sur. These projects more radically modify the context in which they operate. While their visibility has made them symbols Barrios have demanded little from official of a growing interest in barrios, in reality they fall short of fully addressing the barrios' alienation from the formal city and the increasingly violent rivalry between barrios and other issues that are tightly linked to the context they negotiate.

Within the prevailing focus on infrastructure, this thesis works on the premise that, beyond any legal mechanisms to regularize barrios, infrastructure can legitimize the informal via the provision of services. In their existence, these services challenge the barrio's precarious condition and their prevailing image as temporary settlements. More concretely, the projects take the form of lines, centers and nodes that act as

areas of the barrios growing with and within them. Lines stitch services together and grow with new barrios. Nodes work by accumulation, forming an intermittent network adaptable to existing sites. Centers connect nodes and lines to the formal city. Ultimately, the thesis frames infrastructure as essential monuments that connect the barrios—pragmatically and symbolically—to the formal city.

Citizenship and Necessity

governments and are accustomed, in turn, to receiving little. In their shared search for land, infrastructure and services, barrios have proven that necessity transgresses any social and political affiliations, and that strong community networks can firmly form around shared necessities.

Beyond nation-state affiliation, barrios redefine citizenship as a direct involvement with the production of the city. Although slowly, barrio' residents have eroded citizenship's exclusionary limits, traditionally attached to property, and have delineated a new definition of citizen based on their urban practices that originate from the necessity to survive replicable frameworks to adapt and serve the different in the city. Teolinda Bolivar, an architec and urbanist

who has worked in the barrios of Caracas since the early 70s, sees people's insistence on living in barrios as an act of rebellion1. For Bolivar, the peasants that first migrated to Caracas appropriated land both as a means of subsistence and as a symbolic act to secure their right to the city². Yet, these rights are still limited Integrating barrios as part of the city means when attached to a piece of land that is not legally occupied.

Barrios merge regional traditions, the aspirations of the dominant global culture and the new practices that have originated of necessity. Teresa Ontiveros, an anthropologist interested in collective memory in the barrios, frames the barrio's particular culture and the built environment it has produced, as a key part in the meaningful incorporation of the barrio and the formal city. For Ontiveros, both the city and the barrio itself need to recognize the barrio as an important cultural production³. The culture of barrios develops in what Ontiveros calls 'interiorized spaces': the street corner, the grocery store and the public water tap—spaces where relationships are both more acute and therefore more contentious. These spaces created by very practical needs have become part of the community's mechanisms to define and control its territory. But outside of this territory, and even though barrios now house 54% of Caracas'

population, they are still largely invisible. The urban poor are half-citizens. As voters, they are cultivated as a political tool, yet they remain powerless when asking for water or sanitation infrastructure, police and other emergency services, schools or healthcare. recognizing the people living in the barrios as full citizens—carriers of both rights and duties equal to those of the formal city.

In barrios, the urgency of pragmatic intervention takes precedence over projects that strengthen culture and community. Although health and safety are pressing issues, limiting improvement to the mere satisfaction of basic needs undermines the power of acting as a community. This power can transform a person into an active citizen who understands the barrio as a common good. The projects presented in this thesis use the necessities held in common by people living in barrios to build spaces where culture is lived and citizenship is reinforced. The projects provide barrios with space, both physical and symbolic, to meet and act as citizens. Further, they establish the role of government as a provider of basic services, while incorporating alternative ways of complementing these services to allow barrios to proactively participate in the city.

Promise and the Ordinary

The space of appearance, where we make ourselves real by being public, arises for Arendt as the result of both action and speech⁴. The permanence of this space is only guaranteed by power. This power is not one of sovereign power over a body politic but the power to act that emerges in a group of people united, not by the existence of a common will, but by a common purpose for which promises are valid⁵. These promises that secure power originate for Arendt from two facts: "the basic unreliability of men who never can guarantee today who they will be tomorrow and out of the impossibility of foretelling the consequences of an act within a community of equals where everybody has the same capacity to react."⁶

Barrios are built out of a constant negotiation of individual desires and the promises that each person has tacitly made to others as part of a community. Unlike the formal city, barrios operate outside any official rules or regulatory entities. In this context, promises become more poignant while at the same time more fragile—they are the unstable base upon which society functions. Living in the barrios entails a minimum exchange of promises, though these are willfully broken, easily forgotten, and wrongly

replaced. These promises that lightly connect people's actions are always competing with the needs of the ordinary. The ordinary are the activities and their accompanying objects that consume most of the time and space of the everyday. In barrios, because all activities are institutionally unmediated the ordinary unmistakably shapes the built environment and the way people live it.

For Henri Lefevbre, these activities are "humble, solid, what is taken for granted and that of which all the parts follow each other in such a regular, unvarying succession that those concerned have no call to question their sequence... it is the ethics underlying routine and the aesthetics of familiar things." This reality is constituted of—and gains power by—repetition. In barrios, the built environment itself has been constructed by the materials that define the ordinary and their repeated use—by laying a few bricks a day, a family builds a house over two years. These material and temporal dimensions of the ordinary are in their simplicity what has made barrios so resilient to any economic or political changes in the city.

Promises are fundamentally different from the ordinary; their intangibility contrasts the actions

of the ordinary, which physically marks the objects that frame it. While promises are the intangible that keeps neighbors from building in an area reserved for a school, it is the ordinary that builds all the houses around it. The ordinary needs to be constantly negotiated, and promises place these negotiations among equals. By combining basic infrastructure with civic space, the thesis works to allow the ordinary to cultivate the exchange of promises, giving them a place for existence and exchange, and ultimately shaping the ordinary itself. As open and unfinished frameworks, each project change with the barrio around them, existing in the uncertain space between fulfilled and forborne promises.

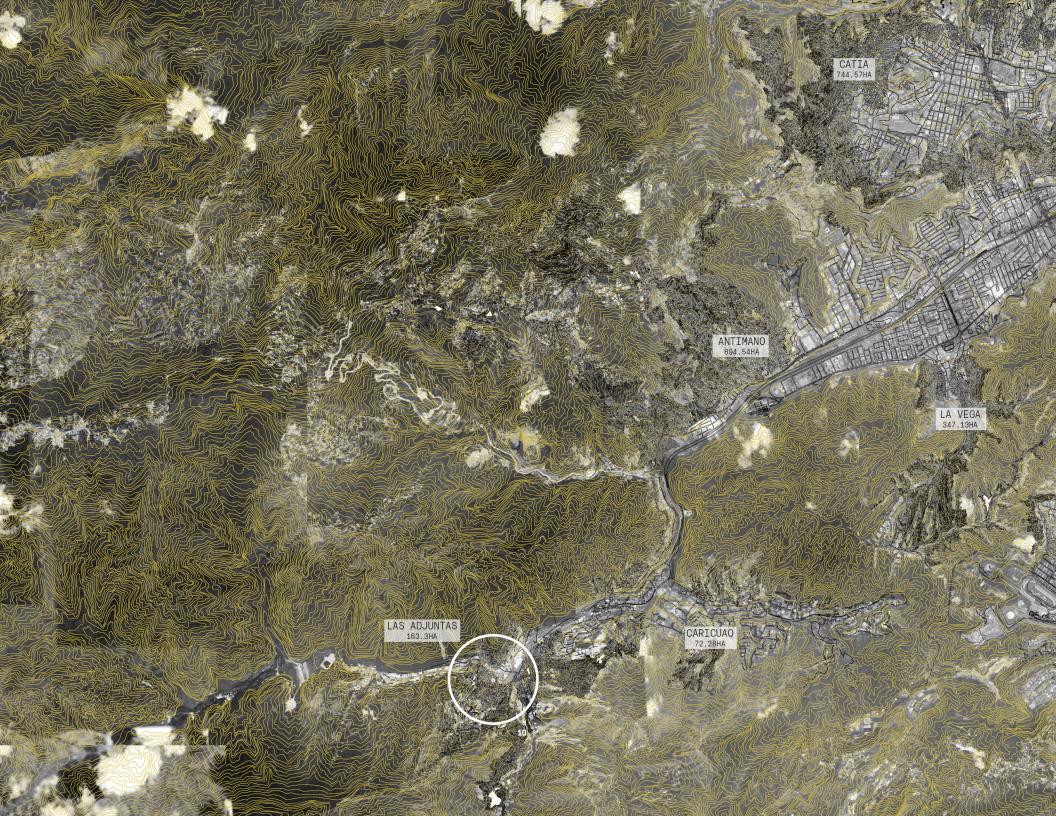
Using Land, Water, Waste and Air, each chapter of the thesis uses these resources to describe the city and its barrios. The three chapters are each accompanied by a design project that, although responding to different issues, closely addresses a specific resource.

Oil and Land illustrates the main forces that have shaped the city, while Tending the land anticipates the future growth of the barrio. Water and Waste traces these systems in the city and in the barrios, and Public Water Common Waste, recasts these two services as public programme. Concrete and Air, interprets the spatial culture of the barrio, while Playing with Air addresses the existing built fabric.



Oil and Land

Oil and Land have directly shaped Caracas. Oil as the symbol of development has attracted millions while Land, with its deeps valleys and steep hillsides, has been an obstacle for urbanization.



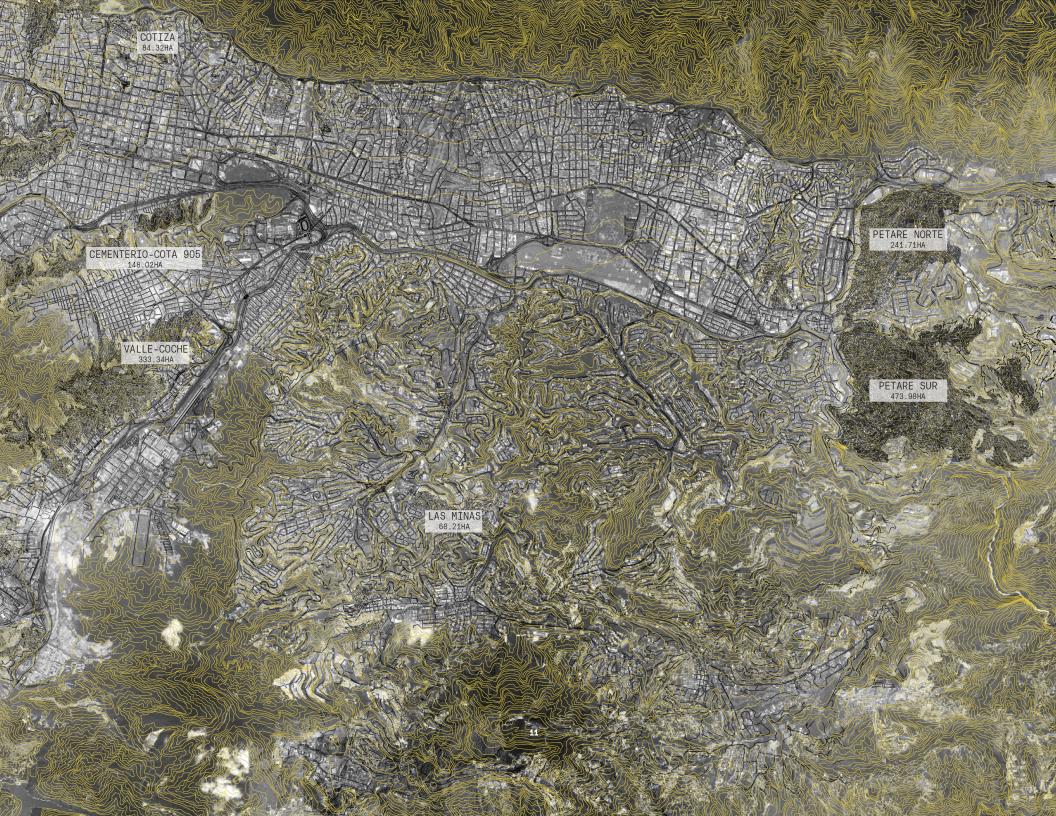
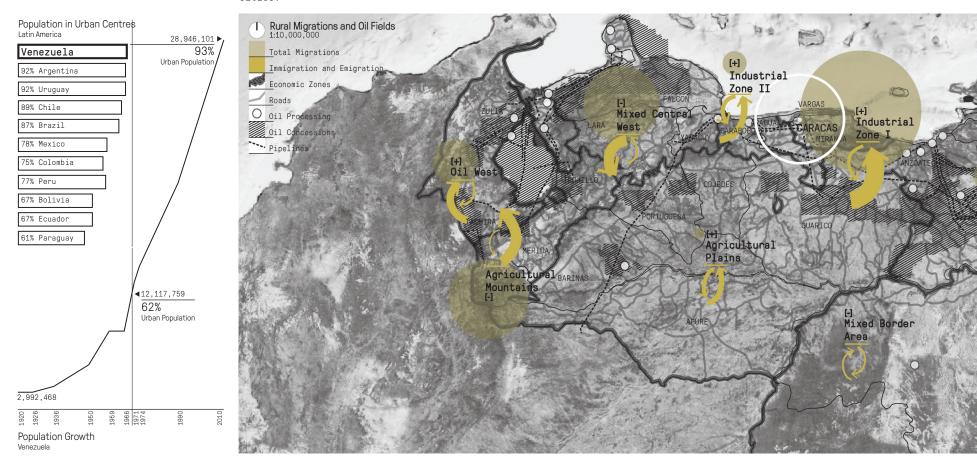


Figure 005.
The country's booming economy of the 1950's and 1960's sparked mass migrations from the country to the cities.





peasant with little or no land residing in the rural areas of the Andes or in the plains and farming for subsistence or working for a landowner.

Swimming against the current, my grandparents, both school teachers, left the Oil riches and the parching heat of Maracaibo and moved to Mérida, high up the Andes. But after the fall of the last military dictatorship in 1958, they followed thousands of other families that had decided to move to Caracas. With seven kids and the sweaters they had just bought for the cool nights of the mountains, they took a bus and left. They were promised 'la sucursal del cielo' (the branch of heaven).

Since colonial times, Venezuelan economy has depended on single exports. The Spanish colony used cocoa to finance their expeditions and new towns. Following the War of independence in 1831, coffee replaced cocoa as the major cash crop¹, and was supplanted by oil in the 1920s. While the agricultural industry kept most of the population in the countryside, oil and the apparently unstoppable prosperity it created triggered migrations to major cities and oil towns. Four major waves of migrations to Venezuela's north-central coast, the center of oil administration, as well as to the centers of oil extraction and processing, shaped the cities that now house 93% of the country's population². This migrating population, largely formed by campesinos, moved to the city using the same roads built to support the oil industry. These roads paved the country from the Andes and the Plains to Caracas, allowing cargo and people to flow easily through the nation's rugged geography.

Caracas became the capital in 1678³ and since then, the city has acted as the political, economical and cultural centre of the country. The offices of all transnational companies that capitalized on the country's oil before it was nationalized in 1976⁴ also settled in the developing metropolis of Caracas given its ideal location.

Figure 006.
Caracas's population growth rate closely followed that of the total national exports.

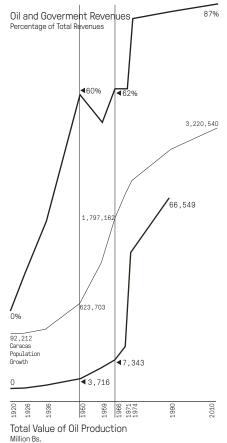




The first two migrations of the 1920s started when oil was first exploited and exported, and subsequently with the fall of the dictatorship of Isaias Medina Angarita in 1945. The third migration between 1950 and 1958 took place during the dictatorship of Marcos Pérez Jiménez when the national economy grew vertiginously with a 95% GDP growth, followed by the overthrow of the very same government in 1958⁵. A fourth migration occurred during the 1970's when oil reached record high prices and gas and food were heavily subsidized⁶.

Through all these migrations, the official approach to the barrios changed. Most governments tried to eliminate or control what was called 'el cinturón de la miseria' (the belt of misery) that still surrounds the city, but during the long and unstable transition periods between governments, the campesinos that moved to Caracas found little or no resistance to their new settlements. Between 1941 and 1953 alone, the number of houses in barrios increased from 7,776 to 53,6167. Barrios that formed around small town centers in the outskirts of the colonial city, in industrial areas, and around construction sites of large infrastructural work, were initially thought of as temporary by local governments. Slowly, they became permanent; they expanded, growing higher and denser and new barrios were fast to follow.

Figure 007. Growing oil revenues funded massive infrastructure projects that restructured the city's urban fabric.



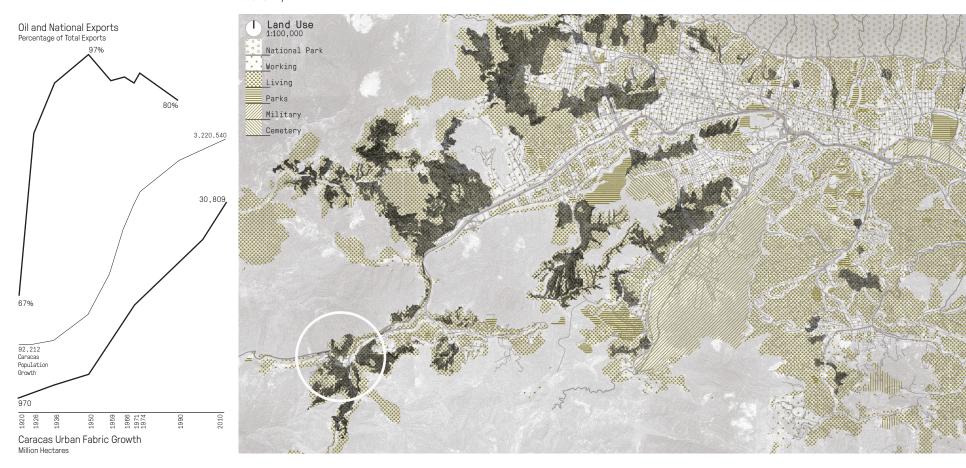




formal residential area usually for the middle or upper class of mostly detached or semidetached houses. Many have become gated communities in recent years.

Slogans like 'El Nuevo Ideal Nacional' and 'La Politica del Concreto Armado' (The New National Ideal and the Policy of Reinforced Concrete) were behind the mid-twentieth century efforts to modernize Caracas along with the rest of the country with funds from expanding oil exports. At this time, the capital of an oil-rich country boasted its progress by building large scale road networks. Between 1945 and 1965, five major highways, were built to connect the metropolitan area to the coast and the rest of the country forcefully dividing the fabric of the city8. These wide avenues and highways drastically restructured Caracas, and its population's economic strata materialized in concrete spatial divisions. Expansive areas of the colonial centre and many central barrios were replaced by modern buildings, mass housing units leveled large expanses of steep hills, the city sprawled with urbanizaciones of middle class neighbourhoods, and Caracas' new margins filled with barrios. New industries that opened in the edges of the valley, following the unskilled labour that poured into the city, were also quickly surrounded by barrios9. All these changes were regulated by the first urban plan for the Metropolitan area of 1950, which imposed segregated land use, called for ameliorating traffic congestion and purposefully ignored the barrios¹⁰.

Figure 008.
The changing prices of oil have directly affected the growth of the city



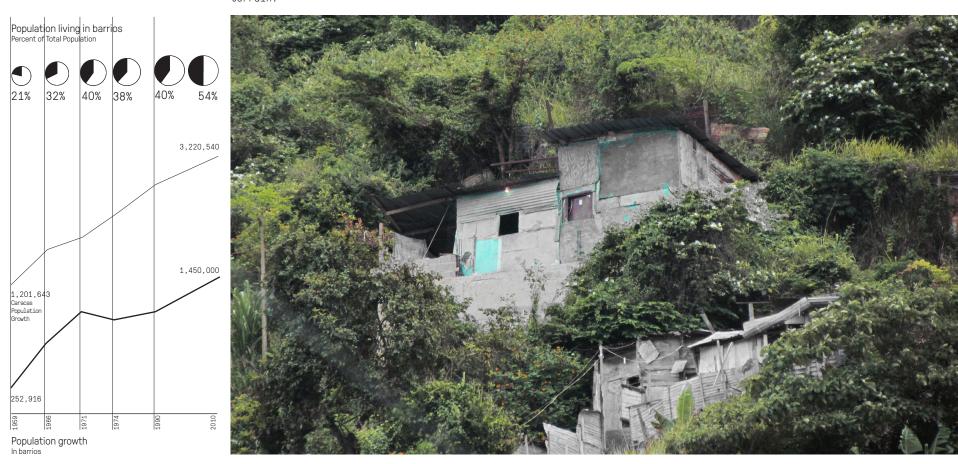


Caraqueños spend between 30 hours to 60 days a year on traffic²⁰

The extensive road network was only part of the ambitious infrastructure projects sponsored by oil. During the Pérez Jiménez regime between 1952 and 1958, 350 million bolívares, more than 15% of the total oil exports for that period, were invested in infrastructure in Caracas¹¹. This massive modernization project included the construction of the main port and airport of La Guaira on the Caribbean sea, several major highways, including two tunnels connecting Caracas to the coast and Venezuela's stretch of the Pan American highway; water and hydroelectric infrastructure; hospitals, schools, parks, and 20.000 subsidized housing units¹².

Unskilled labour from the countryside and the specialized workers that emigrated from Portugal, Italy and Spain after WWII were temporary employed to dig tunnels, pour concrete and lay pipelines to build the infrastructure meant to support the underestimated population growth of the city. Together with these efforts to modernize Caracas, the government forcibly prevented the formation of new barrios, cleared others and built housing units for more than 180,000 people. This did little to accommodate Caracas' growth. By 1958 the barrio population was 220,000¹³; 21% of the total population of Caracas. While the edges of the city expanded with residential areas both formal and informal, the centre rose with commercial towers.

Figure 009.
As barrios expand, the land that remains available is on steeper terrain.



invasión

Invasions are a physical appropriation, albeit not a legal acquisition of a plot of

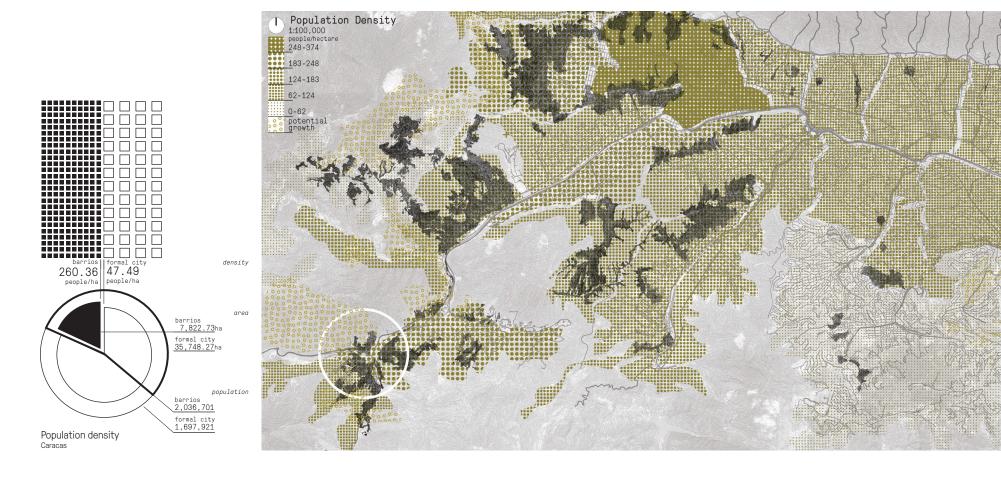
Shack in barrios that is usually made out of recycled construction or packaging materials, plywood, corrugated zinc, and plastic

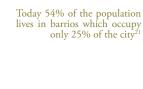
It is three in the morning when they are finally ready. A feu families in a borrowed truck move the little they have to the hill that will be their new home. In the dark they clean the lot and put up a tarp. With the morning sun comes the police. A few are arrested, but elections are coming and no one feels like fighting. The new neighbors stay; they have just traded flooding for landslides.

Most of the still growing residential areas are informal. Barrios start with an invasión, the illegal occupation of a plot of land that belongs—or once belonged—to the military, the national and municipal government, or a private entity. Depending on the agenda of the local and national government of the time, these invasiones are either tolerated or the land is cleared by local police or the National Guard, often repeatedly as houses are reconstructed overnight. Many of the people that migrated to the city in the early 1920s were from the Andes region and accustomed to terracing the sides of the hills for cultivation. They used the same method to occupy the hills of Caracas and it is still done this way: the terrain is cleaned and flattened before a rancho is built.

Once a barrio is settled, even without official property documents, it is very unlikely that the land will be vacated. Many barrios were founded more than sixty years ago, and their residents are not more likely to lose their house to expropriation than any other homeowner in the formal city. Still, efforts have been made to regularize land ownership in barrios. One legal mechanism that has been timidly used instead of a legal land title is a 'titulo supletorio', which is a property document granted without the consent of the owner of the said property¹⁰⁴. It is symbolic at most, but it gives a family an address and a document that can be used to apply for services or loans.

Figure 010.
Barrios are in the areas of higher population density in the city, and also close to the future areas of expansion.

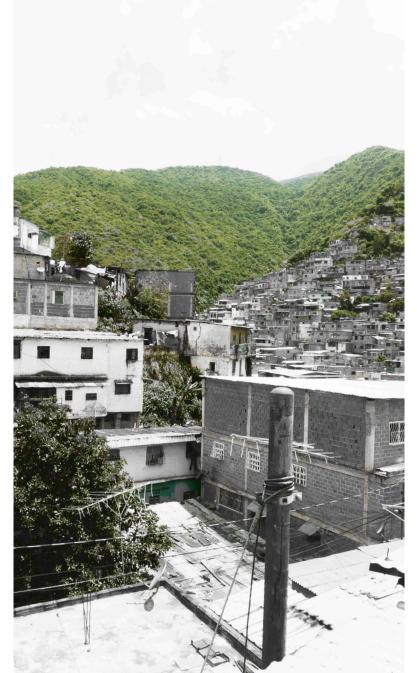


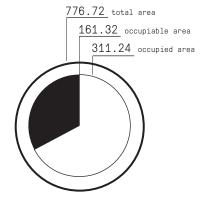


For years, national and municipal governments have used, in different proportions, three fundamental approaches to barrios: relocation, new housing on a former barrio site, and habilitating existing barrios with services, roads, churches and schools. Relocation was specially common in the late 1950s when mass housing blocks were built by the national government in an attempt to eradicate barrios. When the land of a former barrio was strategically located within the city, the solution was to clear the site and substitute the barrio with new housing units, not always for the same demographic that previously occupied the site. The third strategy, which also started in the 1950's in more established barrios, aimed to provide basic services, roads, recreation spaces and transportation for existing settlements¹⁵.

Today, the barrios at the edge of Caracas are the areas with the highest population density in the city. Within these peripheral areas, the local government has identified zones of potential formal development, however, no further zoning, accessibility or service plans have been pursued. With a growing amount of displaced families due to natural disasters, an annual population growth rate of 1.4% and the high prices of land and real estate in the city, existing barrios will inevitably keep growing and new ones will be formed.







Built Area

Figure 011.
There are still a few pockets of unoccupied land that will eventually be occupied.

57% of caraqueños take public transit²²

When the hills are populated by informal settlements they are called <u>cerros</u>, and when similar hills are filled with high class neighborhoods they are called <u>colinas</u>.

She has been stuck in traffic for half an hour now, the bus is hot and packed and she sweats as she holds her purse tight. It will be at least another hour before she gets home. When the bus finally arrives to the subway station she will take the equally crowded train that goes east to the end of the line for forty minutes. After climbing the steps that lead to her house for another twenty minutes she will finally be at home.

The valley of Caracas has slowly filled. The city's centre sits in a valley of roughly 20 km long by 2,3 km wide. The city has extended formally to the gentler hills of the south-east of the valley, and informally to the steeper and more remote hills. In 47 years between 1940 and 1987, the city went from an average height of 820 meters to 1,450 meters ¹⁶.

Some barrios in the main valley formed on flat land under bridges and highways and around creeks, but the vast majority of them are on the hillsides. These hills are flanged by deep valleys, ravines and rivers which are usually also covered by houses.

Caracas' steep slopes make procuring everything—land, construction materials and basic services—significantly arduous for barrio residents. In these barrios, pathways become steep stairs and houses cantilever over unstable soil. The same hills that made *invasiones* and further settlement difficult make the daily life incredibly strenuous. Living on the hill means getting very little or no water, climbing tens of floors a day and experiencing frequent landslides.

Incidental forces of economy and geography have influenced Caracas' urban fabric more evidently than any national or local government, official urban plan or by-law. This process has created a city that is at the same time rich, dense and chaotic.

Tending the Land

Land's pragmatic and symbolic value increases when it is connected to services. In Caracas, where land is scarce and infrastructure inadequate, this value increases incalculably.







Figures 14-21. Stairs in Las Adjuntas

Like many other barrios in Caracas, Las Adjuntas has grown to encompass low and flat lands next to formal developed areas, and many of the hills that surround them. Without many roads, the dense urban fabric that lines the river and fills the hills is accessible only by foot. Through steep stairs and uneven steps people climb up to twenty five floors to get to their houses.

The built fabric has grown tightly around an industrial zone situated on former sugar plantations¹⁷. The first barrios in the area formed around 1950, lining the road that was the only connection to the industrial cities of Aragua and Carabobo.

In the 1960s, the construction of the Urbanizacion Kennedy¹⁸, a mass housing complex that included new roads and water, electricity and sewage made some of the surrounding hills more accessible; these were subsequently and rapidly covered by barrios. The expansion of the subway line in 1987¹⁹ made Las Adjuntas substantially more accessible from the city centre. The area has continued to grow, and the few hills that had remained vacant because of their location and steep terrain, are now slowly filling as the barrio keeps expanding.

Back in the plains, before the sun and the rooster rose, he had cared for the land and lived off it. In the city, cultivating the land is still the only means of survival. Only here, instead of

plowing, he builds.

Project 1 addresses the continuous growth of the barrios and the land they will soon occupy by offering basic infrastructure and civic spaces.







The proposed infrastructure combines multiple systems. It preforms as aqueduct, sewer and electric line: cistern and dump; path, bridge and landmark. The intervention is placed in the currently empty hillsides where the barrios are quickly expanding, and where the soil is considered moderately stable. The spine of services, public buildings and civic spaces acts as a framework for growth that is itself developed in stages as the barrio expands.

Each spine is located in the many ravines that cover the mountain. These areas are especially vulnerable to landslides when frequent torrential rains drain through them towards the Macarao River. Acting as a retaining wall, the infrastructure is built into the mountainside to allow for water flow absorption. Additional mechanical anchors are used to stabilize the soil around the ravines and extended to prevent construction in high-risks areas.

The intervention collects rainwater and stormwater that falls on roofs and flows through paved paths and stairs in the barrio itself. After water is collected, it is filtered and pumped back into the municipal water system to increase the short and sporadic water supply coming from the city. Waste is collected and compacted to be easily transported to the closest street to small transfer facilities managed by the municipal waste service. The path also carries water,

electricity and sewage pipes and provides safe and legal connections to this services for the surrounding houses in each node.

This intervention recognizes that new barrios will keep forming, and existing ones will expand when land is available. It anticipates their growth with proper infrastructure but without the rigidity and speculation that characterizes formal development. It is easily replicable and adaptable as it allows for incremental growth that can follow the particularities of each existing and future barrio and its land.

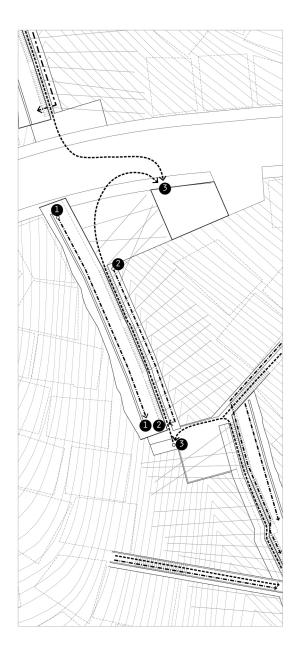
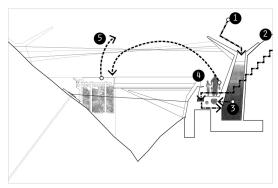


Figure 023. Resource flow diagram 1:700 Figure 024. (opposite) Site Plan 1:1400

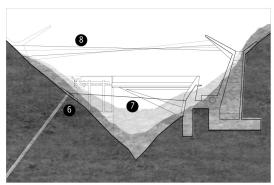
Rainwater and Stormwater flows
 downhill where it is added to the municipal system or it can be drafted via a public tap in each node

Waste is collected in each node and transported to the closest road to a municipal pick-up station

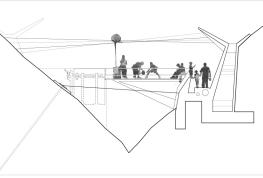




Systems



Prevention

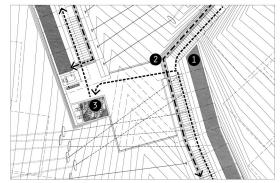


Occupation

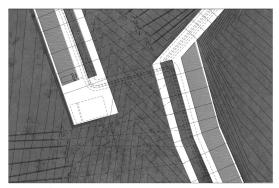
- Rainwater is collected along the infrastructure
- 2 Stormwater is collected from roofs and streets runoff at each node
- 3 All water is filtered and added to the municipal water system to supplement incoming water sources and increase pressure
- Waste is collected and compacted in each node
- Once compacted waste is transported to the closest municipal pick-up station accessible by the municipal collection services
- 6 Soil anchors stabilize the land in the ravine.
- Cables are extended to reserve the area of the ravine and avoid construction in high-risk areas
- When cables are close to public space they are used as supporting structure for a canopy

Figures 25-28. Sections 1:400
Figure 028. (opposite) Section CC 1:100

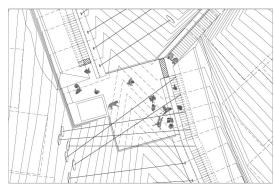




Systems AA



Prevention BB



Occupation CC



Figures 29-32. Plans 1:400 Figure 032. (opposite) Plan AA 1:100

 $260 \; \text{people/hectare}$

2 nodes/hectare 130 people/node

water needed for drinking, cooking and cleaning

20 1/person/day 78,000 1/node/month

water needed for social and economic development

120 1/person/day

468,000 1/node/month



Rainwater Catchment 76.7 mm average monthly rainfall

with 50 linear meters of collection/node

2,300 m2 collection area

with a collection efficiency of 0.9

23,277 total 1/moth



Stormwater Catchment

76.7 mm average monthly rainfall

0.5 hectare/node

with a collection efficiency of 0.5

50,603 total 1/month

 $73\,\text{,}\,880\,\tfrac{\text{Total Water Collected}}{\text{1/month}}$



2.18 kg/waste/person/day (no recycling) 1.27 kg/waste/person/day (recycling)

Waste Collection

10.8 m3 compactor capacity

966 kg (not compacted) 3,311 kg (compacted)

total waste produced per node

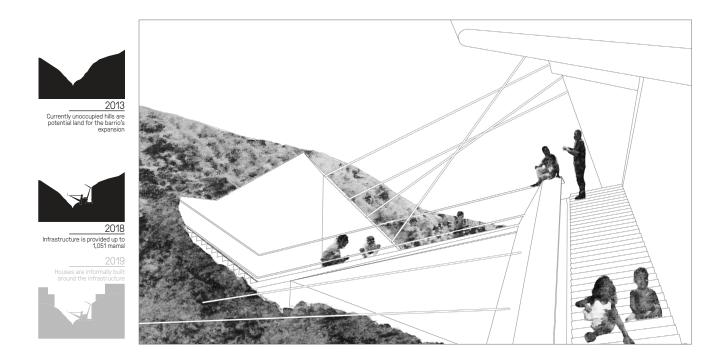
566.8 kg/per day (without recycling)

165.1 kg/per day (withrecycling)

6 days between collection 20 days between collection

(with recycling)





2023 Infrastructure is provided up to 1,131 marrisl

Figure 033. View, 2018

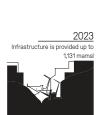


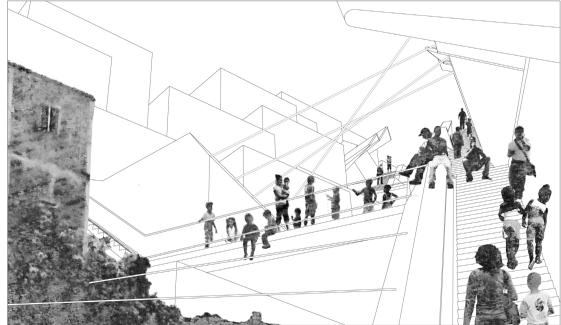
Currently unoccupied hills are potential land for the barrio's expansion











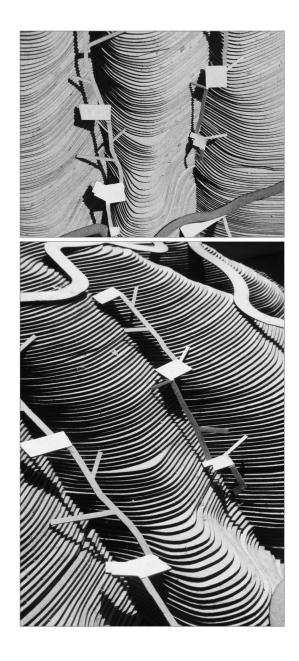
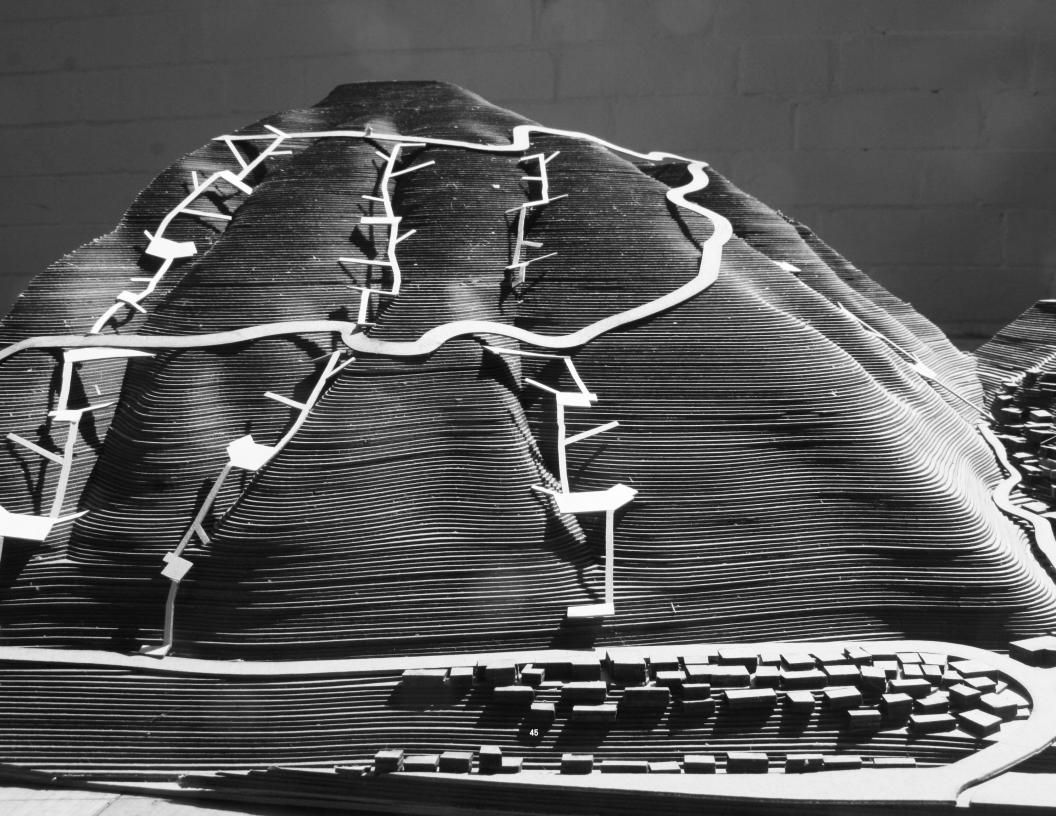


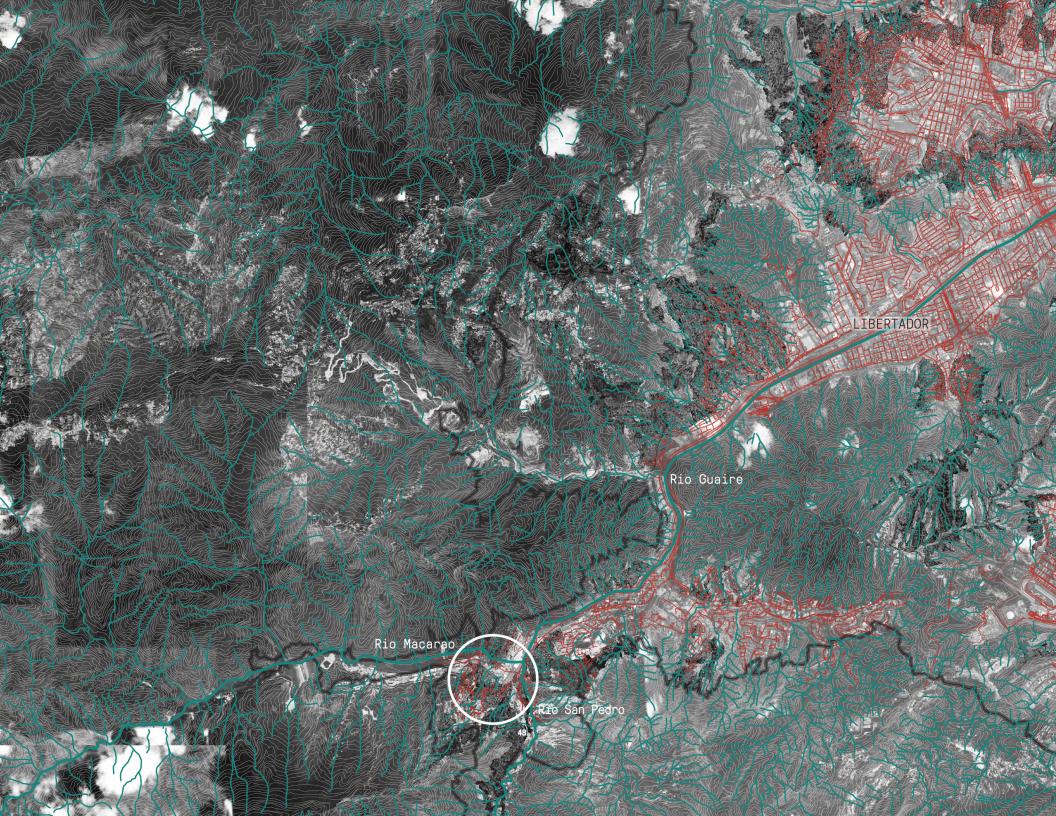
Figure 35-36. Detail Site Model Figure 37. (opposite) Site Model



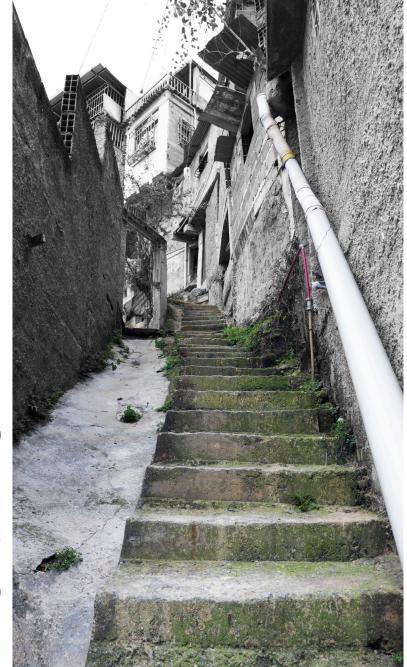


Water and Waste

Access to running water and waste management services is directly related to the topography of the valley of Caracas which is, in turn, a demographic striation of the city.







Household served by Water Infrastructure
Percent of Total Population

formal city
98%

barrios
86%

truck or public fountain
running water

40% 72% 83% 88% 91%

64%
of the total
water consumed
is not paid for

water deficit
30%
water lost
25%

Water Use Percent of Total Water Used

Figure 40.
Most households in the city are connected to the water distribution network, yet, only less than half of them currently pay for water.



Caracas runs on markedly inefficient water infrastructure and waste services: in order to serve the valley, water must travel more than 1,000km¹ vertically and 130km toward the city, while waste is transported at an average speed of 17km/h² for more than 70km to the landfill.

Despite frequent water rationing, the formal areas of the city that are located in the valley have a relatively constant water supply. On the hills, however, running water is increasingly scarce, and even though 82%³ of the city's population is connected to the municipal water system, there is not enough water entering the city to constantly supply the hills. Barrios located in elevated sites and distant from the city centre require an extensive pipe network with very high water pressure. This makes it particularly onerous to bring water to these locations⁴. This explains the water shortage not only in the barrios but also in the formal city—without increasing the amount of water that comes into Caracas or reducing its use, the current volume of water is further divided among a growing population. Like electricity and sewage, the limited volume of water that enters the barrio is mostly diverted illegally from the closest main water pipe to an improvised network of secondary and tertiary pipes that run on the surface of streets, pathways and stair, weaving its path in and out of houses.

Figure 41.
Major deficiencies in water supply have forced households to find expensive alternatives to secure potable water.

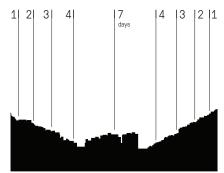
Cost of Water Bs.F./20L

running water 0.3

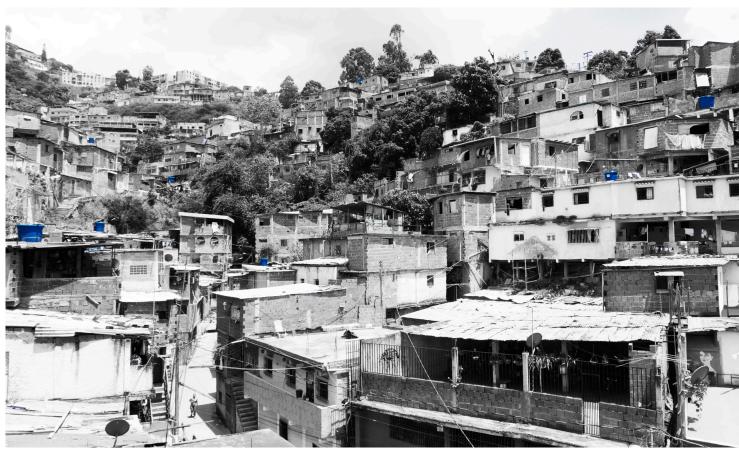
water truck 1.5

water truck

7.4FBs.F hourly rate for a minimum wage of 1,780.45Bs.F. per month



Current Water Supply days/week





The myth of bottled water being more expensive than gas is actually truth. A liter of gas is fifty times cheaper than a litter of water. <u>Gas is</u> subsidized, water is not

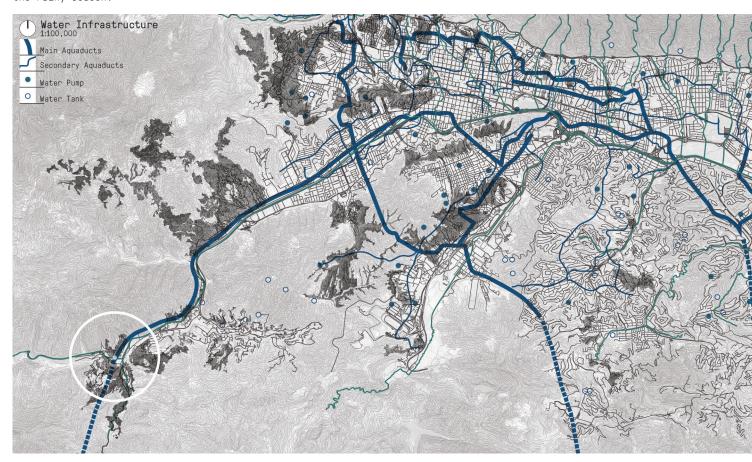
They have been waiting for two weeks for the water to come.
When it does come it runs carelessly: clothes and shoes are washed, houses rinsed, plants watered, and tanks filled. A whole week worth of water can be spent in a day.

The augmentative of *hotella* (bottle) this 20 liters plastic or glass jug is a common way of getting drinking water.

The main system of aqueducts that today feeds Caracas was built in the 1950s⁵. Since then, a few more aqueducts from different sources have been added to serve newly developed areas of the city. Pumps and filtration stations are distributed in the main valley. In 1966 the national government made the use of water tanks obligatory for every registered household. This measure was meant to be temporary as a new water distribution network was built to guarantee a constant supply⁶. Today, the service is still irregular, and many households in barrios have plastic tanks that are provided by local governments. These tanks populate the rooftops and are filled when running water is available. Other communities that do not get regular water supply are served by cistern trucks of 10,000 liters. Speculation often determines the price of this service and the water is poured into oil drums or water tanks. In areas not accessible for trucks, water is carried in buckets and on foot.

Authorities affirm that tap water in Caracas is potable. Studies on water quality are not available and most people, regardless of their income, do not drink tap water without boiling or filtering it first. Because natural gas is inexpensive, boiling water is a common practice. *Botellones* can also be bought at relatively high prices in groceries stores or delivered by trucks. The higher up the hill bottled water is bought, the more expensive it is.

Figure 42.
The many creeks in the city are also dumps and sewers which increase the risk of flooding in the rainy season.



RACIONAMIENTO DE AGUA EN CARACAS DURARÁ SEIS MESES DESDE NOVIEMBRE DE ESTE AÑO

LOS HABITANTES DE CARACAS SE PREPARAN PARA CORTES DE AGUA DE HASTA 48 HORAS, QUE SE PROLONGARÁN DE NOVIEMBRE HASTA PRINCIPIOS DE MAYO. EL GOBIERNO AFIRMA QUE SE DEBE AL CLIMA Y LOS OPOSITORES A LA FALTA DE INVERSIÓN EN INFRAESTRUCTURA.

EL COMERCIO, 30 DE OCTUBRE DEL 2009

WATER RATIONING WILL LAST SIX MONTH STARTING ON NOVEMBER OF THE CURRENT YEAR

The population of Caracas is getting ready to face water cuts of up to 48 hours that will run between november until the beginning of may. The government affirms that it is caused by the weather and the opposition argues that it is because the lack of investment in infrastructure.

EL COMERCIO, OCTOBER 30, 2009





Water rationing depends on annual and seasonal rain trends. However, the same rain that fills lakes and reservoirs and provides water to Caracas also causes landslides and floods.

Many of the hills and ravines that were once forested are now covered in barrios. This improvised urbanization, devoid of proper drainage when combined with the heavy rains of the winter season, causes landslides in the hills and flooding in the lower areas. The frequent use of creeks as dumps obstructs the natural water runoff, which greatly increases the risk of flash floods.

Caracas has no dedicated stormwater system or effective sewage processing. Although 98% of the city is connected to the sewage system, only 50% of the sewage water is treated before reaching the Caribbean sea⁷. Stormwater and sewage water that come from both the formal and informal areas is directly dumped to the Guaire, the main river of the city, as it flows East. Sporadic efforts have been made to connect the sewage system of the city to collectors that travel alongside main rivers, but the existing pipes constantly leak and often overflow with the heavy rains.

When it rains hard for days, the streets become rivers and the rivers flood to become lakes. If they could only change buses for boats and umbrellas for paddles.





QUEMA DE BASURA SE HACE COMÚN

EN CATIA SE RECURRE A ESTA PRÁCTICA ANTE LAS FALLAS EN EL SISTEMA DE RECOLECCIÓN

EN LOS BLOQUES DE LOMAS DE URDANETA, IGUAL QUE EN TODA CATIA, CADA VEZ ES MÁS COMÚN QUEMAR BASURA, UNA PRÁCTICA QUE EN EL PASADO FUE PROSCRITA POR MOTIVOS AMBIENTALES Y DE SALUD PÚBLICA

JAVIER BRASSESCO. EL UNIVERSAL. MIÉRCOLES 24 DE FEBRERO DE 2010

BURNING GARRAGE IS NOW COMMON

In Catia people turn to this practice to face the failure of the collection system

IN THE BUILDINGS OF LOMAS DE URDANETA, LIKE IN THE REST OF CATIA, IT IS MORE AND MORE COMMON TO BURN GARBAGE, A PRACTICE THAT IN THE PAST WAS PROHIBITED FOR ENVIRONMENTAL AND PUBLIC HEALTH REASONS

JAVIER BRASSESCO. EL UNIVERSAL. WEDNESDAY FEBRUARY 24, 2010



Figure 43.
With a very inefficient waste collection service even waste that accumulates in areas accessible by waste trucks are often burnt.



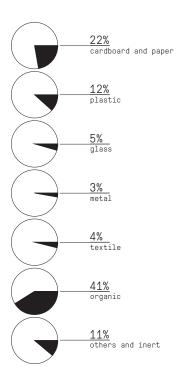
The National Government provided all water and waste services for free until 1989. After a major economic crisis in the 1980s, all public services were restructured and decentralized, and Hidroven, a staterun company, along with its subsidiaries, were created to manage all water services. Water has since being expensed, but the annual budget has never matched the total annual operational costs⁸. Not only did the population grew above all predictions, rendering the current distribution system outdated before it was completed, but the network currently yields losses of more than 30% of the water volume it moves⁹ due to a lack of proper maintenance.

In 1935, Caracas inaugurated the Aseo Urbano y Domiciliario (Urban and Domiciliary Waste Management) the first waste management agency in Venezuela. Until then, and much like today, garbage was burned in backyards or small barns where small animals were raised. Collection was a daily service in the city's formal residential areas and even around some of the central barrios¹⁰. Many of the ministries concerned with public health and infrastructure were also created during this period, including the Ministerio de Sanidad y Asistencia Social (Ministry of Sanitation and Social Assistance) in 1936 in an attempt to address the most common causes of death: gastroenteritis and tuberculosis¹¹.



Total Waste Collection ton/year

1,629,000



Waste Composition Percent of Total Waste

Figure 44. With no municipal recycling program all waste collected goes to the landfill.



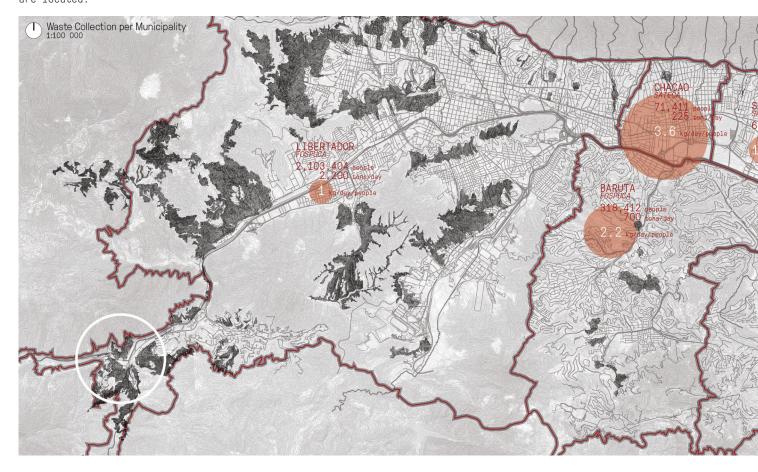
Caracas generates 16% of the country's total waste and with 1.45 kg/capita/day, it is the city with the highest garbage production in Latin America¹². There is no municipal collection or processing of recyclables nor compost in the city. Currently, all collected garbage is taken to the landfill La Bonanza, located 70km away from the city centre. Of the two transfer stations intended to compact the waste for efficient transportation to the landfill, only one is currently working, making the system considerably slower.

Even though no municipal recycling is in place, many materials like plastic containers, glass bottles and tin cans are reused in the kitchen, for plants or toys. Yet, unlike other countries in Latin America, no informal economy has emerged to collect and sell recyclables. A few smaller programs run by NGOs have recently tried to establish collection programs by which churches in central areas can sell sorted recyclables in large quantities but these have been met with little success.

Burning garbage is a common practice in barrios. With the increasingly deficient waste management system, this practice has recently become more frequent in the rest of the city. Garbage can sit outside for weeks until it is eventually burned inside garbage storage rooms, metal dumpsters, on the curb, in a park, or in an empty lot.

Every week so much garbage accumulates in the empty lot by the church that the smell is unbearable until, eventually someone decides to set it on fire. The smoke rises, the dogs bark, their food now charcoal, and the life of the street keeps on its course.

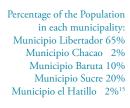
Figure 45.
Municipalities with less waste collected per person are the ones where the large groups of barrios are located.

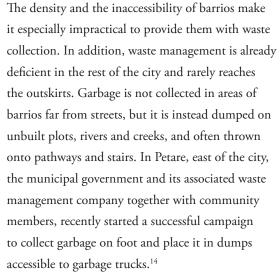


 $\frac{17}{\text{vehicular average speed}}$

An average of $\underline{500}$ trips are made daily to the Landfill La Bonanza

Waste Collection Caracas





Caracas' waste management is performed by five private companies that operate in the different municipalities of the Metropolitan area. Companies currently collecting less garbage per capita work in the municipalities with the highest population density. This is most likely due to a combination of lower garbage production and collection in barrio areas, but no further data is available.

Urbanization in Caracas has outrun its own water infrastructure and waste services and most barrio areas lie outside current water distribution and waste management zones. But unlike water infrastructure, waste services are not easily co-opted and hence its effects are more visible.



Public Water Common Waste

Water and waste infrastructure are desperately needed in both the formal and the informal city. By making these public they also become civic.







Figures 47-49. Informal Dumps in Las Adjuntas Figures 50-58. Informal Water Networks in Las Adjuntas

Las Adjuntas gets its name from its location close the confluence of the San Pedro and the Macarao rivers, which form the Guaire, Caracas's main river. Both rivers cut through the mountainous and unpopulated areas west of Caracas. As they get closer to the city, they are lined with barrios and industrial buildings. The Macarao River was channeled underground to accommodate the subway line and replaced by a street known as El Rio (the river). This directed the seasonal floods to a site that currently has a dumpster and a basketball court and further west to the residential area that sits right on the river banks.

abasto:
small store that sells
everything from candy to
beer, cigarettes, water and
some perishables. The higher
up the hill the abasto is
located the more expensive all
items are.

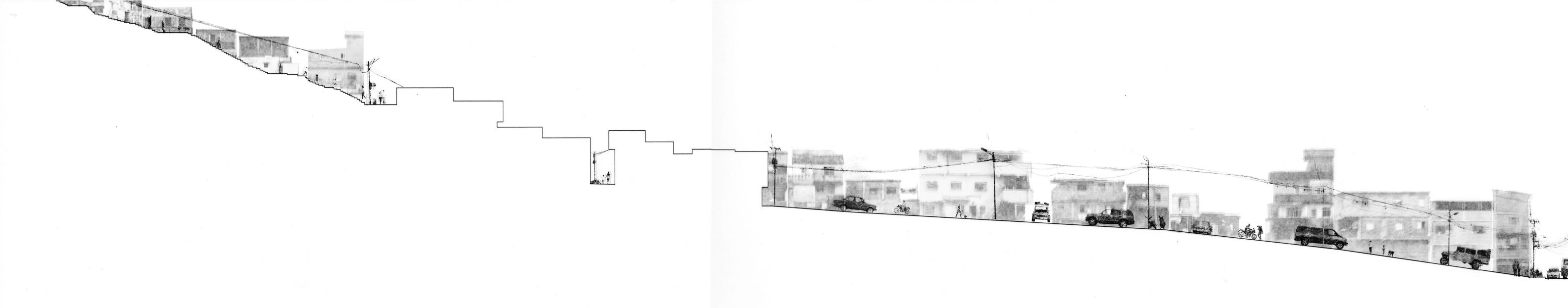
Close to the street El Rio, the main street of Las Adjuntas is lined by many *abastos*, religious stores, photocopying and internet shops, hair salons and food carts. There are also two open dumpsters whose garbage is sporadically collected and often burned. The waste collection route in Las Adjuntas runs along the main streets and the industrial areas, and up the hill through the housing blocks.

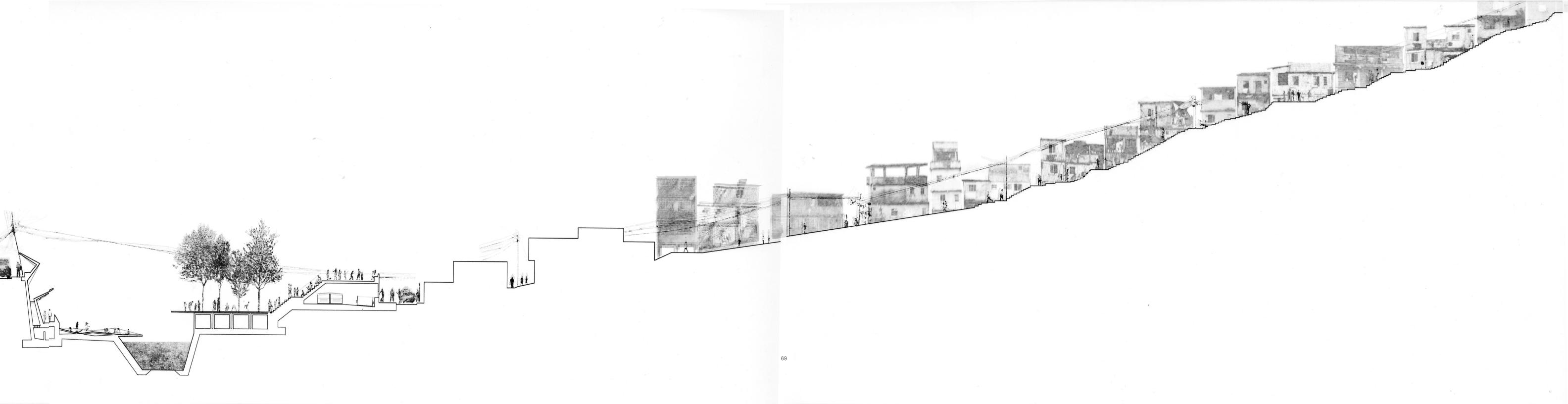
Project 2 proposes a flood catchment basin that doubles as a communal space and a recycling collection centre.

After work, they are welcomed home by dry pipes and empty tanks. The following morning they will be greeted by heaps of waste accumulating on the street as they make their way to work.

Figure 59. (overleaf) Section 1:200

 \triangleright



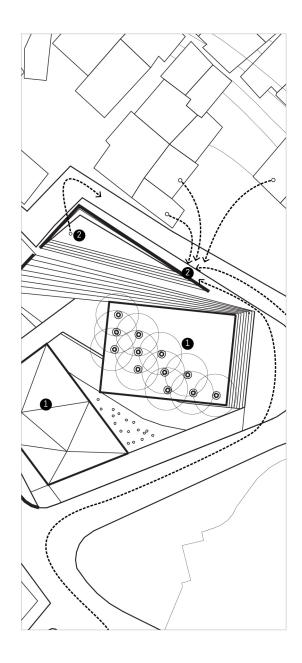




Beyond addressing the basic issues of their distribution and disposal, this intervention offers water and waste as catalyst of public programme. When shared, these activities serve both cities and further ratify barrios as permanent neighborhoods.

The project sits at the juncture of the formal area of Las Adjuntas and its dense barrios. It cleans, reserves and improves one of the few open sites located at the last section of the Macarao river before it joins the Guaire. The site floods in the rain season for a few days.

This scheme provides an emergency catchment basin to mitigate the sporadic flood of the river while supporting recent efforts to implement small recycling programs in Caracas by sorting and storing recyclables on site. The intervention also collects and filters rain water to be used in a public wading pool and a small planted park. Large areas around these two public programmes host traditional religious celebrations, community meetings and sports, and smaller gatherings. The project choreographs recycling collection schedules, traditional saint days, spinning top and basketball tournaments and river floods.

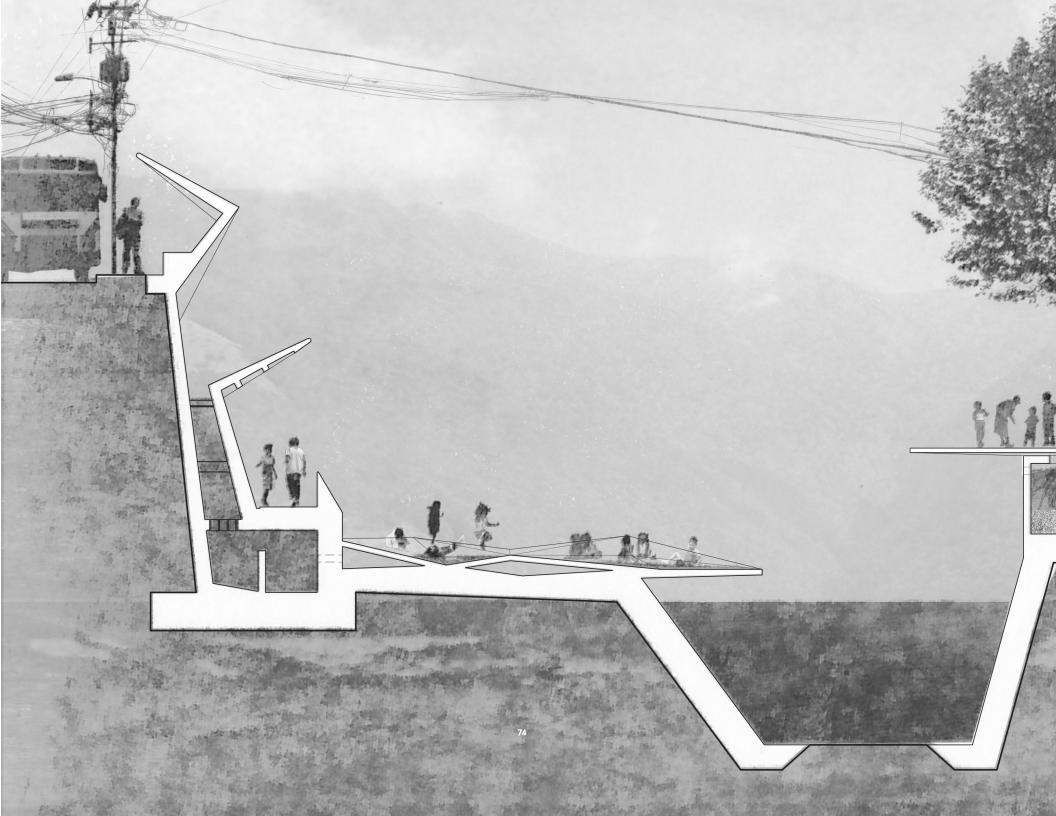


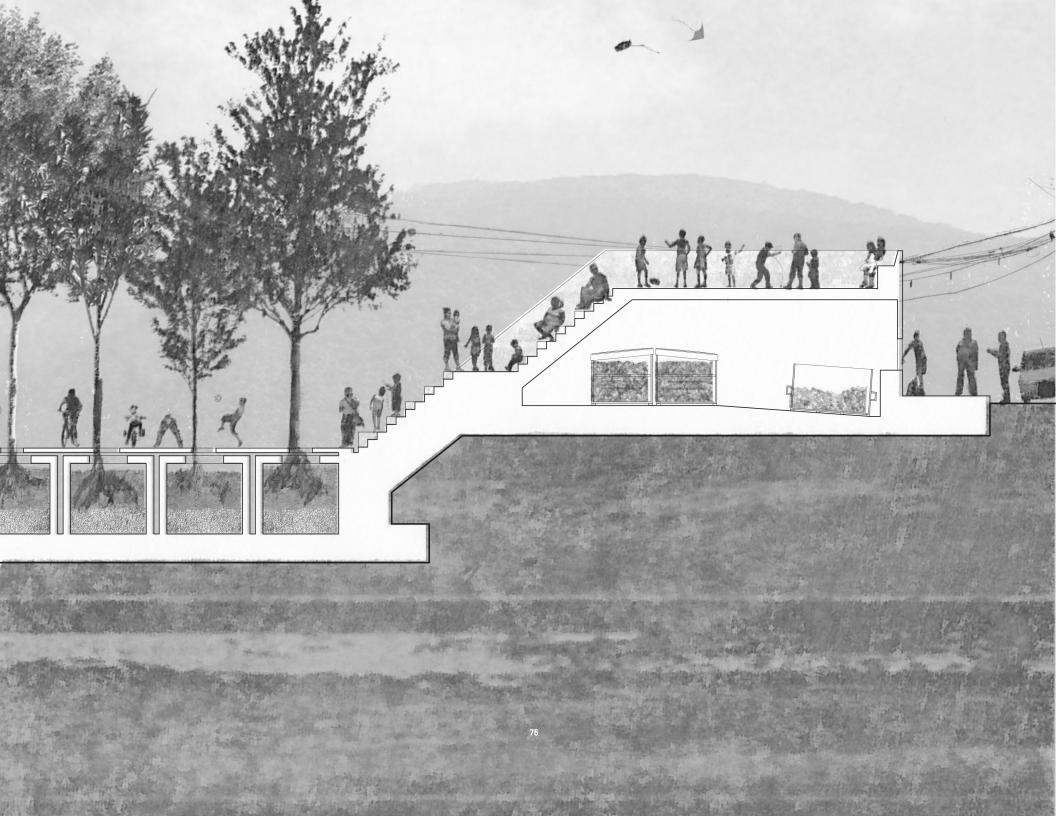
Rainwater is collected, filtered stored and used for the wading pool and irrigation in the dry season

Figure 61. Resource flow diagram 1:700 Figure 62. (opposite) Site Plan 1:1400 Figure 63. (overleaf) Section 1:100

² Domestic recyclables are collected from the barrios and the formal areas around the site

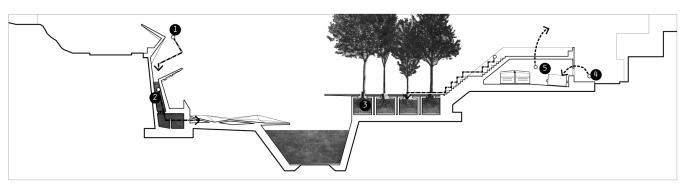




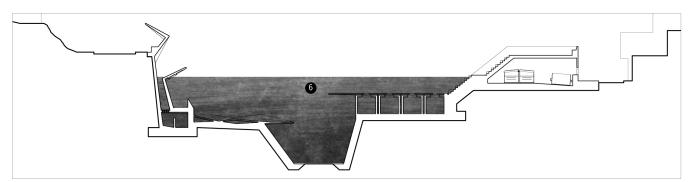


- Rainwater is collected, filtered
 and stored to be used in the wading pool and for irrigation in the dry
 season

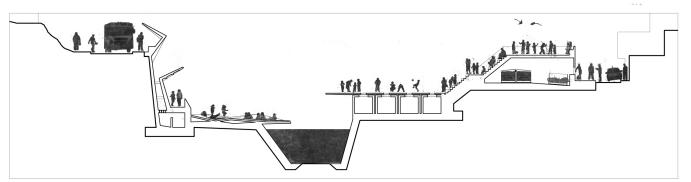
- Domestic recyclables are collected,
 sorted and stored to be sold for a small profit to fund the recycling operations and maintain the public spaces around it
- 6 The basin mitigates the effects of the sporadic floods of the river



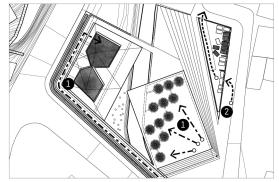
Systems



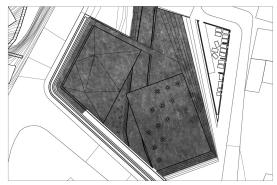
Prevention



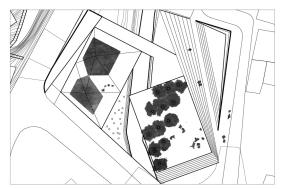
Occupation



Systems AA



Prevention BB



Occupation CC

10,000 people



Rainwater Catchment 76.7 mm average monthly rainfall

933 m2 collection area

9 , $442 \, \frac{\textit{with a collection efficiency of 0.9}}{\frac{1}{1/month}}$



Recycling
0.91 kg/recyclables/person/day
910 kg/recyclables/day

200 paper and cardboard (22%) kg/day

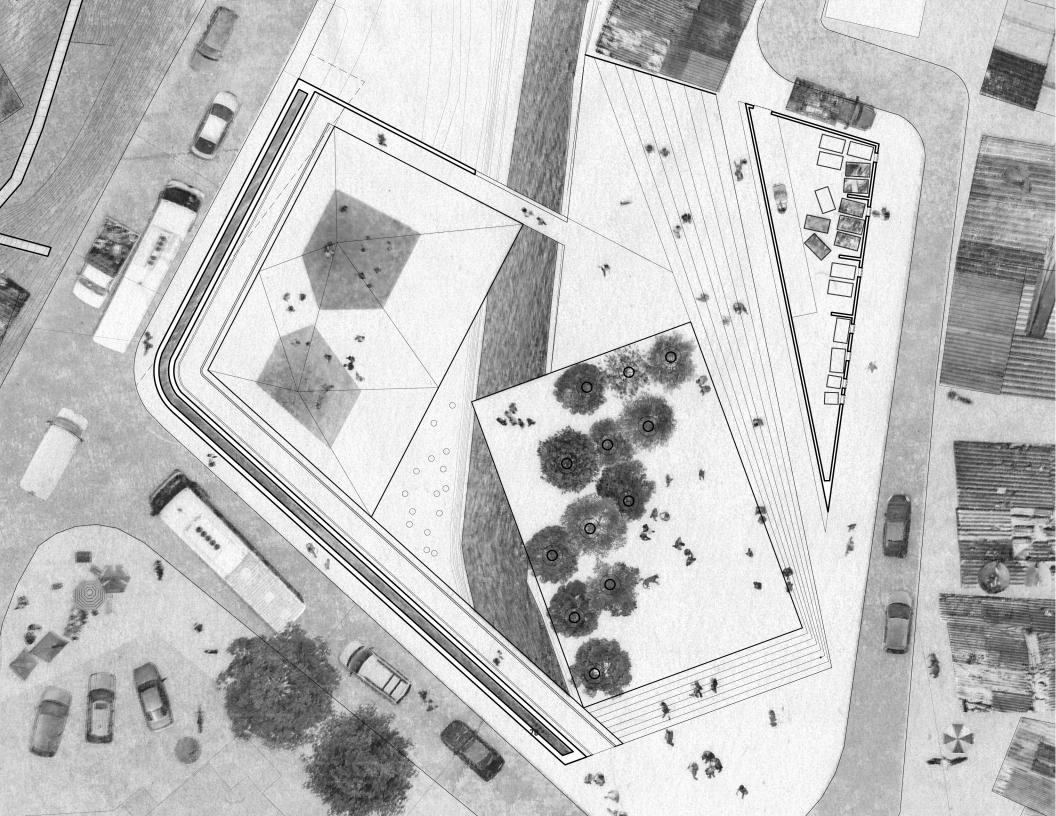
 $109 \ \text{paper and cardboard (22\%)} \\ \text{kg/day}$

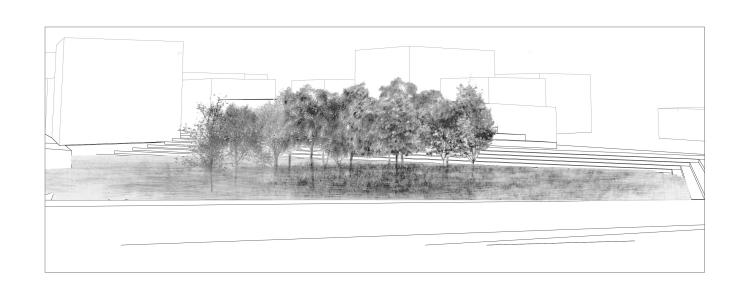
45 glass (5%) kg/day

27 metal (3%) kg/day



Figures 62-64. Plans 1:400 Figure 70. (opposite) Plan 1:200





With garbage incinerators in operation the dumpster is cleared and an emergency catchment basin is excavated





the effects of major annual floods are ameliorated

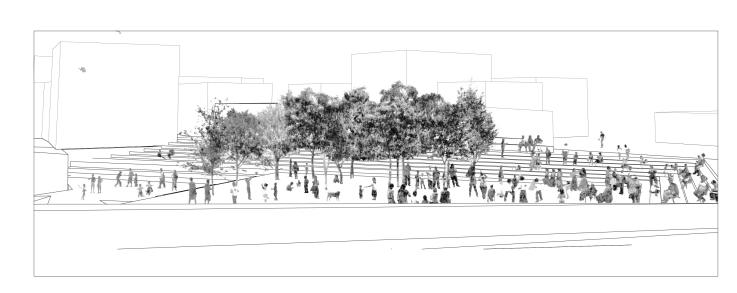








Figure 72. View of the basin during the San Juan festival

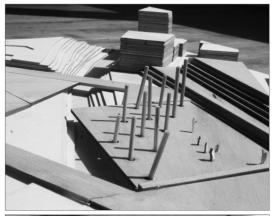
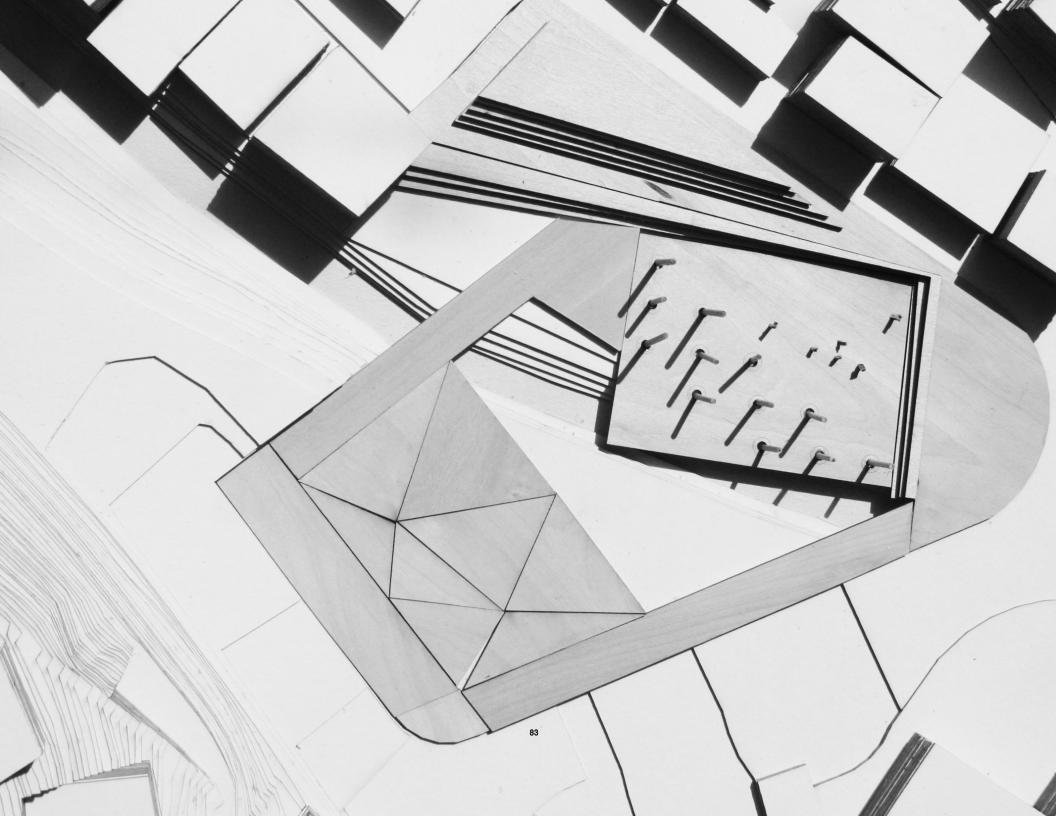




Figure 73-74. Detail Site Model
Figure 75. (opposite) Site Model





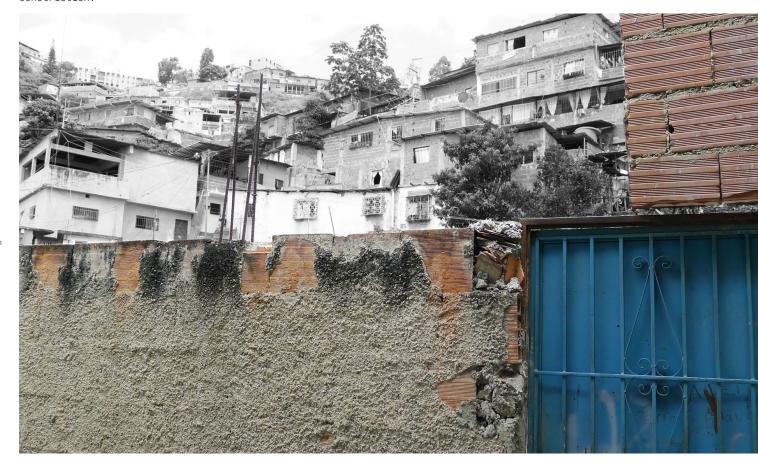
Concrete and Air

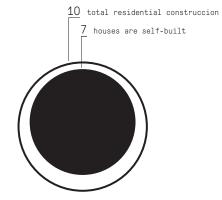
The modern Caracas is built on concrete; it is the symbol and substance of development. The city's relationship to air is instead more subliminal: air is the substance of culture.





Figure 78. Barrios are always under construction.





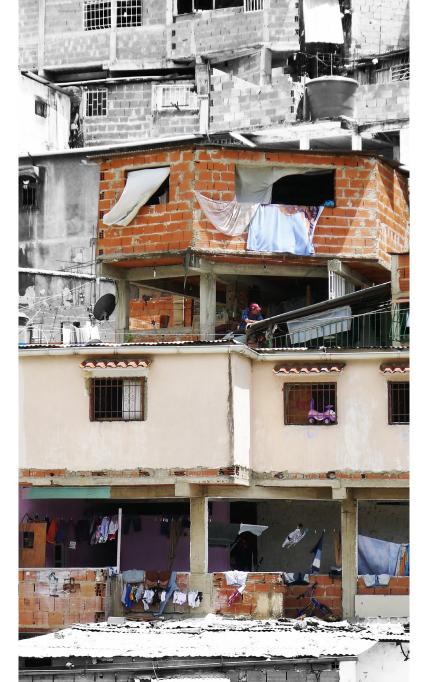
Construction Venezuela (1990-2001) The process of construction in a barrio starts with the cleaning and terracing of a plot of land. A *rancho* is later built out of discarded materials, corrugated zinc panels and plywood. Soon after, the shack will get electricity and running water and a sewage connection is also eventually procured. After months or maybe years, a concrete frame will be poured and eventually brick infill walls are built around the shack. These first walls might eventually grow to accommodate two, three or four stories. The speed of construction depends on the household's changing income and growth.

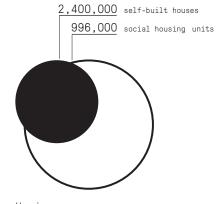
The house is usually built by the family and their close friends and neighbors. People with construction experience, and that usually live in the same barrio, are sometimes hired to help with more complicated tasks like pouring the concrete frame and stairs. If the family members work, construction is done on the weekends or in the evenings.

Many techniques and materials used in the construction of the formal city are also used in the informal settlements, since many of the construction workers live in the barrios¹.

He works the late shift as a security guard in the city centre.

Every day before he packs his dinner and leaves to work, he lays a few bricks on this one wall of the ground floor of the house. His mother waits to move to the second floor.





Housing Venezuela (1928-2000)

Figure 79.
The materials and process of construction is standardized, but no two houses are ever the same.

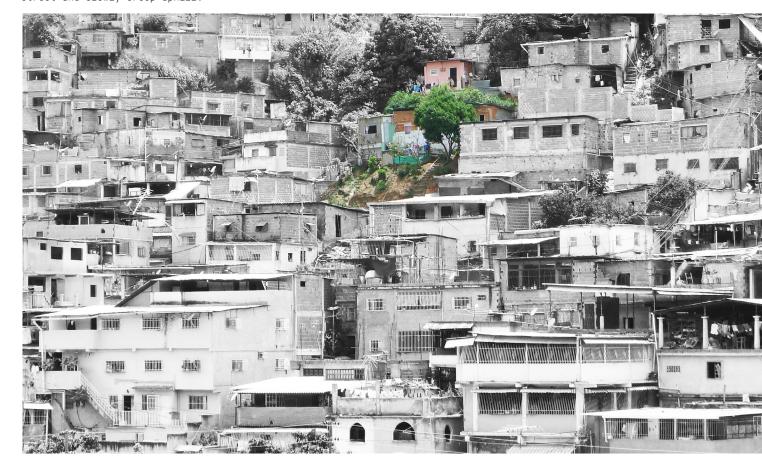
Houses are invariably built as a concrete frame with no foundations, clay bricks or concrete blocks infill walls, and a zinc or plastic panel roof. Concrete and brick walls are often coated with stucco and brightly painted on the inside. The outside of the house is considered less important, and usually only older homes and the houses surrounding main streets are brightly painted or finished with stone or tiles. With the exception of roofs, houses in urbanizaciones use the same concrete frame and brick infill system. Roofs in developers or government-built houses have pitched clay shingle roofs while most roofs in barrios are flat and composed of zinc panels.

Once a family has secured a plot and built a house, they usually stay for generations² and continuously invest an extraordinary amount of time, effort and money into their houses. Instead of decaying with time, barrios grow and develop: shacks become houses, changing zinc panels for brick walls, pathways are paved and stairs built, street lighting is installed and the many plants that overhang windows and balconies steadily grow.

They finally have the materials to replace the concrete shack they live in. They call a few friends and family. Next weekend, they will build a house while a sancocho (beef soup) cooks in the neighbor's kitchen. Beer and music will also be provided.

All materials need to be carried up the hill. A kid no more than eight carries bricks one by one up the narrow stairways. He places a foam cushion on his shoulders, hunches, balances the brick and start walking.

Figure 80. Barrios develop from the main street and slowly creep uphill.



middle and high class

| 60% 42% |
| poor (new, ascending and structural) |
| 40% 58% |

Poverty
Percentage of homes living in poverty

informal bus service that is a cross between a taxi and a bus. It has a predetermined route and leaves when all seats are full. They are usually old, large American cars or eight passenger jeeps for the more

Main Street: Barber shop Chinese restaurant santeria store hair salon hair salon hair salon internet abasto abasto shoe repair street food street food bar mechanic pharmacy pharmacy cakes women's clothes stationary

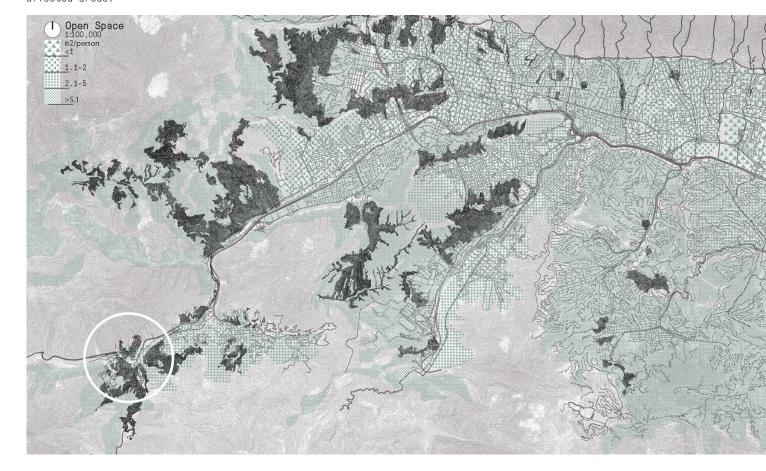
Besides topography, two main factors directly influence the built fabric of a barrio: its age and its connection to the city. Barrios grow outwards from the main street usually from the bottom of the hill up. In newer areas, further from accessible streets, the density and height of the built fabric is lower and its construction more precarious.

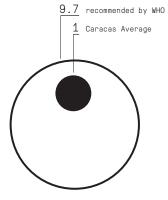
Most formal and informal employment sources are located in the formal city³. A barrio's connection by bus, subway or *por puesto* to the city centre is a determinant factor in the density of the barrio. The further away from accessible routes a house is, the least amount of public transportation and the steeper the walk is.

Location, similar to the formal areas of the city, influences real-estate transactions in a barrio. Illegally occupied lots are flattened and traded. Houses and rooms are rented and sometimes sold. In newer barrios, most houses are owned by their occupants. In more central and settled barrios, up to 40% of the population are renters⁴.

Most barrios are organized around a main street accessible by car where most of the services and small business are located. The rest of the barrio is composed of houses lining narrow paths and stairs, interspersed with abastos and bars. Many streets and most pathways and stairs are not named and houses have no addresses.

Figure 81.
There is little open space in the city, and with the high density of barrios, these are the most affected areas.





Open Space m2/person



The average noise level in Caracas is 80 decibels, the World Health Organization recomends a maximun of 65 decibel

The few large public spaces built in Caracas during the city's modernization projects of the 1950s were oblivious to the location of the more populated areas of the city. Not many new public spaces have been built since, malls have instead become the preferred places of recreation. These too are in the formal city. The high density and the abrupt topography of most barrios limit the amount of traditional public space. Instead, people stop and talk on street corners, in front of abastos, bars and schools. On Saturday and Sunday afternoons, the neighbors pull out a few chairs and chat while kids play outside. Many other shared activities happen in the streets: traditional religious festivities, improvised cooking, playing and dancing, weddings and baptisms, and other celebrations that sometimes include the whole barrio. The construction of stairs and pathways, water pipes, sewage and street lighting are organized by neighbors, sometimes with the help and materials from the local or municipal government or loans secured by a community group. Cooperation to procure shared infrastructure is more common in new barrios, when working together with neighbors seems more urgent and the benefit is clear.

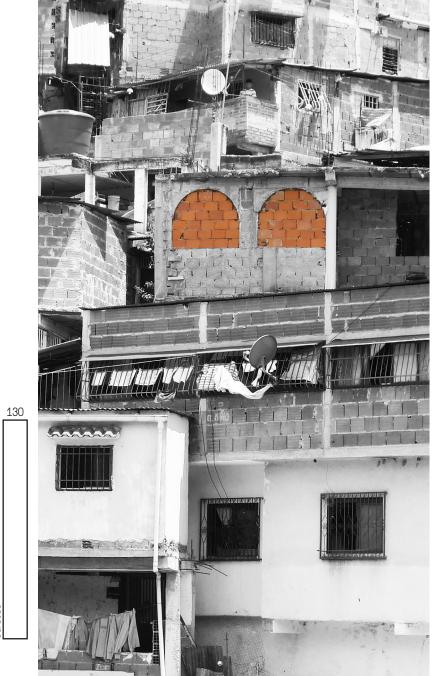


Figure 82. All windows have bars or have been recently blocked.

Violence murders/100,000people

9.5 autiago

The diverse culture of the barrio that by necessity happens in the street blends with a set of social problems that are also reflected in the street life: violence related to gangs, drugs and alcohol abuse, high rates of unemployment, which are exacerbated by low levels of literacy, that although not exclusive to barrios are often augmented by a very high population density and low income.

Caracas is currently the Latin American capital with the highest per capita murders that for 2011 represented 19,336 deaths⁵. Most shootings are between gangs formed by young men between 16 and 22 years old⁶.

House robbery is also common and all houses both in the formal and in the informal areas of the city have bars on the windows. This has been common for many years, but today, many barrio residents have decided to block existing windows or not to leave any openings on new walls facing the street.

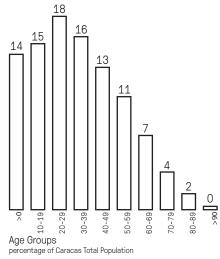
The commonplace violence dramatically affects the way people use the street. Barrio residents navigate the same route to and from their house, the main street, the abasto and their friend's house. Imaginary borders between different barrios are not usually crossed, and the only interaction between them is limited to the main street or special events like sports or traditional celebrations.

He is the only one in the street with a flat screen TV, a video game console and a brand new motorcycle. He is also the only one with two guns and a few bricks of crack cocaine to sell.

He used to drive a porpuesto.
He was good at it too, turning
sharp corners as if he were
driving a motorcycle. While
parking it one night before the
walk home, he stood in a bullets
path. It might not have been for
him, we will never know, but
in this city bullets are like rain.

Figure 83. Venezuela is a young country. Kids grow up playing in the small alleys and on rooftops.





platabanda:

construction term for a concrete slab, now commonly means the last floor of the house that usually serves as recreation, storage and laundry room. Barrio houses have no front or backyards. Instead the last floor of many houses double as outdoor space. Completely or partially roofed, platabandas are the space for pets, laundry, storage and play. With an average of six people per house⁴, they are highly valued and persist over additions to the number of family members sharing the house and renovations or extensions.

Given the high population density, the air itself is contested in the barrios. Houses with cantilevered second and third floors hover over pathways and stairs almost touching their neighbors. Houses closer to an accessible street get the constant smog of busses in traffic. Higher areas can be close to a dump or a polluted creek. For the whole barrio though, air carries the sound of drunk fights, kids playing, loud music, and gun shots. But air is also a playground. A very common pastime among kids, even today, is flying kites. Made out of light bamboo sticks found in creeks and ravines, and garbage bags, kites are flown off rooftops, pathways and stairs. From the street they are often spotted caught on electric wires.

Spinning tops, marbles and other traditional games that require little space are also very popular among both kids and adults. Championships are organized and winners celebrated.

In a city that constantly builds itself up, air is one of the only potential sites for escape.

Platabanda:
Dog
Parakeet
Washer
Votive Altar
Laundry
Construction materials
Tortoise
Chairs
Table
Water buckets

Their teenage son got in trouble, trouble that will chase the whole family out of the house she built and lived in for the past twenty years. She will have to start again, and so will he.

Playing with Air

Air in Caracas is as valuable as Land and yet, because it is elusive, it is also more democratic.







Figures 80-90. Informal Occupations

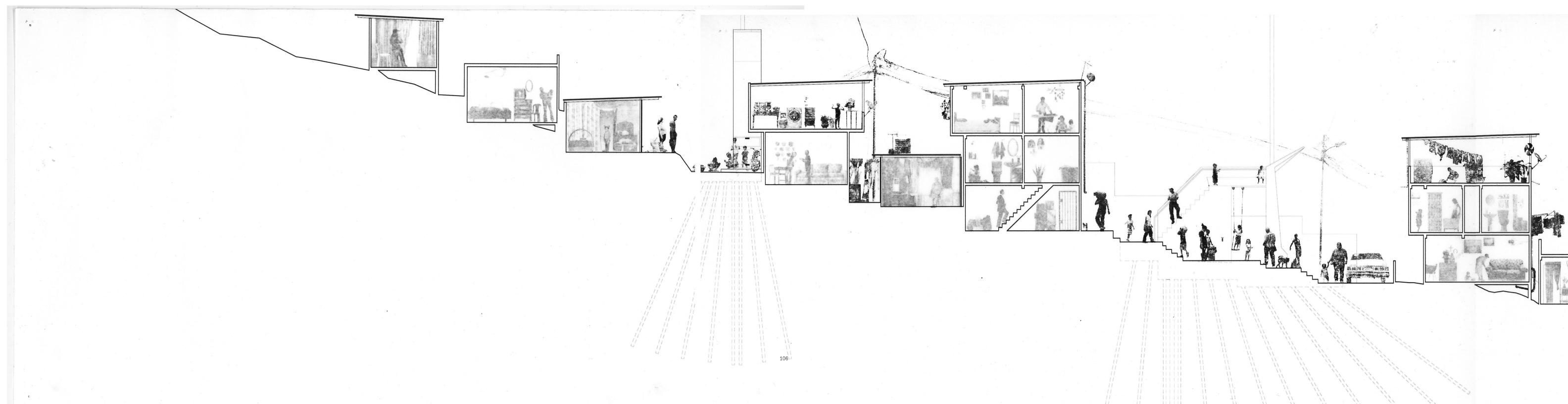
Las adjuntas, like many other barrios in Caracas, uses its streets for recreation. With only three basketball courts and one playground serving over ten thousand people, most events and day-to-day meetings are confined to the narrow streets or the community leaders' living rooms. This dense environment is always fluid: the private easily spills outside and the public often invades the private.

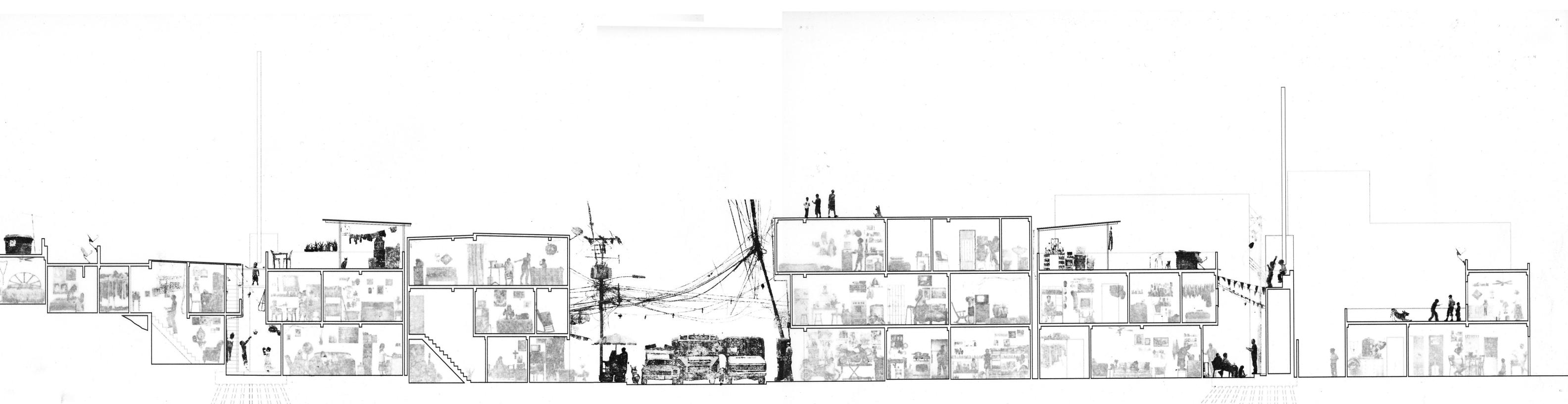
With limited space for parks, courts or playgrounds, improvised benches, exercise bars and basketball hoops occupy many empty spaces around paths and stairs. These are often built by a group of neighbors with materials collected between them. These small moments of pause offer not only a place of recreation but also a landmark in the maze of stairs and pathways that lead to them.

Air space in Las Adjuntas like in most barrios is almost as contested as a plot of land. Houses' top floor cantilever, a web of wires runs through the narrow paths spreading out into houses, and smoke and smog sporadically fill the air.

Simultaneously a well and a dumpster, project 3 combines ground water drafting and waste incineration in small nodes that spread throughout the existing barrio.

We used to roam the streets, barefoot and careless, looking for the right place to launch our kite. The kite never made it back home. And the adventure would start again the next day.

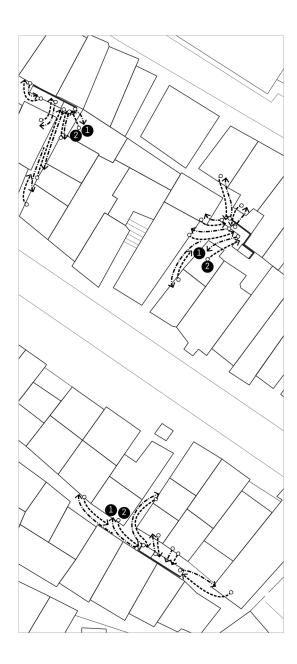






Each of the proposed tower services a path or stairway and provides sitting and gathering areas and a small platform for flying kites. As a landmark, the intervention also gives a street an address. The foundation of each tower is an array of compaction piles that by adding material to loose and sedimentary soil stabilizes large areas around them. Stabilization of the soil is especially important in barrios in the event of an earthquake. Earthquakes are common in Caracas and the barrios are specially vulnerable because of their high density and the instability of most of the constructions.

This intervention works not as a continuous infrastructure but by accumulation. Each tower can be adapted to fit onto a particular pathway or stair and have a small physical area of influence. Because of their size and domestic nature, towers can be easily modified by its users. When waste collection in the city is eventually regularized and extended to the barrios over time, the towers will remain potential sites for antennas, solar panels and other technologies that will further service the barrio, and will persist as landmarks for the community around them.

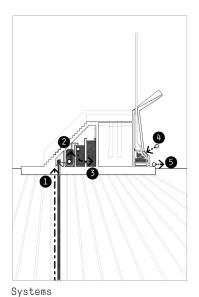


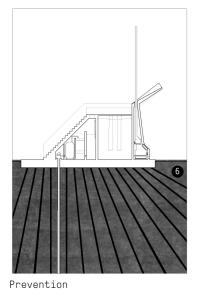
Ground water is drafted as needed and filtered for direct consumption

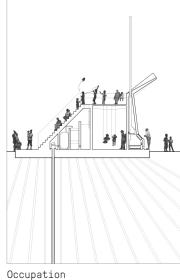
2 Waste is collected and incinerated in each tower

Figure 93. Resource flow diagram 1:700 Figure 94. (opposite) Site Plan 1:1400



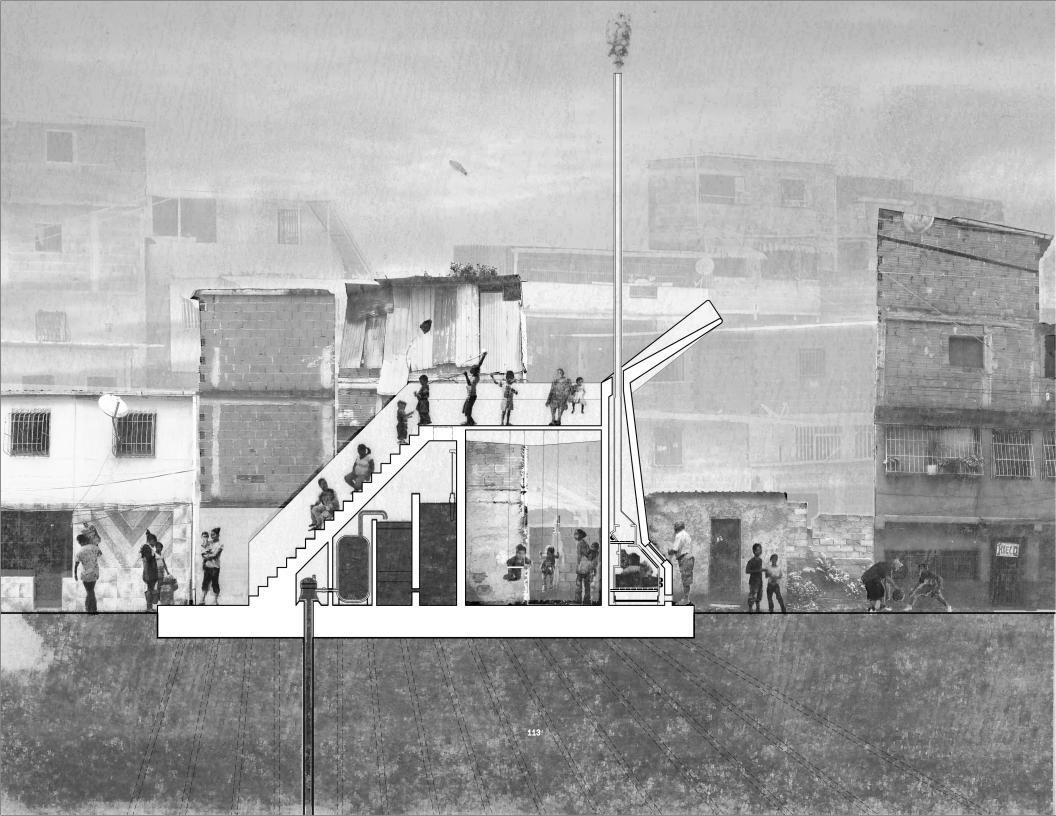


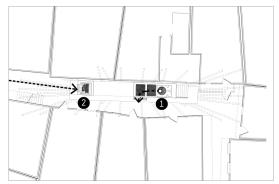




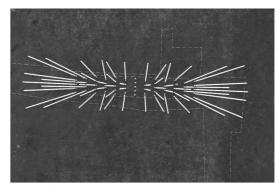
- Groundwater is drafted as needed in each tower, filtered for direct consumption. A small quantity of water remains on reserve as contingency
- Waste is brought in to each tower to be incinerated. After each cycle, the residue is taken to the recycling centre
 - Compaction piles add material to the soil around them to stabilize the soil in large areas under houses and paths

Figures 95-97. Sections 1:400 Figure 98. (opposite) Section 1:100

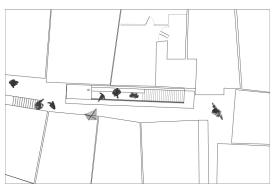




Systems AA



Prevention BB



Occupation CC

260 people/hectare

2 towers/hectare 130 people/tower



Ground Water Drafting water needed for drinking and cooking

12 1/person/day 46,800 1/tower/month

15 FBs/201 of potable water

568 <u>Savings</u> FBs Month/Person



2.18 kg/waste/person/day (no recycling) 1.27 kg/waste/person/day (recycling)

Waste Incineration

180 kg incinerator capacity
4.5 time for complete burn-out hours

total waste produced per tower 566.8 kg/per day (without recycling) 165.1 kg/per day (with recycling)

3 burns a day (without recycling)
1 burn a day (withrecycling)

Figures 99-101. Plans 1:400 Figure 102. (opposite) Plan 1:100



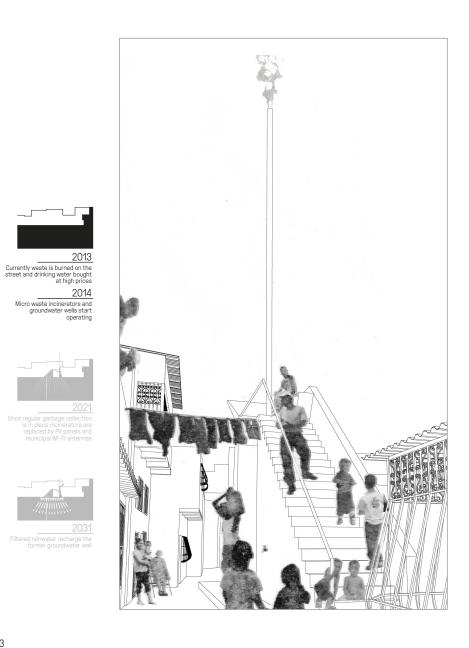
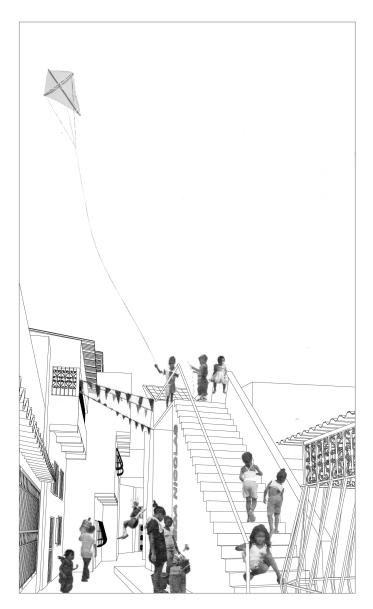


Figure 103. View 2013







Currently waste is burned on the street and drinking water bought

2014

Micro waste incinerators and groundwater wells star



202

Once regular garbage collection is in place incinerators are replaced by PV panels and municipal WI-FI antennas



<u>2031</u>

Filtered rainwater recharge the former groundwater well

Figure 104. View 2021 Figure 105. View 2031





Figure 106-107. Detail Site Model Figure 108. (opposite) Site Model

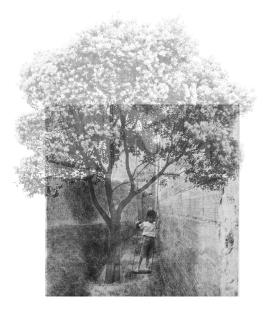






Figure 105-106. Detail Site Model Figure 107. (opposite) Site Model





Between Air and Land (continued)

According to Hannah Arendt, necessity is confined to the private realm, and therefore by definition it is foreign to action. But shared necessities can effect action. Action is a generative force distinct from labour and work, because it is created directly between people and without the mediation of objects. Building in the barrio is done out of necessity, but the process is so vital that it cannot be framed inside the infertile nature of labour or the predictable consequence of work. When considered within the context of the barrios, action creates the built environment by means of promises. In this setting, necessities generate action because they are fulfilled in public. If rendered accessible and intimate, infrastructure can satisfy basic needs in public while cultivating the extraordinary power of action.

Traditional infrastructural systems are either remote and therefore absent in the city (like hydroelectric dams, reservoirs and landfills) or they exist as basic and single-purpose networks (like roads, aqueducts networks and electric grids). Unlike these systems, the projects presented in the thesis overtly place infrastructure in the city. Furthermore, they are inserted within people's daily life in order to be appropriated and tended by the community, despite

According to Hannah Arendt, necessity is confined to the private realm, and therefore by definition it is foreign to action. But shared necessities can effect action. Action is a generative force distinct integration to the formal city.

In barrios the private realm is fluid; it is readily interchangeable with the public. The projects use this flexibility by harnessing a sense of intimacy and ownership that usually belongs to the private realm, while remaining public and shared. Because of its size, project 3 (tower) better illustrates this ideal proximity of infrastructure to the everyday. The project is pragmatic, accessible and intimate—it satisfies basic needs while remaining deeply embedded in each site and its people.

For Arendt, not all action is political³. Action is only political when it originates in freedom. Politics in their ideal form derive from plurality, not in the modern sense of representative democracy, but simply from individuals acting together. Plurality is defined by Arendt as the "equality and distinction"⁴ inherent in people. Politics only exists in the relationships between people⁵ and this imperative presence of others make politics—and action—strictly public. In the barrios all action is political because it is

directed towards the fulfillment of shared necessities. Infrastructure that is present and shared can make these actions visible—visibility that is instrumental in integrating the barrios and the formal city.

The projects, in their form and tectonic, make infrastructure visible and celebrate both its utilitarian role of providing basic services and the civic space it interventions within the barrios and as an aggregation institutionally unregulated and constructed through of projects that address barrios in their different conditions. As a formal intervention in an informal site, the projects make legible barrios' participation in the city while keeping a level of productive indeterminacy. This indeterminacy allows the projects to work as frameworks that accept changes in their use, size and form. Moreover, when they are read as one scheme, the projects logistically and symbolically connect existing and barrios and the formal city.

Using poured concrete—widespread in the formal city and its institutions, and also used in barrios as a structural material—the projects have an ambiguous presence that responds to the site, its materials and construction, while remaining distinct from the built fabric of the barrio in their form. Project 1 (stairs) harnesses infrastructure's potential to shape the built environment. By making infrastructure visible, the project acts as a framework for urbanization that also

suggest possible appropriation and new patterns of development.

Action is for Arendt the experience of freedom⁶. Yet freedom cannot be fully realized without the existence of promises. Reality reflects both the uncertainty that comes from the freedom of action creates. They are designed to be recognizable as formal and the potential certainty of promises. In the barrios, improvisation, the built environment itself emerges out of the reification of promises. These promises can be of abstention or deed, but it is in this latter category where the potential for action truly resides.

> Infrastructure can provide a space for the exchange of promises and the performance of action. In this space, it becomes possible to recognize the barrio—and the city—as a shared resource, thereby fostering kinship and empowerment. Through action, public space can be transformed into civic space, and its users into citizens.

All three projects challenge infrastructure's traditional role of purely utilitarian systems by pairing infrastructure with civic space. Civic space sits between the accessibility of the public realm and the intimacy of the private, but involves active participation that engenders action. This space of civic life is more clearly visible in project 2 (basin)

where civic programme is directly shaped by the infrastructure that produces it. The project encourages make promises that affect our mundane, but vital shared tenure and engaged use, bringing to the fore the more tangible results of promises and the actions that derive from them.

According to Arendt promises mediate action⁷.

In the absence of many other common grounds, promises are our connection to others, something that the ordinary. The existence and potential for action we can exchange as equals, they define our identity in our exposure to the world8. A life modulated by promises is one of imperfections, repetitions and minutia that make up reality. When tuned to the specificity of this lived reality, architecture can overcome—perhaps only momentarily—its more inevitable state of historic monument, political message, economic benchmark, cultural symbol and moral judge. Instead, architecture can be founded in the ordinary, finding poetry in the pragmatics of living.

There is potential for meaningful change in the essential and repetitive nature of a life. Architecture can make use of this potential to modify the core of reality, for it is here where life is more accessible. By drawing from the modest without yielding its

larger intentions, architecture gains the ability to reality. Similarly, this reality in its relentless existence appropriates architecture.

Action, as the beginning of something new, connects reality to promises⁹. Architecture originates And action begins architecture. Promises arise out of in action, constantly renewing our reality out of slight the will and because of the necessity of living together. changes in the repetition of the ordinary. Architecture offers new futures that both celebrate and emancipate and promises can only be experienced from within a community. This almost tangible feeling that is evident only in people, gives architecture the capacity to replace caution for hope.

> This thesis is built on the assumption that architecture—like a promise—has "the capacity to dispose of the future as though it were the present"10.

I walk the barrio with a blue makeshift swing in my backpack. I am looking for a place to hang it somewhere in the narrow alleyways that snake up the hill. For three days I carry it, but I find nowhere to put it. So I draw it. This is after all, only one more beginning.





Notes

Introduction

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- 3. Ontiveros, *Cultura y Costura de Habito Popular Urbano*, 29.
- 4. Arendt, The Human Condition, 201.
- 5. Ibid., 244.
- 6. Lefebvre, Everyday Life and Modernity, 24.

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- 2. Central Intelligence Agency, The World Factbook 2013-14, Venezuela.
- 3. Lombardi, Venezuela: the search for order, the dream of progress, 71.
- 4. Sequera, Agenda del petroleo en Venezuela. Venezuela, 55.
- 5. Talton, Politics of the Barrios of Venezuela, 5.
- 6. Saunders, Arrival city: the final migration and our next world, 114.
- Meza, Cerro Piloto: el Plan Extraordinario de Vivienda para Caracas 1954, 20.
- 8. Troconis, Caracas, 235.
- 9. Ibid., 242.
- 10. Ibid., 243.

- 11. Ibid., 234.
- 12. Ibid., 243.
- 13. Karst and Murray, *The evolution of law in the barrios of Caracas*, 7.
- 14. Bolivar, Desde Adentro, 146.
- 15. Troconis, Caracas, 246.
- 16. Marcano, La Crisis del Agua en Caracas, 51.
- 17. Grohmann, Macarao y Su Gente, 65.
- 18. Ibid., 66.
- 19. Ibid., 67.
- 20. Avila, El Futuro de la Capital esta Estacionado.
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- 4. Marcano, La Crisis del Agua en Caracas, 23.

- 5. Ibid., 52.
- 6. Ibid., 55.
- 7. Ibid.,85.
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- 9. Ibid., 15.
- 10. Troconis, Caracas, 234.
- 11. Ibid., 234.
- 12. Caracas Sana, Cuadernillo 1: Un programa de reciclaje, 12.
- Alcaldia del Area Metropolitana de Caracas, La Caracas de Hoy.
- Ramos, Challenges and Opportunities of Waste Collection in Caracas: Sucre Municipality Case Study, 10.
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- 2. Karst and Murray, The evolution of law in the barrios of Caracas, 10
- 3. Ibid., 9

- 4. Ibid., 18
- 5. Lozano, La "sensación de inseguridad" se ensaña con Caracas.
- El Dividendo Voluntario para la Comunidad, Manual Replicable de Innovacion Social Construccion de Comunidad, 10.
- Palacios Ybarra, El Ruido Marca la Nota en la Capital.

Conclusion

- 1. Arendt, The Human Condition, 7-10
- 2. Ibid., 175
- 3. Arendt, The Promise of Politics, 95
- 4. Arendt, Between Past and Future, 149
- 5. Arendt, The Human Condition, 244
- 6. Ibid., 246
- 7. Ibid., 245

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