



# **NATURA 2035**

sustainable urban environment

IVAN TAMAYO RAMOS

**PLACES TO LIVE, WORK AND PLAY**

**PART I: RESEARCH**

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**PART I  
RESEARCH**



## FOREWORD

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ISLA DE ORABA, CULIACAN

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GUADALAJARA, JALISCO, MEXICO

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CULIACAN, SINALOA, MEXICO

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BARCODE IN OSLO, NORWAY

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JARDIN BOTANICO, CULIACAN

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SAN IGNACIO, SINALOA



MAZATLAN, SINALOA



COSALA, SINALOA

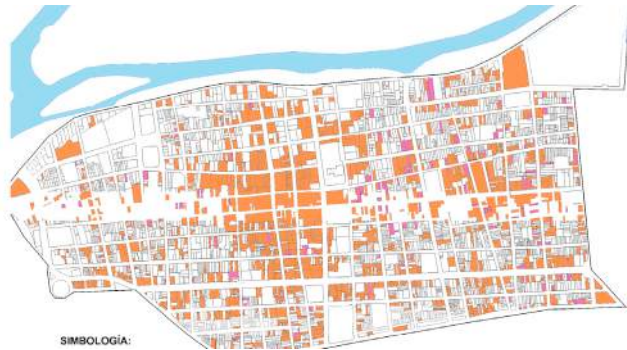
## SINALOA, MEXICO

Sinaloa is one of the richest states in Mexico, due to its industries such as mining, fishing, agriculture and cattle. It is located on the northwestern coast of Mexico. To the west Sinaloa faces Baja California Sur across the Gulf of California. The state covers an area of 58,328 km<sup>2</sup> (22,521 m<sup>2</sup>).

The state has a variety of culture because of the large immigration from around the world that arrive in the last century, mainly during the World Wars. The state grew fast mainly in three cities. Culiacán at the center, Los Mochis in the north and Mazatlán, a busy port in the south.

"According to the 2019 projection, Sinaloa is home to 3,216,000 inhabitants, 61% of whom reside in the capital city of Culiacán..." "It is a young state in terms of population, 56% of which is younger than 30 years of age. Other demographic particulars report 87% of the state practices the Catholic faith." (<https://en.wikipedia.org/wiki/Sinaloa>)





SIMBOLOGÍA:

COMMERCIAL



SIMBOLOGÍA:

HOUSING



SIMBOLOGÍA:

INDUSTRIAL

SERVICES AND INDUSTRIAL

## HISTORIC CENTER

Special attention in this study is paid to the city center. It was naturally the first place to develop in Culiacán. Since 1532 the city was founded and its city core traced. Located next to the river, the city center started as it was used to by the Spanish conquerors, with a church and a square. Like most early cities, the growth was mainly linear following the main avenue from the church up north and south. It is home to 860,000 inhabitants according to INEGI, the government census unit. The urban built area as measured on google earth expands up to 180 km2. Including the adjacent villages that form part of the city.

The city center is the most walkable area in Culiacán. The variety of shops, restaurants, schools, hospitals, businesses and housing makes the perfect environment for people to walk. It is also the main destination for all public transport. All bus lines arrive at the city center bringing people from the villages on the outskirts of the city to its core. The principles of the center were used in Natura to plan for and organize a mixture of functions.



STREET COMMERCE



EMPTY PLOTS



PARKING, PRIVATE AND PUBLIC

## HISTORIC CENTER

Even though it is one of the densest areas in the city, it is actually quite low density. When it comes to housing there are big houses with few people living in them. Around half of the houses have been turned into commercial office spaces. The high density is achieved by the local tourism and working people.

On the top map there are red dots symbolizing all the informal Street Commerce that is abandoned in the city center. It is a reflection of the informal economy.

There is plenty of small empty plot to be further developed. Many of them are being used for parking and storage place but it is encouraging to build more housing in the city center, since many of the commercial streets become empty when work is done.

When the core of the city grid was created almost 500 years ago, it was not planned for cars or buses, therefore now there is constant traffic congestion. Widening streets will not solve the traffic problem, on the opposite, there is a global trend to free the centers from cars supporting pedestrian and bicycle mobility. ([https://www.inegi.org.mx/contenidos/programas/ce/2009/doc/minimonografias/m\\_sinaloa.pdf](https://www.inegi.org.mx/contenidos/programas/ce/2009/doc/minimonografias/m_sinaloa.pdf))



ISLA DE ORABA, CULIACAN



MALECON CULIACAN



PARQUE LAS RIBERAS, CULIACAN

## RIVERSIDE

Due to the geographical location by the rivers and sea, there is a tradition of Malecon, extensive roads along the waterfront.

Culicán is made out of three rivers. In total there are eleven rivers in Sinaloa. This urban element is often seen in the cities along the coast of Mexico.

On the southern edge of Natura, there is a canal surrounding the site, with a width of 10 meters, therefore an opportunity to learn from what exists and use it in the project.

The waterfronts are normally made of wide avenues of four to six lanes, with a tree line in the center and on the extremes, so the sidewalks are shaded. Plenty of businesses are located along the waterfront. It is a desirable place to be, therefore there is high traffic of people.

People usually arrive by car and once parked they walk for hours enjoying the street foods while their kid's bicycle or skate by the wide sidewalks.

Abundant street lighting is very important for the success of the Malecon, due to the insecurity of the place, light provides visibility and a sense of safety.

In Culiacán there are two Malecon, the old and the new one. They run parallel to each other, surrounding the river and its parks on both sides.

The highest price of land per square meter in the city is along with the Tres Rios development, which is the built sector along the Malecon. The highest buildings are also located along the riverfronts.

Traffic can be a problem, especially to find parking spaces during the weekends.

Sometimes on special days, the street is closed for parades or demonstrations.

People enjoy driving around the riverfronts with loud music and sports cars.





MOCORITO, SINALOA



COSALA, CULIACAN



MOCORITO, SINALOA

## LA PLAZUELA

The kiosks, and its people Plazuelas (in english squares), just like in any culture, is an important element in every city center. Culiacán is no exception. La Plazuela is located next to the main Cathedral and alongside Avenida Obregón, the main axis connecting the south and north of the city.

People dance at La Plazuela. Music is played live and the most rooted inhabitants of the city center, most of them in their senior ages, enjoy with their partners and friends tango under the kiosk.

At La Plazuela the visitors can find shoe cleaners. It is a tradition that remains from the old times of Mexico. For a few bucks, a person can enjoy reading its newspaper while getting their shoes polished and listen to many stories the workers have witnessed during their long years at the square. Since The Cathedral is located at the square, often one can appreciate weddings and other kinds of religious events.

There was a time that La Plazuela and The Cathedral were separated by a street, and I am proud to say that my grandfather Mario, during his Municipal presidency ordered the street to be removed and extend the Plazuela unifying it with the church.



MERCADO GARMENDIA, CULIACAN



MOCORITO, SINALOA



MERCADO GARMENDIA, CULIACAN

## MARKETS

Like the rest of the world in Culiacán there is a tradition for local markets. This tradition was forgotten for most of the population due to the supermarket franchises that offer air conditioning and plenty of parking lots. For restaurant owners, the local market is still the best option to buy fresh groceries at wholesale prices.

There has been a comeback for local markets, as the world has become more standardized and impersonal. There is a nostalgia for the humane feeling of markets, which is an opportunity to innovate. The flea market is a big part of Mexican culture. Many people from the villages outside the city come both to sell and buy goods and enjoy the markets.

Every Sunday on different streets among the city of Culiacán the flea markets are set up at running from the early morning towards midday when the sun gets too hot. A visitor can find second-hand clothing and accessories as well as enjoy a warm dish or some fresh seafood.



TAQUERIA LOS BOMBEROS, CULIACAN



STREET VIEW GOOGLE, TAQUERIA



GOOGLE MAPS. TAQUERIA

## STREET AND FOOD

Before food trucks became cool, in Mexico it has been a way of starting the gastronomic enterprise since the early days. It is such a strong tradition that tacos are hard to find in restaurants, tacos are meant to be served at the street, seasoned by the buses driving by. It is important to consider in Natura the design of the street and sidewalks spaces for food trucks, because even though they are temporary structures one can say they are permanent tenants of the streets, and no one will disagree with having them. There is a need for the food trucks for week or weekend getaway for tacos with friends and family. Often food trucks are located not on the main avenues but on smaller streets that are accessible by the main roads.

The reason is, in my opinion, that on narrower streets a customer can be safer from traffic. Also for the street restauranter slow streets means he can offer to go service, so people will drive through once and order, then circle around the block and pick up the food ten minutes later. It is so interesting to be aware of such urban systems.





EXPANSION OVER GARAGE



SCHOOL ACCESORIES SHOP



TORTILLA MICRO FACTORY

## THE GARAGE

Another important factor in the life of the people of Culiacán is the house parties which are not limited by the heat of the city. In order to fit all of the family and friends, house parties tend to be in the garages, most of the time with the garage door open for the smoke of the grill to go out and the party to expand to the street.

Because it is part of Mexican culture, neighbors are very tolerant of street parties as well as cops. When passing by as long as the people remain within the limits of their sidewalk it is not a problem.

I understand that in an ideal world people don't need cars and we all walk and commute in public transport but cars in Mexican culture are not just a means of transportation but a place to be. I personally don't like driving and I choose trams over cars, but most people in Culiacán like to have their "freedom" of driving whenever they please. Taking into account that cars and garages are important for people in Culiacán I decided to embrace their wants and give them the opportunity of using a car in Natura and also the option of moving by bicycle or inner public transport.

## DEVELOPMENT IN MEXICO





HORIZONTAL HOUSE



SMALL APARTMENT BUILDING



LARGE BLOCKS OF HOUSING

## SOCIAL HOUSING

There are 126 million inhabitants in Mexico, 70 % of people live in cities, 75% of land use in cities corresponds to home use and 5 million houses are abandoned.

In Mexico, half of the population lives in poverty and is not eligible to get credits to buy a finished home in a housing development, therefore most of them build their own houses.

The social housing developments available are only houses, hundreds sometimes thousands of homes one next to another. Many of the inhabitants end up leaving their homes because of bad quality, a far distance from work, etc. This downward spiral makes this development dangerous and boring places to live. Because of this, in Mexico there are endless housing areas, but not cities.

The existing social housing developments in Mexico is an example of how not to do housing in Natura, segregating people limits their ability to evolve.

People don't walk in these places, because there is nowhere to walk to.

Housing must be integrated with the rest of the city, where the residents should be able to sustain their daily lives within their district.



SMALL GATED COMMUNITY



MID-SIZE GATED COMMUNITY



LARGE GATED COMMUNITY

## GATED COMMUNITIES

Because of the insecurity and crime that is abundant in Mexico a lot of people who are able to afford a house tend to buy within a gated community where they feel safe and it is understandable when there is no other alternative.

But gated communities only reinforce the crime because walls divide people and grow inequality.

It is not common in the most peaceful and developed countries to live in gated communities. Rather, houses are integrated into the city. Mexico inherited the American Dream of owning a car and a backyard, a valid dream in the 1960s, but 60 years later it has proven obsolete. The issue is that Mexicans built cities with this dream in mind, but now depend on the car in many places. Fortunately, there is an opportunity of change with the aid of technology and shared economy.



SMALL: 1000 M2 BUILT AREA



MID SIZE: 100,000 M2 BUILT AREA



LARGE SIZE: 250,000 M2 BUILT AREA

## SHOPPING MALLS

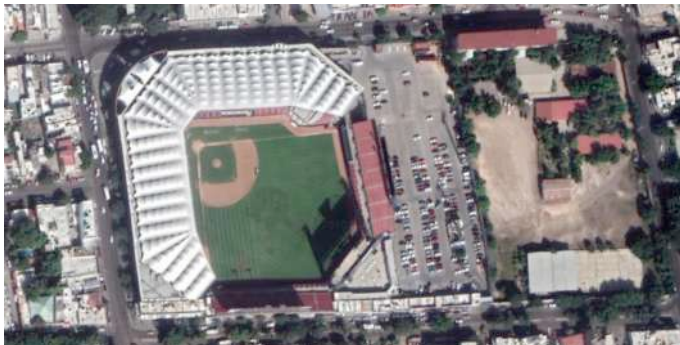
I grew up in the 90s, and remember my first experiences in the shopping malls in the USA. It was exciting, I was fascinated by the scale, options and air conditioning, it felt like everything you needed was available there. At that time there were few shopping malls in Mexico like the Americans, so it was special. As I grew older, and witnessed the cities all over the world having the same type of shopping mall and in many cases the same shops, it stopped being special and became dull. Before I began the urbanism master program at ARCHIP, I didn't have an opinion on shopping malls, besides losing interest in them. As I began to understand cities and its evolution I realize how damaging are shopping malls to urban fabric and society. Think about it, they are huge, and in most cases are surrounded by a parking lot twice its built area. Thousands of cars under the sun, with maybe a few palm trees. Not a friendly way to build our cities right? Shopping malls, sometimes over 200,000 m2 plus their parking lots create voids in the city, black holes dividing one extreme to another, so big, is not walkable.

Trade is necessary and is as old as the human race, and the activity around it is a form of social interaction and it should as well be integrated within the city, fragmented every now and then, with a direct connection to the street and accessible by foot and public transport, not depending on the car... Anyway it is changing now, many shopping malls in America are empty and in search of a purpose. And why is this happening? Both e-commerce, people ordering goods via the internet and being delivered at home are more common now. People rather spend their free time walking in parks, swimming, biking or skating, and rewarding activity, physically, mentally, or socially. It is a bit of a shame if in some cities you meet people only inside a windowless warehouse.





SMALL: AREA 1000 M2



MID SIZE: AREA 10,000 M2



LARGE SIZE: 100,000 M2 BUILT AREA

## PARKING LOTS

In Mexico there is a starting tendency to build vertical parking purpose only buildings. Because the land is relatively cheap and we have a lot of it, parking lots are horizontal, taking too much space.

Yes when public transport is not efficient, cars are the option to move around build-for-cars cities, but it is time to fix these cities to be less car dependent.

Often I hear: "we build parking lots horizontally, because it is cheaper" and it might sound true for the short term and the individual, but for a society, in the long term I believe it is actually less cost-effective.

My reasoning is following: it is not the amount of capital invested in the true cost of developing something, but rather the unreached potential return of the property.

For example, in the second picture, we can see a baseball stadium in Culiacán, with a 10,000 m<sup>2</sup> parking lot. In this case, it looks like it was only the concrete invested in the property maybe if generous there might be the lighting. And let's imagine an investment of 1 million dollars, well the return made is limited to the number of cars parked per day. It is probably empty on a daily basis with the exemption of game days. If the developer would have invested in vertical parking space, it could have cost him three times the invested capital, but it might have used only a third of the space in the property, and the rest would be free for something else to be built and enrich the area, plus adding value to its parking building.

The argument here is that when developing, there must be a holistic approach with the well being of the city and its society in mind, and like that, building by building, the urban space is created, coherent and continuous.



INTEGRAL, CULIACAN CITY CENTER



SEGREGATED, AIRPORT AREA MONTERREY



REMOTE, DESERT OF SAN LUIS POTOSI

## LOGISTIC CENTERS

In the past, during the industrial revolution manufacture, storage, and processing were built together with housing for employees creating a kind of industrial villages. Then as cities grew the warehouses became valuable for their purpose. Plus globalization and technological innovation allowed more efficient ways of production, or in some cases moving the production elsewhere, so these industrial villages, which are now part of the city, were and still are being developed into something else.

In the past decade, there has been an increase in logistics centers being built near airport areas or in the remote countryside, because every time these warehouses become bigger and more sophisticated, such as in the case of data storage and processing or robotic manufacturing for cars, airplanes or another robot.

It is out of my reach to say if it's good or bad that such huge constructions with few or none workers are being built far from the city. But when I look at city centers such as Culiacán, because of no strict planning or regulated land use, warehouses are built within the city center, so it is common to see a storage facility next to a school, some apartments and perhaps restaurants. One might think that is strange or even wrong but it works. Why? Because of its totality, a warehouse here and then helps to mix functions and creates a diversity of people and aesthetics, making each block more interesting and real. With the increasing demand for last-mile delivery products by e-commerce, we are witnessing some warehouses being built in dense urban areas. I wouldn't be surprised to see more industries coming back to the city, maybe underground or inside residential blocks like it happens organically. It is something to consider, how can we make urban mix-use developments and include industry within the program.





CINDER / CONCRETE BLOCKS



BURNED CLAY BRICK



CONCRETE SIDEWALKS AND STREETS

## MATERIALS

Most of Mexican cities are made of social housing projects and private gated communities, side by side but walled. Most houses are built from concrete hollow blocks because it is a cheaper and faster way to do so. Also, there is no skilled human capital needed or special machinery other than simple tools.

Burned clay brick is the second most used material and it is more sustainable and thermally efficient than concrete blocks. It is also better for local economies since clay bricks are usually produced by small manufacturers run by families in rural areas.

Bricks are normally smaller than blocks therefore, it takes more time to erect a wall. Blocks, since are hollow, can be filled with reinforced concrete to work as columns and beams. While bricks are solids, there is a need to make a wood form and build a self-standing column or beam for structural purposes.

Cemex, one of the biggest cement companies in the world is Mexican, so it is not surprising concrete is everywhere, from streets, sidewalks, and buildings.

Culiacán is very hot, and concrete streets retain the heat increasing the temperature in the city and making it a walking hell in the summertime. A good alternative could be to shift to more earthen materials such as bricks that will make it cooler and nicer while allowing the rain to penetrate the soil avoiding flooding.

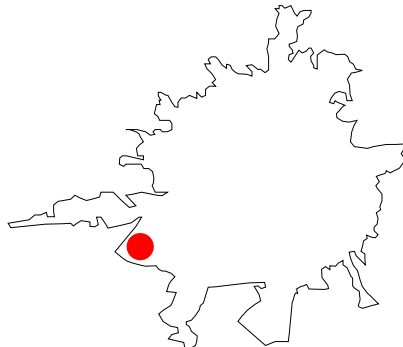
## LOCAL MARKET RESEARCH



MEXICO



SINALOA



CULIACAN

## LOCATON OF THE SITE

Mexico is a country located in North America with a North Pacific Ocean, Gulf of Mexico and Caribbean Sea coastline. Neighboring countries include Belize,

The United States, and Guatemala.

Population 126,190,788 (2018) Sinaloa has 600 kilometers of coast in the pacific ocean. The population in Sinaloa is 3.2 million people, from which 46% of the population is younger than 24 years old and 34% is younger than 19 years old. The capital and the most important city is Culiacán. The Northern Economic Corridor (COEN) connects Mazatlán with the East coast of the United States, crossing an area that produces 23.14 % of the national GDP (Gross Domestic Product). GDP per capita: \$ 87,462.94.

According to the Economic Census (INEGI) 2014, 34,406 companies operate in Culiacán, of which 98.8% are micro and small, and there is an Economically Active Population (PEA) of 357,702 as of March 2017. (<https://en.www.inegi.org.mx>)

Culiacán is the leader in the state with a production of around 5 million tons of corn. It also leads the production of vegetables (tomato, cucumber, chili, eggplant and pumpkin) and fruit (mango, melon, and watermelon), beans, soybeans, safflower, rice, wheat, and sorghum. (<https://www.culiacan.gob.mx/informacion/demografia/>)

## ORIGINS

The town of San Miguel de Culiacán was founded on September 29, 1531, by the conqueror Nuño Beltrán de Guzmán. During the late 16th and early 17th centuries, San Miguel de Culiacán became the strategic center to continue the conquest, colonization, and evangelization of western New Spain. (<https://en.wikipedia.org/wiki/Culiacán>)





CULIACAN



SOUTH WEST EDGE



SITE

The site is next to the airport at the southwest edge of the city. The airstrip is located 250 meters from the site's west end. The site used to be farmland. A 10 meter wide irrigation canal flows around its south edge.

There are two existing streets running from North to South and the city perimeter highway passing outside its southern edge. It is the plan to extend two boulevards from the Northern neighborhoods. With one of them connecting to the highway with a bridge. There is a preparation to connect the existing East and West Boulevards from its center.

Currently, there is no land use. It is a goal from this study to find out the best use possible.

Can the grid be flexible enough to allow all functions to take place everywhere? And if so what would it be its regulations to keep organized chaos?

Proximities:

Pedro Infante commercial corridor 7 Km.

Historical Center 10 km.

Tres Rios commercial corridor 10 km.

La Primavera edge city 10 km.

State University and Botanical garden 15 km.

Altata Bay in the Pacific coast 50 km.

Mazatlán International maritime port 200 km.

Topolobampo International maritime port 234 km.

Los Cabos, B.C. 300 km across the Sea (1-hour flight ).

Aeropuerto Cd. de Mexico 1200 km (1 hour 50 min. flight ).

Phoenix, Arizona, USA 1250 km (2 hours flight).



ACCESS FROM AIRPORT



CONNECTION WITH NEIGHBOURHOOD



NORTH EAST CORNER

## PERIMETER

2020 meters waterfront, the canal is 10 meters wide but might extend.

2030 meters shared boundary with existing social housing developments.

720 meters shared a boundary with the airport zone.

To the North of the site is the airport which is connected by Boulevard Air Force and eight Lane fast transit Boulevard passing through the site connecting to the highway over the canal through a bridge. The plot on the North side between Natura and the airport is not developed. It is uncertain what will be built in there, but we are taking into consideration the extension of an existing Boulevard from the northern neighborhood.

There are several neighborhoods on the northwest side of Natura Maine Boulevard that will be extended to pass through Natura all the way to the side over the canal in a future bridge to connect to the highway parallel to the Air Force Blvd.

It is very important to consider a friendly connection with the neighborhoods.

Natura is meant to be an inclusive development and it is open to bringing its neighbors to make use of its parts and vibrant streets.

Several functions like the church and parks will be in the border of the neighborhood to promote a friendly and familiar transition.

In the last picture, we can see that a few houses are located right in the border of Natura. They have an existing wall which will have to be considered when designing the proposal in order to avoid a long and boring facade.



SOUTHEAST CORNER



ACCESS TO HIGHWAY



AIRSTRIP RELATION AT WEST END

On the southeast corner as we can see in the top picture there is a boulevard standing over the canal to an industrial area. It is the third connection to the highway.

The southern access to the highway is a critical point in the project because the boulevard Air Force is guiding the traffic to the airport. It will be a busy and fast intersection which must be carefully crafted to avoid congestion.

There is an opportunity for the future inheritance to have a long and attractive recreational area near the water around the canal on the southern border of the site.

To avoid flooring and create a healthy distance from the noise and pollution of the highway a greenbelt can enhance the public space alongw the canal.

On the bottom picture, we can see the West end of the site. Because the airport is next to it, there is a security wall along the West perimeter of Natura.

There is an existing road parallel to the canal. That road could be moved to the opposite side of the canal to have a direct connection between the Park in the water.

The water is meant to be used for the irrigation of the agricultural land. Therefore no swimming will be allowed in the water also for security because the flow might be fast. Taking advantage of the continuous supply of running water I can think of the possibility of incorporating water infrastructure such as ponds or streams into the site for recreational purposes.

The highway design is optimized for fast traffic to access the airport. It consists of eight lanes for going in each direction. The boulevard is separated in four parts from which runs North and South. The edge lanes are meant to be for slower traffic and parking space for commercial businesses along the boulevard.





SOUTHEAST CORNER



ACCESS TO HIGHWAY



AIRSTRIPE RELATION AT WEST END

On the southeast corner as we can see in the top picture there is a boulevard standing over the canal to an industrial area. It is the third connection to the highway.

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The highway design is optimized for fast traffic to access the airport. It consists of eight lanes for going in each direction. The boulevard is separated in four parts from which runs North and South. The edge lanes are meant to be for slower traffic and parking space for commercial businesses along the boulevard.

The boulevard is 40 m wide. There is no clear connection now how cars campus from one side to the other. From the design of the boulevard, I can tell that it was prepared for cars to cross from East to West only to add the South and North end of the site.



SOUTHEAST CORNER



ACCESS TO HIGHWAY



AIRSTRIP RELATION AT WEST END

The distance of the Boulevard from the South to the North and is 600 m, therefore I believe is too long. I can imagine proposing a crossing point add the center of the boulevard to unite the West and East part and not segregate functions.

Although it's not visible from the photographs you can imagine that there is greenery to be planted on the divisions between the traffic lines making the boulevard greenery and shaded.

The site's previous land use was agriculture. In the bottom picture, there is a visible greenhouse on the right side. Culiacán is a major agricultural exporter and respecting the history of the site and anticipating the future trends of urban farming. In the proposal we will see how to incorporate its origins.

There are several stigmas that will have to be solved and people's ideas changed towards living near the airport and Highway.

There is no doubt that noise will come from the airport and highway therefore through greenery and carefully placing the functions of the nearest buildings to the noise exposure the problem can be solved.

According to the information from the airport no flights fly during the night, but the first one begins very early in the morning so it is a question if houses or offices are better off being close to the airstrip. The lighting on the boulevard is very important and not only should make clear the way during the night but also provide a warm and friendly feeling to those who would walk or bike along.

On the east end is the boulevard Luis G. Urbina, it is connecting the northern neighbors to the south highway over to canal.

The existing boulevard on the east end of this site has a circular shape making it complicated for the square buildings to sit along its edge.

I believe here either there could be a buffer zone between the road in the buildings filled with greenery or leave some space for an open-air parking lot.

Although I did not favor open space parking lots because they break the urban fabric by making the walkable borrow distance between the building and the street long and boring.

And also it would be more pleasurable to bike along the road surrounded by trees and greenery than cars on concrete.



ROAD TO AIRPORT FROM CITY



HIGHWAY SOUTH OF THE SITE



HIGHWAY ACCESS ON SOUTH EAST CORNER

A problematic difference between the levels is that when riding the bicycle, pushing a stroller or for people who are handicapped, it is very uncomfortable to climb on the sidewalk.

It is way more efficient and pleasant when the sidewalk and street share the same level. The invitation for people to cross the street should be a priority and this can be achieved by making a special ground for communicating the crossing.

In the top picture, we can see the road leading from the city to the airport. It is a fast road since people are usually rushing to get the flight.

It is always exciting as you drive to the airport to see on your right side the airstrip with the landing planes. The visual connection from the ground to the sky is important and attractive and should be reinforced in the project. There are still ways of dealing with the airplane so close by. One way would be to try to ignore it by keeping as far as possible from them. The second option is to embrace the flights and create opportunities for people to contemplate the flying planes. Every time we will fly more and more as we become more globalized.

On the opposite side of the road, we arrive at the highway crossing Natura. It is a major intersection with busy and fast traffic that connects the south and north of the state but also it is part of a mobility ring for motorized vehicles that's around the city.

The highway ring connects La Primavera, which is a gated community of mix-use with an area of 1000 hectares located 8 kilometers from the site.

In the third picture we can see the access from the highway on the southeast corner with a gas station to the left.

It is a smaller road with slower traffic. To the right, it is an existing industrial warehouse. After the site, south of the city is the field of agriculture. The city development plan is regulating the growth to stay within the existing limits of city meaning from the



BOULEVARD LUIS G. URBINA



BOULEVARD RAMON LOPEZ VELARDE



TENOCHTITLAN STREET

The highway link to the inside with the intention to make a more dense and compact urban environment.

The main boulevard connecting the neighborhoods to the north of the site is Luis G Urbina. It is an important connection because it will bring thousands of people living nearby to Natura. Since there was no proper planning when developing the social housing in this neighborhood, we can see on the top picture how there is no hierarchy of land use. The boulevard is a field with housing just like any other street in the neighborhood. Probably the value of these homes will increase as more traffic will drive by and we can expect that the small houses will be replaced by commercial buildings.

In the middle of the boulevard, we can see on the top picture the water drainage. It is open and dangerous and there is no proper limited infrastructure from cars to prevent falling down in the drainage. The reason why it is probably open is that it serves as a rainwater collection device and this water runs down to join the irrigation canal that passes along the southern edge of Natura. Therefore the drainage system will have to prolong inside the site but there are alternatives to how can it be done properly. Such as doing it on the ground and preparing all the necessary drainage grids to collect the water.

The reason why we don't want the open drainage, besides being dangerous for cars and people to fall down, is that it prevents pedestrian crossing by limiting it to the use of bridges.

On the second photograph is the boulevard Ramon Lopez which connects to the highway. As we can see it is an underdeveloped street with no buildings on one side but a wall dividing one neighborhood with another.

Tenochtitlan street is another access from the neighborhood to Natura. It is a smaller and slower traffic street.





PUNTA AZUL GATED COMMUNITY



RESIDENCIAL ROMA GATED COMMUNITY



STANZA CANTABRIA GATED COMMUNITY

## HOUSING

### Strengths:

The highest percentage of placement of the offer analyzed is within the horizontal type with 46% of the 1,234 units vs. 45% of the 549 vertical housing units.

The highest placement is found in horizontal housing with an average of 2.4 units sold per month vs. 2.2 in vertical housing.

### Horizontal housing

The highest horizontal house sale price per square meter is found in the residential plus segment, with an average of \$ 33,945 pesos, more than double the price of the middle segment with an average of \$ 13,586 pesos.

The largest placement of horizontal housing is found in the popular segment with the placement of 7.8 monthly units, with an average value of \$ 586,000 pesos.

The Roma Residencial project (1.4 km) in the middle segment is the closest to the evaluated site, with the placement of 3.6 monthly units in houses of \$ 1.5 million pesos on average.

### Vertical housing

The department of Las Mañanitas (1.3 km) has a placement of 3.9 monthly units, the average price per department is \$ 394,500 pesos.

### Opportunities:

Horizontal housing projects with proximity to shopping centers have better acceptance among buyers.

The dwelling for the middle-income population is the most developed within the analyzed area since there are 9 projects within the segment. Its average placement is 2.5 units per month.

Due to the characteristics of the property, a planned community project could be carried out with housing aimed at different segments of the population, in addition to complementary uses.





PUNTA AZUL GATED COMMUNITY



RESIDENCIAL ROMA GATED COMMUNITY



STANZA CANTABRIA GATED COMMUNITY

#### Weaknesses

Currently, there is an available stock of 661 houses in 18 nearby horizontal housing developments, 71% are from the middle segment. There are also 422 vertical housing units, 86% of the popular segment.

The residential and residential plus segment developments are the ones with the lowest placement with an average of 0.9 units sold each month.

Vertical housing in the residential segment has an average placement of 0.1 units per month, while that of the traditional segment is 0.6 units per month.

#### Threats:

As a preliminary, horizontal housing has a low placement, during 2018 the placement in the analyzed area was 4 units sold monthly on average, currently, it is 2.4 units. Las Mañanitas (1.3 km) still plans to develop more on-site apartments that are still available.

The immediate area is not yet so densified that it will be difficult for the vertical offer to grow in the term cost.

Within the study area, there is still undeveloped land, so it is not ruled out that in the future more housing projects will be built.

#### Conclusions:

It is proposed to use 50 hectares of the property for the construction of 2,600 to 2,800 units (this last figure will be used for the income year).

The construction of stages is proposed and that each stage complies with preserves, each an average of 100 units, so there could be around 28 preserves.

Surfaces of 100 m<sup>2</sup> and 110 m<sup>2</sup> of construction with 110 m<sup>2</sup> of land respectively.

Prototypes of 3 bedrooms with two parking spaces.

A presale price of \$ 14,450 pesos per square meter of construction is suggested (from \$ 1,450,000 to \$ 1,656,000 pesos per unit).



LA CEIBA SHOPPING MALL



EXPLANADA SHOPPING MALL



PLAZA SENDERO SHOPPING MALL

## COMMERCIAL

### Strengths:

The shopping centers anchored in operation that were analyzed have an average occupancy of 97% of their profitable area. The average monthly rent per square meter of the analyzed shopping centers is \$ 303 pesos in premises between 24 m<sup>2</sup> and 103 m<sup>2</sup>.

The Strip Center analyzed has an average occupancy of 93% and an income of \$ 275 pesos per square meter in premises between 24 m<sup>2</sup> and 66 m<sup>2</sup>.

### Opportunities:

The new shopping center will form part of a mixed-use complex with housing that will be able to supply new tenants and captive clients in the area with a novel design. According to the capacity model, there is an opportunity to integrate 20,706 m<sup>2</sup> into self-service store sales floors.

The analyzed property is located less than 800 meters from the Culiacán International Airport which received 2.4 million passengers in 2019, this population could be a consumer of a new shopping center. It is estimated that the new Blvd. Fuera Aérea Mexicana has a flow of four to five thousand cars a day, reaching 15 thousand cars in peak demand.

### Weaknesses:

Competition: According to the capacity model, there is an oversupply of more than 53,000 m<sup>2</sup> of a profitable area in the analyzed area, this due to the forthcoming opening of Explanada Culiacán.

There is also an oversupply of three movie theaters, also for the upcoming opening of Cinemex in Explanada Culiacán. Explanada Culiacán, the first Entertainment Center in the city, is located 1.2 km from the evaluated site. It will have 74,912 profitable m<sup>2</sup> and marketing of 81%, it is expected to open in the first half of 2020. There is a profitable area on offer in at least eight Strip Center-type



LA CEIBA SHOPPING MALL



EXPLANADA SHOPPING MALL



PLAZA SENDERO SHOPPING MALL

Spaces within the analyzed area that do not exceed 2,000 m<sup>2</sup> of profitable area.

**Weaknesses**

**Competition:** According to the capacity model, there is an oversupply of more than 53,000 m<sup>2</sup> of a profitable area in the analyzed area, this due to the forthcoming opening of Explanada Culiacán.

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Within the primary Trade Area there are about 32,000 households, however, the socioeconomic level which predominates, has an average family income of \$ 14,500 pesos per month, that is, 14% lower than the national average of \$ 16,536 pesos per family per month.

**Threats:**

**Competition:**

La Ceiba (6.1 km) is another shopping center under construction that is located within the analysis area, it will have 40,000 m<sup>2</sup> of profitable area and will have anchors such as Cinépolis VIP, Coppel and Cimaco.

There is a commercial area in planning that is contemplated in an area of 36,000 m<sup>2</sup> belonging to the Industrial Park La Costa (0.5 km), which includes restaurants and services.

**Conclusion:**

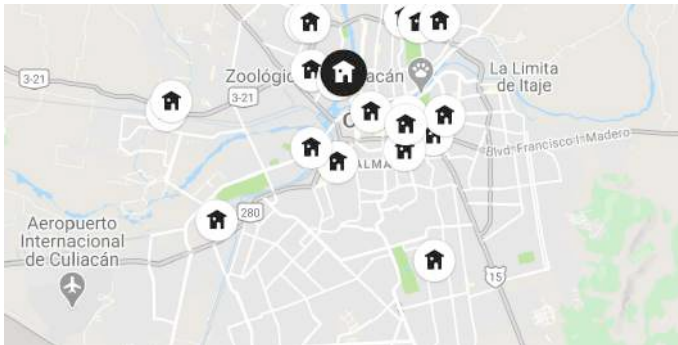
The main commercial area is a Neighborhood Center-type commercial services and convenience area with a profitable area between 10,000 m<sup>2</sup> and 11,000 m<sup>2</sup> in phases.

(<https://creasoluciones.com.mx>)

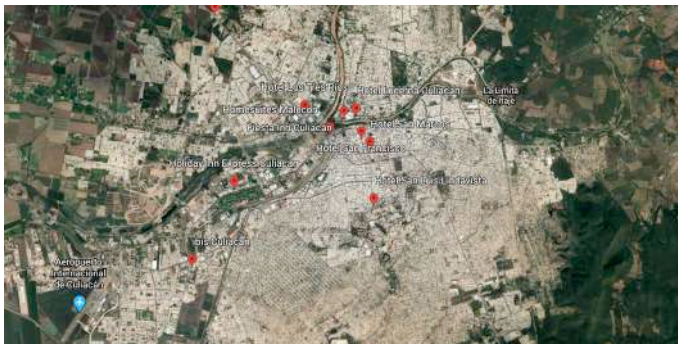




TYPE OF HOTELS IN CULIACAN



AIR BNB LOCATIONS IN CULIACAN



LOCATION OF HOTELS IN CULIACAN

## HOTEL

### Strengths:

The analyzed hotels have an average occupancy of 65%, all of them 3-star category. The average rack rate presented by the analyzed hotels is \$ 1,099 pesos per night. The arrival of tourists to Culiacán in the period 2015-2019 grew 49.6%. These tourists stay mainly in 3-star and 4-star hotels. Culiacán International Airport during the period 2015 - 2019 had a 72% increase in passenger arrivals, mostly domestic.

The number of flights at Culiacán International Airport during the period 2017-2019 presented an increase of 26.7%.

### Opportunities:

The hotels analyzed are 3-star, there is the opportunity for a new hotel with a higher category.

The proximity of the evaluated site to the Culiacán International Airport is definitely an opportunity for new hotels. The new hotel could have between 110 and 120 standard and suite rooms.

### Weaknesses:

Because the analyzed area is still in the consolidation stage, there is a lack of shops and services that are attractive to future guests.

### Threats:

Two hotels under construction were identified: Fiesta Inn Express in Explanada Culiacán (1.2 km) of a 4-star category. Fiesta Americana Culiacán (6.1 km) of a 5-star category.

The Airbnb platform represents a threat to the hotel sector, in Culiacán there are currently 336 units, with a growth rate of 16% quarterly on average. The average monthly occupancy of Airbnb units is 53% and the unit rate is \$ 822 pesos per night.





EL TREBOL INDUSTRIAL PARK



CENTAGRI INDUSTRIAL PARK



QUAZAR INDUSTRIAL PARK

## INDUSTRY

### Strengths:

The warehouses within industrial parks have an average rental price of \$ 78 pesos per square meter, which is 38% higher than the stand-alone warehouses with an average of \$ 56 pesos per square meter. The site is located within an industrial corridor with parks such as La Costa (0.5), El Trébol (1.3 km), Quazar (2.4 km), so it would have excellent synergy.

The property is located in a strategic place: less than three minutes from the Culiacán International Airport and the Benito Juárez Highway, which connects to Culiacán - Mazatlán, and Culiacán - Los Mochis roads.

Exports in the Industrial sector in Sinaloa registered an increase of 10.1% in 2018.

### Opportunities:

The logistics park could be divided and sold under a condominium regime with lots in progress for the construction of warehouses by the owners.

Within the industrial parks analyzed, there is little supply in wineries with surfaces less than 1,000 m<sup>2</sup>, so offering surfaces from 500 m<sup>2</sup> would be attractive.

### Weaknesses:

According to José María Cadena, president of the Council for the Economic Development of Sinaloa (CODESIN), some of the problems for installing more companies in the state are land use permits in industrial sectors (<http://codesin.mx/category/reportes-economicos/>).

### Threats:

Currently, Parque Fundadores, PyME (Industrial park of small business) (1.4 Km) is being built, which will have about 59,000 m<sup>2</sup> of area in lots within the park.

Parque Centagri (Industrial park) plans the purchase of land of about 98,000 m<sup>2</sup> to expand its park, which would reach close to 300,000 m<sup>2</sup> of total land.

### Conclusion:

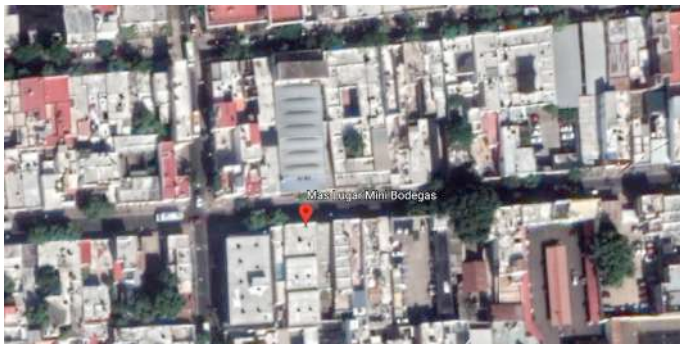
It is recommended to use a surface of 30 hectares of industrial use. (<https://creasoluciones.com.mx>)



PERSONAL STORAGES ON HIGHWAY



FACADE OF PERSONAL STORAGE



PERSONAL STORAGE IN THE CITY

## STORAGE

### Strengths:

The mini winery developments analyzed have an average occupation of 87%. The occupation of the warehouses that are within the Trade Area is 92%.

In 2013 the Mexican Self Storage Association (AMDAAC) was created with the aim of achieving a standard of competition, generating synergy, and making agreements between the associations. They have 13 associated companies.

The proximity of the property with the Culiacán International Airport favors that the mini-warehouses can also be part of a logistics center for e-commerce.

### Opportunities:

The industrial warehouses located within the analysis zone are important demand generators for the development of mini-warehouses.

The tenants of the future shopping center could be potential clients of the mini-warehouses.

The new development of mini-warehouses could offer complementary services such as removals.

The urban sector Bachigualato which is in the process of growth does not have a supply of mini wineries.

### Weaknesses and Threats:

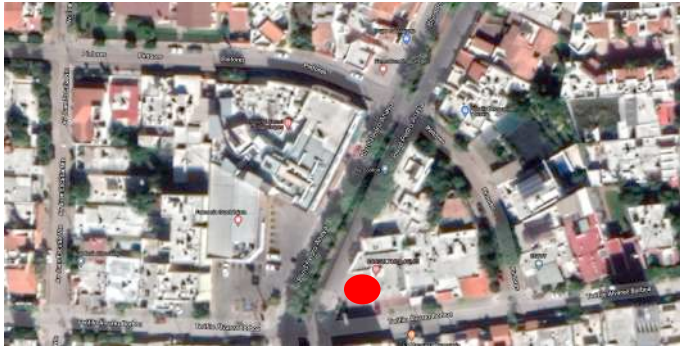
One of the main generators of demand for mini-warehouses is vertical housing developments, which are not yet well established in the analyzed area.

Within the primary Trade Area there are about 32,000 households, however, the socioeconomic level which predominates, has an average family income of \$ 14,500 pesos per month, that is, 14% lower than the national average of \$ 16,536 pesos per family per month.

### Conclusion:

The inclusion of a 3 to 4 thousand m<sup>2</sup> area for the sale of mini-warehouses in the analyzed property is considered viable.

(<https://creasoluciones.com.mx>)



CORNER CLINIC IN THE CITY



LARGE HOSPITAL IN THE CITY



HOSPITAL COMPLEX IN SUBURBS

## HOSPITAL

### Strengths:

The analyzed offer of medical offices is located in the downtown area of Culiacán where there is a medical cluster. The rental prices in doctor's offices range from \$ 125 to \$ 423 pesos, depending on the conditions and age of building.

It is estimated that in 2020 in the municipality of Culiacán there are more than 256,000 people under the age of 14 and more than 89,000 over the age of 60 years old. These segments of the population generally demand more medical services.

### Opportunities:

Currently, the only hospital within the analyzed area is Hospital Angeles Culiacán, which is 15 minutes by car from the evaluated site.

A hospital and consulting project would be the first choice of private health services for the industrial parks around the site.

In the analyzed area, there are 7 pre-sale and sale housing developments, for a total of 639 units, which could mean more than 2,300 new inhabitants in the area who will demand medical services.

### Weaknesses:

The site is located away from the cluster of hospitals and clinics located within the first square of Culiacán (downtown area).

The average monthly family income in the primary area is \$ 16,903 pesos per month, making it a population that dedicates few resources to private medical care.

### Threats:

82% of the population of the municipality of Culiacán is affiliated with some public health services such as IMSS, ISSSTE, or popular insurance, among others.

(<https://creasoluciones.com.mx>)





SCHOOL IN HISTORIC CITY CENTER



STUDENTS IN PUBLIC SPACE



SCHOOL BUILDING TO THE LEFT

## SCHOOL

### Strengths:

Prestigious universities such as the Tecnológico de Monterrey and Universidad Tec Milenio occupy properties of more than 50,000 m<sup>2</sup>. The property in Natura could offer that surface to similar universities. About 27% of the population of Culiacán are potential users of basic education services (preschool, primary, and secondary). Another 27% are in an age range between 15 years old and 29 years old, that is, potential users of upper and upper-middle level, including post-graduate degrees.

### Opportunities:

Many higher-level students from other towns in Sinaloa such as Los Mochis, Ahome, and Guasave migrate to Culiacán in search of an educational offer. A mixed-use project that includes housing would be a generator of demand, mainly for basic education services (preschool, primary and secondary).

The analyzed area is one of the growth poles of housing.

### Weaknesses:

The closest multilevel schools to the property, Multiversidad Latinoamericana Campus Barrancos (3.2 km) and Colegio Valladolid (3.4 km), have the lowest tuition fee with \$ 1,400 and \$ 1,470 pesos per month, respectively, the sample average is \$ 3,983 pesos. Currently, public transport routes do not pass in front of the property, the most are Bachigualato - Paraíso, Bugambilias, and Bugambilias Norte, so you would have to walk for more than 10 minutes.

### Threats:

In the municipality of Culiacán during the period 2017 -2018 there was a decrease in enrollment at the primary and secondary levels of 1% and 5% respectively.

(<https://creasoluciones.com.mx>)





OFFICE AT LA CEIBA MIX USE DEVELOPMENT



TARA OFFICE SPACE IN LA PRIMAVERA INDUSTRIAL ZONE



120 OFFICE BUILDINGS NEAR THE RIVER

## OFFICES

### Strengths:

The average rental price per square meter of the A + offices analyzed is \$ 260 pesos, that is 29% more than class. An office with an average of \$ 202 pesos and 60% higher than class B offices with an average of \$ 163 pesos.

Class A offices have an occupancy of 91%, that is 10% more than Class B with 81% and 23% more than Class A + with an average of 63%.

### Opportunities:

There is an opportunity to have spaces for virtual office operators and coworking, this concept already has a presence in Culiacán with a rental price of \$ 1,500 pesos per m2.

### Weaknesses:

The analyzed property is not located on the financial corridor of Blvd. Pedro Infante - Tres Ríos, so an office project would not have the same synergy.

The companies installed in the area usually have offices within their industrial warehouses.

Accessibility to the site is primarily by private cars since there are currently no public transport routes that pass in front of the property.

### Opportunities:

There is an opportunity to have spaces for virtual office operators and coworking, this concept already has a presence in Culiacán with a rental price of \$ 1,500 pesos per m2.

### Threats:

Currently, there are several projects under construction with sale and rental of office spaces, all on the financial corridor Blvd. Pedro Infante - Tres Ríos:

Ceiba with 24,900 m2 of office area.

Estela Corporate center with 25,400 m2.

Corporate 4 Rivers with 12,000 m2.

These projects add 62,300 m2 of the office area.

(<https://creasoluciones.com.mx>)

## WORLD REFERENCES



LONDON, UK.



OSLO, NORWAY.



PRAGUE, CZECH REPUBLIC.

## STRUCTURE

There exist plenty of urban structures but to simplify it, we can say they are organic and square. In Medieval ages, cities were usually built on organic structures such as we can see in the center of London. It is a more complex system, where it's hard to navigate although as we can see in this picture all roads lead to a center-points and there are several centers within the grid. The density we see in the grade of London is one of its kind because it's compact, organized and carefully crafted through time.

Center of Oslo we can see the great Bank orthogonal but with different sizes of blocks. Smarter on the edges and larger blocks at its core. With the smallest size 0 45 m and the largest 120 m wide blocks.

Smaller logs are more friendly for pedestrians to walk since they can access other streets easily.

The inner courtyard in the blocks in the center of Oslo is small with sizes of 15, 20, and 35 meters wide.

In the seventh district of Prague, the blocks are much bigger, the longest one has 300 m in one site and they range from 45 and more on the other. When blocks are too long it is dividing one side of the district to the other since people have to walk all around to get to the next street. But specifically, in this case, it works well because to the north of the longest block it's a park so the block guides the people from the core of the district to the park creating density on the street.

The courtyard on the inside of the blocks range in size but on average have a 65 meters width on one side, while the other can be between 35 up to 250 meters long.

There are some successful courtyards where people from the apartments were able to organize and maintain a shared green area. But in other cases, the inner courtyard is divided into several private courtyards respectively for each building making the parks too small to be useful,





LONDON, UK.



OSLO, NORWAY.



PRAGUE, CZECH REPUBLIC.

therefore it happens that the inhabitants of the building lose interest in maintaining it. Its use becomes limited to the garbage and some storage space.

As previously mentioned the organic grid at the center of London, allows for interesting views and passages. In this picture, we can appreciate both the variety of architectural styles that have been a witness to the evolution of the city. Different heights create more place insights and higher density.

In Oslo, we can say a well-organized Street design with white sidewalks and public transportation. Interestingly we can see how in both the city center of London and Oslo there are a few or none trees. It keeps a clean aesthetic and clear view while allowing the sunlight to feel the streets and facades.

The bottom picture is the district of Vinohrady, a well-demanded district of Central Prague. It's mixed-use makes it attractive as well as the density of people but it is clear from the picture that there is a parking space issue. There are too many cars parked on the streets and prioritizing their use makes sense side works for pedestrians. The street contains some trees which makes it pleasant while not so many trees to darken the facades.

Ideally, there should be efficient public transportation with a sustainable mix-use program on each block for pedestrians to thrive. But still, we cannot ignore the current need that we have created for cars, therefore the optimum would be to find a way that works for both cars and pedestrians.

Perhaps if the inner courtyard of the blocks is empty there could be space for parking. With the aim to free the streets from parked cars and widen sidewalks.





OSLO, NORWAY. PEDESTRIAN BRIDGE.



A MULTI MODAL DESIGN FOR PUBLIC AND PRIVATE TRANSPORTATION.



CAR FREE CITY CENTER MASTERPLAN

## MOBILITY

Moving around in the capital of Norway is easy and comfortable. Since density is low and public transportation efficient, there are usually no congested trams and buses.

Also, the city center is quite flat making it attractive to bike and walk. There is a municipal plan to make Oslo city center car-free. Providing the necessary infrastructure such as pedestrian bridges, biking roads, and parking lots for bikes, wide streets, and frequent bus and tram stations, located strategically for buses or trams every 250 - 300 meters.

Parking spaces have been removed from the city center, as well as cars being banned from certain streets, easing the way for pedestrian use.

The public transportation network in Oslo is not limited to the land. Since it is a coastal city there is a ferry system moving people from the center to the main islands.

As well the city is connected to the airport via a high-speed train. The airport is located 45 kilometers from the city center but the trip takes 20 minutes and it runs every 10 minutes.

There is a major development to be built in the airport area of Oslo. I can imagine it will work as an extension of the city rather than a satellite district due to its quick connection to the center.

By looking at the trend of freeing city centers from cars in the capitals, such as the case of Oslo, Madrid, New York, and Mexico City. I found that new development is starting to be promoting a car-free living, supported by efficient transportation and pedestrian priority.

On the top image is the city of Hamburg in Germany and we can see a green loop circling around the city. This is an ongoing project to increase sustainable mobility in the city through a network of parks and public spaces.



HAMBURG GREEN LOPP MASTERPLAN



MOBILITY SYSTEM INSIDE OBERBILLWERDER



VISUALIZATION OF CAR FREE LIFE INSIDE THE DEVELOPMENT

Below we can see Oberbillwerder, it is the largest one-off development in Germany since Hafen City. A new district of Hamburg. The 124 ha development area is located at the edge between city and landscape. A visionary approach to anti-iconic architecture, future mobility, and responsible use of resources.

The overall development strategy embraces social, financial, and environmental sustainability as well as climate adaptation through a nuanced distribution of functions, typologies and resources.

Smart mobility and infrastructure ensures rapid connections to Hamburg's city center but prioritize pedestrians, cyclists, and public transport. The broad green artery that weaves into the plan provides access to all neighborhoods, public functions, and social activities. ([www.adept.dk](http://www.adept.dk))

It is a perfect reference for the vision of Natura.



MELBOURNE, AUSTRALIA 453 PEOPLE PER KM2



OSLO, NORWAY 2,166 PEOPLE PER KM2



MANHATTAN, NEW YORK. 25,846 PEOPLE PER KM2

## DENSITY

Density is key to the success of a city if there are too few people then it is not sustainable to have a restaurant or shop, plus it gets boring when streets are empty. Too much density can be negative if not organized such as in cases like Mexico City or another metropolis of the developing world.

But in general, people like to see other people while being on the street. It creates a sense of community and helps cities to be more secure because there is, as Jane Jacobs said: "Eyes on the street" (Jacobs, 2017).

In Melbourne Australia besides the city core, the density is extremely low. There is no more than 500 people in square kilometer. I have personally never been to Australia so my opinion is limited but I can imagine streets being quite empty and people driving from the suburbs to the core just to see other people.

In Oslo, Norway where the density is between 2,000 to 3,000 people per km<sup>2</sup>, it is enough to witness an urban life, while not so much to be congested.

The extreme case can be Manhattan in New York, one of the densest cities in the world, with more than 25,000 people per km<sup>2</sup>. It is a fascinating city where every day you'll meet millions of people in the street. This allows for the exchange of ideas, cultures and vibrant economic activity to exist. It's hard to imagine that every city would be as dense as Manhattan. I think there is a reason why some cities are more dense than others and there are people that enjoy less dense places too.

Natura has an area of roughly 1 km<sup>2</sup>, and I believe in order to create an urban environment at least 10,000 people should be able to live there. This will allow businesses to thrive and social life to exist.





MELBOURNE, AUSTRALIA 453 PEOPLE PER KM2



OSLO, NORWAY 2,166 PEOPLE PER KM2



MANHATTAN, NEW YORK. 25,846 PEOPLE PER KM2

People usually move from smaller cities to larger ones in search of opportunities for work and social life. Dense cities offer better services, public infrastructure, and diversity. Therefore richer experiences.

Today, 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050. Projections show that urbanization, the gradual shift in the residence of the human population from rural to urban areas, combined with the overall growth of the world's population could add another 2.5 billion people to urban areas by 2050, with close to 90% of this increase taking place in Asia and Africa, according to a new United Nations data.

It is critical how the future will be planned for cities to adapt to the upcoming migration. So far I have witnessed that in Mexico the evolution of cities has been a collection of housing projects rather than urban development.

This migration represents an opportunity to create new centers on existing cities and even near cities from scratch.





SOFT EDGE OF THE CITY



VIA WEST 57



SOUTH RIVERSIDE PARK

## WATERFRONT

Manhattan island has approximately 47 kilometers of waterfront. Surrounded by three rivers Hudson, East, and Harlem.

Along the riverside, there is a network of parks such as Highbridge Park, Inwood Hill, Riverside, J.V.L East River Park, Rockefeller, and Battery Park.

Riverside Park is the longest one, with 6 kilometers of coastline, starting at the Piers in Manhattan Cruise Terminal in the south. It extends to the north ending at the General Grant National Memorial in West Harlem, but the green belt seems to connect all parks along the Hudson River, so one could say that the true length of the green infrastructure on the west side of Manhattan is 20 kilometers long. Starting at Rockefeller Park all the way up to Inwood Hill Park.

This is important, because it is not a continuous single park but a connected network of parks and public spaces, with different qualities serving diverse purposes. Piers, stadiums, Museums, Churches.

In some areas, the connection between the city and the park is soft and effortless like you can see in the top picture. But in other areas, for example when the famous building VIA West 57 building meets the river, there is no direct park since 12th avenue dominated the space.

In my opinion is good to have areas with parks with some exemptions to enhance the diversity in the waterfront and skyline.

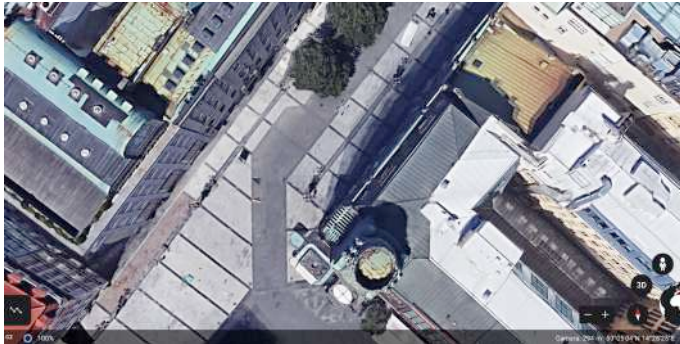
In Riverside Park, the width of the green space varies from 100 to 200 meters before it reaches the water or the highway next to it.

Natura has two kilometers of water canal front but its connection is interrupted by three bridges, two existing and a future one in the central area which is planned by the city to connect to the highway.

So in order to keep a continuous park along the canal, then a pedestrian ramp-bridge could be proposed over the Boulevard Air Force, since it's 40 meters wide.



WIDE CROSSING STREET AND URBAN FURNITURE



DEFINING EDGES TO DIVIDE CARS AND PEDESTRIAN USE



SIDEWALKS MATERIAL AND DESIGN

## STREETSCAPE

Sidewalks in the center of Prague are made out of small stone blocks of granite, black and white, and with them, they form special patterns that provide identity to the spaces on them.

Just like a building sometimes has different flooring materials or textures, the city can be enriched with ground covers such as in Prague. Stone grounds are effective for rainwater to penetrate the soil and avoid flooding. Also, they are easily replaceable when in need of service.

The design of sidewalk flooring is an important element to give character to the street, and it should be embraced in Natura. Simple patterns that won't be out of fashion in the future, such as several streets in Prague. They are hundreds of years old and remain attractive.

Urban furniture is another element to be integrated within the streetscape. It provides the opportunity for people to sit and enjoy the city, sometimes for a quick call or a snack.

Textured streets cause vibration for cars when driving by, and this communicates the drivers to slow down giving priority for pedestrians.

We must not forget that cities are for people to walk. People drive cars, but walk to them and out of them, all destinations are reached by foot, so the pedestrian comfort and accessibility must be the top priority in our cities. Every other form of transportation is temporary, eventually, technology evolves just like we don't use horses anymore, in the future we won't depend on cars to move around, so cities should not be built for cars anymore.

It is interesting to see how the top destinations in the world for tourism are walkable cities, on every continent. What people enjoy is to walk and meet other people on the go.

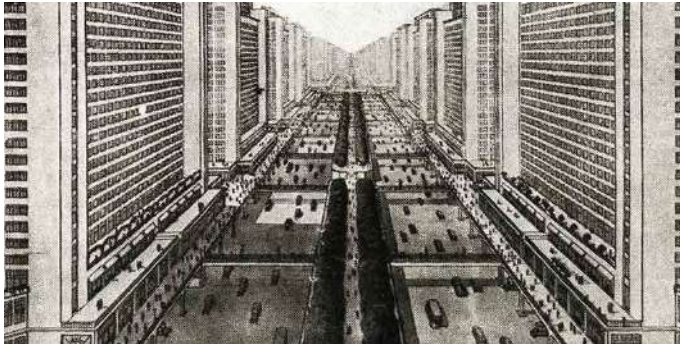
Streetscape for people invites restaurants to serve the food on the sidewalk, residents to sit by the door and contemplate life without the hazard and pollution of excessive motorized vehicle use.

It is important to use a material or texture depending on the purpose, for example, to skate or bike stone blocks are not convenient, polished surfaces might be a better option in this case. It all depends.





THE IDEAL CITY BY FRA CARBEVALE 1420-1484



VILLE RADIEUSE 1930 BY LE CORBUSIER



TOYOTA CITY 2020 BY BJARKE INGELS

## IDEALS

Through the ages, man has tried to design the perfect human settlement.

Their proposals are inspired by the wants of the society contemporary to their projects, an ideal place to live and inspire in what their cities did not provide. For example, back in 1420 the ideal city was an ordered place of a human scale, five to six stories high. It was not the highest it could be, because by that time there were already cathedrals more than 80 meters high. What I find interesting is the absence of trees in Fra Carnevale's vision. Probably most people living in rural areas were dealing with natural threats as part of the day. Living in a treeless city kind of symbolizes the domination of man over nature.

After the third industrial revolution in 1930 Le Corbusier visualized Villa Radieuse, a standardized and infinite city of repetitive buildings that lacked ornament or anything rather than mere functional elements. It seems to me that Ville Radieuse is so monotonous, it becomes a clean slate for its residents to focus only on their pursuit of individual progress. Ironically it was this type of urbanism that was adopted by communism expressing the opposite. There is no individual but masses to be allocated.

Nowadays we are experiencing a shift back to nature, cities have become so crowded and in many cases polluted, that what we miss is tranquility and harmonious living in wood buildings filled with trees and greenery.

Technology is allowing us to be less dependent on moving in order to satisfy many of our needs. Life is delivered at your door.





(Y)OUR CITY CENTRE. GLASLOW, SCOTLAND



ROHANSKY ISLAND PRAGUE, CZECH REPUBLIC



TOYOTA CITY 2020 BY BJARKE INGELS

## FUTURE DEVELOPMENTS

(Y)our City Centre, a collaborative framework initiated by Glasgow City Council will transform the center into a lively, green, livable, attractive, and competitive area.

Taking on a holistic and integrated approach, the idea here is to fill up unused plots and utilize existing infrastructure i.e. making them more versatile, mixed, and smart in their functions. ([www.mvrdv.nl/](http://www.mvrdv.nl/))

Rohansky Island in Prague: The proposal divides the area by the structure of street spaces into regular building and non-building blocks. Using the street line and construction line, limited gross floor area, and other rules, binding requirements for construction in the area are defined, including height regulation. Proposals for the material solution of buildings in blocks within the given rules are left to individual builders in more detailed projects. The presented design of the material solution ("masterplan") shows one of the many solutions for the location of buildings within the building blocks. The border between the buildings and the nature park is determined by a new promenade for pedestrians, cyclists, and skaters. Its edge and importance are supported by an alley with beautiful views of the river. The slope slightly towards the water offers a seat. A small square is designed at the intersection of the inner street and the access route from the metro station. ([www.hnilicka.cz](http://www.hnilicka.cz))

Toyota City. Danish architecture studio BIG is designing a "prototype city of the future" with wooden buildings and autonomous vehicles for Japanese car company Toyota near Mount Fuji in Japan.

Named Woven City, the first phase of development on the site of a former car-factory will be home to 2,000 people who will test the vehicles, robotics, and smart homes in a "real-world environment". ([www.dezeen.com/](http://www.dezeen.com/))

## MIX USE BLOCKS



80 X 70 METERS BLOCK



190 X 115 METERS BLOCK



230 X 160 METERS BLOCK

## SCALE

There are two factors to take into account on the scale of blocks, one is the outside dimensions, how the block relates to the streets, the distances that are created by solid buildings on the ground, how long they are and the facade, how high could it be. Then there is the inner factor of the block scale, the courtyard, is it big enough for something to take place? Will the people be comfortable with the distance between apartment windows on the inside courtyard? Does the height of buildings and the scale of the courtyard allow the sunlight to enter the spaces inside apartments, offices, etc.?

On the pictures to the left, there are three scales of blocks in the city center of London. I choose this particular location because it explains three scenarios of how the courtyards can be used.

The top picture is a mix-use block, with housing and offices on the perimeter construction and industrial use inside the courtyard.

The warehouse seems to have access to natural light through the roof, but I wonder how can this be achieved while making use of the roof for recreational purposes.

If the courtyard is taken away from the residents then the roof could be used as its apartment building common space.

On the west side of the block near the top corner is the entrance to the warehouses. Access for trucks and service.

The middle picture portrays a block with more open space inside itself, although it is not a single courtyard but a series of them allowing the distance between the group of buildings. The scale here gives room for sports facilities and playgrounds to take place, we can imagine a school is part of the block as well as apartments and small industrial buildings located in the southern facade. In the north facade, there is an inviting public space as an extension of the streetscape.

At the bottom, in the largest and most complex block is visible that the plots within are not regular. The proportion of built to courtyard space is approximately 85% built, in this case, some buildings have blind facades and a few of them are located completely inside the block. The scale of the block allows it.





FACADE ON MIX USE BLOCK



COURTYARD OF MIX USE BLOCK



INTERIOR AT MIX USE BLOCK

## QUALITIES

Even though from the air perspective the block seems saturated, on the pedestrian level, the distinction of the limits of the block is not clear, but the spaces in between seem fun and interesting. Imagine being inside the courtyard of a building that is already on the inside of the block, would it matter?

The picture on the left page is the same location as the previous pages, on the scale content. Organize in the same order.

On the top image is the facade of the apartment building with the warehouse in its courtyard. As you can see it makes no difference for the pedestrian walking aside the block since the industrial use is hidden from the street sight.

The middle image is a closer look from and an aerial perspective to the playground in the courtyard of the block, it is possible to appreciate that there are two accesses from the street to the playground. Both are wide enough for cars to enter in case of service or emergency but in daily life it's mostly pedestrians who make use of this space. Quality will be the privacy and safety for the kids and residents to have sports courts and playgrounds away from cars. I can also imagine space must be much more quiet and calm as if it would be next to traffic.

On the bottom picture, is an interior portraying an old church which is located on the inside of one of the buildings that are hidden in the courtyard of the larger block I showed on the previous images. It is fascinating to think that it is possible to mix all these uses in a block while keeping them authentic and seamless, most definitely this was not planned but it evolved naturally and probably the church was there before other buildings were constructed next to it. But it works, and as for the streetscape, one can imagine the diversity of people sharing the sidewalk, each one of them happy to make use of the block for their favorite purpose.



ZURICH, SWITZERLAND



MEXICO CITY, MEXICO



TOKYO, JAPAN

## PROGRAM

Mix-use makes attractive cities, and as designers, we want to enhance diversity but it is out of our reach to decide whether a taco shop will take place or a gym. Normally when a program of a mixed-use development is over designed or specified completely, its conception normally loses authenticity and becomes boring. The unexpected variety of functions is what makes it interesting, and it usually happens like that when unplanned but flexible land uses allows.

This can be achieved through a regulation plan which is open to changes as long as the individual owners and users are happy with it. In many highly developed countries, such as Switzerland, every neighborhood has the right of opinion to approve or not a future development or even smaller changes in its neighborhood. On one hand, it makes the process for obtaining permits and begins construction slower, but when it is approved almost everyone is happy, therefore the future project is adapted to the common well being.

In Mexico, it can happen that suddenly after living peacefully for years in your house a bridge is built blocking the view and increasing traffic in the area, and there is not much a neighbor can do to stop it. In conclusion, diversity of program enriches cities, but there must be a plan regulating future development. As is said, rules are made to be broken, but still, rules make good guidelines for sustainable growth, considering all parties, social, economic, and environmental. On the bottom picture, we can appreciate a mix-use area in the suburbs of Tokyo, where there are houses, farms, warehouses, and schools.





AERIAL PERSPECTIVE LOOKING INTO THE COURTYARD



MASTER PLAN OF DEVELOPMENT



PEDESTRIAN VIEW FROM SECOND STORY

## FUTURE

The future does not unfold evenly across the world. It is some countries and societies taking the first leap into an alternative development by experimentation, and afterward, sometimes decades later, other countries follow.

As we saw in the ideals pages, visionaries often stick to a theme and manifest their concepts of what should be according to their interests.

I find this project very quite unique because it is offering the best of both worlds, a complex of highly technological skyscrapers surrounding what feels like a low rise village with small density filled with greenery as carefully placed as a zen garden.

It is an exemplary project, it opens the possibility to accept both realities, honoring the origins of our civilization but embracing the future. Zendai Himalayas Center by Mad Architect in China.

The mixed-use development, totaling over 560,000 m<sup>2</sup> of building area, will host commercial, hotel, office, and residential functions. The development “seeks to restore the spiritual harmony between humanity and nature” through integrating contemplative spaces that merge nature with the demands of modern living. ([www.archdaily.com/908039/mad-architects-nanjing-zendai-himalayas-center-nears-completion-in-china](http://www.archdaily.com/908039/mad-architects-nanjing-zendai-himalayas-center-nears-completion-in-china))



## **PARKS AND GREENERY**



AERIAL PERSPECTIVE TIDE PARK, LONDON



MASTERPLAN TIDE PARK, LONDON



HUMAN PERSPECTIVE TIDE PARK, LONDON

## LINEAR PARK

Even though it is not entirely linear, Tide Park in London is cataloged as such. I selected this example as a reference to use in Natura because it works well how the park brings the city into the waterfront. It opens up the views for the people on the inside of the city as well as the residents on the buildings.

Parks are becoming increasingly complex in comparison as before, for example in here we can appreciate the several levels which the park offers, and escalating ground down to the sea. The fact the green areas and walkways are not orthogonal it mimics the organic structure of the city of London, as a park is efficient since people normally walk in diagonals and wave-like ways, not entirely linear.

The Tide Park has received a lot of criticism as trying hard to copy the High Line of New York, which is a very successful project. No doubt it has been copied in many places around the world. The argument of critics is that it is an elitist place, focused on the corporate workers and residents of the luxurious residential buildings of the project.

As well as pretentious artwork being for display rather than a playground for kids to play. Adding to this is the fact that as a park is too monitored, and there is no permission for people to eat or drink? Strange, but its spacious principle of bringing the city into the sea then expanding through the coast is something I liked. I do agree that the sculpture-like lookout bridge to nowhere is pointless. High Line in New York works because like on the streets, there is the place to start and a place to go. Usually, people don't enjoy walking to a dead-end place where they have to come back in the same way.

Finished in 2019, the park manifests the pre-global crisis time when it was conceived a time in history where everything was possible and luxury was everyone's goal. Now in 2020, post-corona-virus time, luxury seems obsolete.



AERIAL PERSPECTIVE JIŘÍHO Z PODĚBRAD, PRAGUE, CZ



HUMAN PERSPECTIVE JIŘÍHO Z PODĚBRAD



AERIAL PERSPECTIVE OF ROUNDABOUT ON PARK

## CENTRAL PARK

Jiřího z Poděbrad Square is located in the Vinohrady district in Prague. The size of the park is 220 x 130 meters, with a total area of 28,600 m<sup>2</sup>.

In the center of the park is a church that works perfectly as the landmark of the district.

The structure design of the park is organic as it tries to connect the obvious access points at the centers and southwest corners leading to another park in the opposite direction.

The scale of the park is big enough to enrich the views of eight blocks of mix-use buildings surrounding the park. The benefit of it impacts thousands of people who live in nearby areas and other visitors that attend festivals and food markets, which happens regularly.

The park is easily accessible from the rest of the city since it contains a metro station underground and a tram stop on its southern sidewalk.

There is an art installation in the form of a water fountain, plus plenty of urban furniture for people to stay.

On the bottom picture is visible how a roundabout is embedded in the park. It is not a common element and I do not know the history behind it, but what I have experienced when visiting the park is the food trucks parking here during busy sunny days provide service to the people, without blocking the street or damaging the grass, so it is a practical strategy.

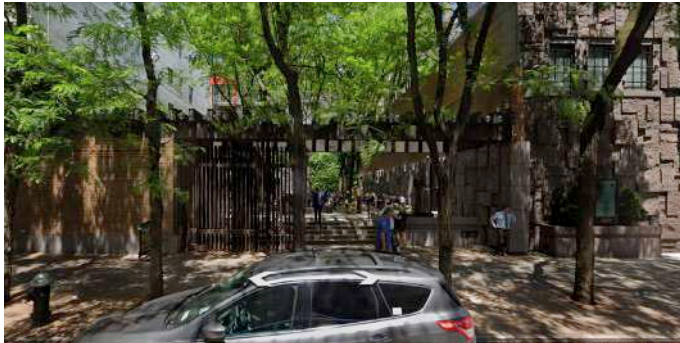




AERIAL VIEW, GREENACRE PARK, NEW YORK



INSIDE GREENACRE PARK



STREET VIEW, ACCESS TO GREENACRE PARK

## POCKET PARK

As they say, the best things come in small packages, parks don't have to be huge to have an impact. What people seek when visiting parks is an opportunity to relax and give themselves a break from the busy city life.

Pocket parks range in size but are no bigger than 1000 m<sup>2</sup> and are usually small in size but big in character.

Pocket parks don't use a lot of space and are not offering parking lot, because is not needed. Its main users are meant to be within walking distance, so pocket parks are integrated into the blocks but accessible from the sidewalk. They can be used by anyone, but psychologically they belong to its immediate community.

Greenacre Park is a privately owned, publicly accessible vest-pocket park located in the Turtle Bay neighborhood of Manhattan, New York City, designed by Hideo Sasaki, former chairman of Harvard's Dept. of Landscape Architecture, in consultation with architect Harmon Goldstone. The park, which is owned by Greenacre Foundation, was a 1971 gift from Abby Rockefeller Mauzé, the philanthropist, the daughter of John D. Rockefeller Jr., and the granddaughter of John D. Rockefeller.

The 6,360-square-foot (591 m<sup>2</sup>) park was assembled from three lots, which had previously been occupied by a store, a garage, and part of a synagogue. It features a 25-foot (7.6 m) waterfall, a trellis with heat lamps for chilly days, chairs and tables, as well as honey locust trees, azaleas, and pansies, which together attract an average of 700 visitors a day. ([en.wikipedia.org/wiki/Greenacre\\_Park](https://en.wikipedia.org/wiki/Greenacre_Park))



URBAN FARM IN HOTEL ROOFTOP. BOLOUGNE, FRANCE



URBAN FARM IN PARIS ROOFTOP



INDOOR URBAN FARM BY AEROFARMS IN USA

## URBAN FARM

As the world is seeking innovative ways to be more sustainable, urban farms are becoming increasingly popular in major cities around the globe. Its advantages are that with the technology available to grow food indoors and under the sun but with special irrigation systems and much less soil, we can cut the expenses and carbon footprint of some of the food we consume.

Another benefit of urban farming is that it can add greenery to cities, reducing harmful runoff, increasing shading, and countering the unpleasant heat island effect. "Garden plots can help people reconnect with the Earth, and gain a greater appreciation for where our food comes from..." (National Geographic, in <https://asiatimes.com/2016/03/rooftop-revolution-begins-the-green-knight-rises/>) Although planners have a long way to go, boosters envision soaring vertical farms that will eventually produce most of what we need within a short walk from home.

The middle photo is the largest urban farm under construction, located in the southwest of Paris the total area of the farm is 14,000 m<sup>2</sup>. More than 30 different plant species will produce around 1,000 kg of fruit and vegetables every day and provide a job for 20 gardeners.

"The farm will also offer a range of services related to urban agriculture, including educational tours, team-building workshops, and special events. Last but not least, there will be an opportunity for local residents to lease small vegetable plots of their own – in specially-devised wooden crates – helping to reconnect city-dwellers with their food source." (<https://www.theguardian.com/cities/2019/aug/13/worlds-largest-urban-farm-to-open-on-a-paris-rooftop>)





CHICAGO CITY HALL, USA



ROCKEFELLER CENTER, NEW YORK



CSOB HQ, PRAGUE, CZ

## ROOF GARDEN

As we built as a reduced natural ground, it would be optimum to replace the buildings footprint green area on its roof. It is happening now in some places and I show here some relevant examples and a brief history.

Chicago City Hall

"It was after the terrible heatwave in July 1995, when there were more than 700 heat-related deaths. It was decided to find ways of making the city cooler in spite of rising temperatures. Chicago's rich gardening history combined with Mayor Daley's mission to make it the 'greenest city in America' and a settlement from ComEd, created the ideal setting to build a huge, show-stopping green roof on the top of City Hall." ([land8.com/how-the-chicago-city-hall-green-roof-is-greening-the-concrete-jungle/](http://land8.com/how-the-chicago-city-hall-green-roof-is-greening-the-concrete-jungle/))

Rockefeller Center in New York

"The gardens on the building rooftops were part of architect Raymond Hood's original 1930 scheme. There were the plans to have gardens on the roofs of all buildings and also the plans for connecting bridges between the rooftops. But it was a difficult time and rooftop gardens only were included only in four buildings." ([www.bigapplesecrets.com/2015/07/rockefeller-center-roof-top-gardens.html](http://www.bigapplesecrets.com/2015/07/rockefeller-center-roof-top-gardens.html))

CSOB HQ Prague

"CSOB's five-story headquarters is situated at the base of the Radice valley and does not dominate the landscape. Existing trees were preserved and 730 quick growing and local species of trees have been planted on the site and in the nearby forest park. Six landscaped roof gardens have been created, 18,000 m<sup>2</sup> of lawn laid and 7,100 small shrubs have been planted, including climbing plants that cover sections of the facades. Climbing plants have also been used within the indoor courtyards to visually connect the roof gardens with the indoor environment, where plants also feature heavily." ([www.skanska.cz/en-us/Expertise/projects/57206/New-CSOB-headquarters-Radlicka](http://www.skanska.cz/en-us/Expertise/projects/57206/New-CSOB-headquarters-Radlicka))



## RESEARCH CONCLUSION

There are many factors that influence the well being of a city. It is the sum of them that make urban environments be successful. When creating a city we place the people at the center of our design the rest tasks to solve will present themselves naturally. To serve correctly the individual and masses.

Always taking into account the sustainability of the environment, society, and the economy.

Keeping in mind that people move from one place to another. Destinations are as important as the time it takes to reach them. Besides all other things that make walking comfortable, fun, and safe.

Cities are NOT the agglomeration of housing projects.

Urban environments are interconnected activities of endless forms and functions in a physical space.

Made for people by people. Places to Live, Work, and Play.

**PART II  
PROPOSAL**

## FOREWORD

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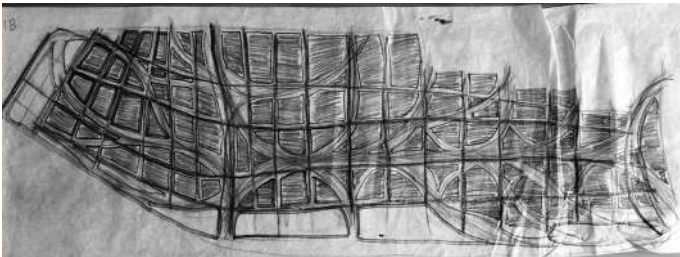
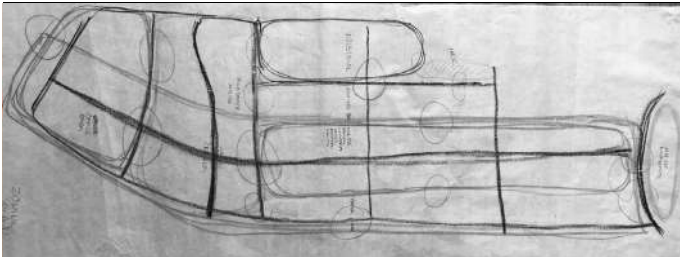
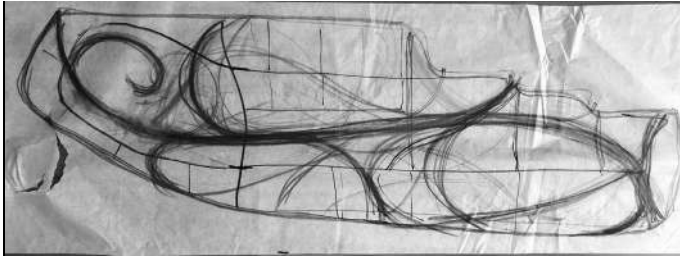
## AKNOWLEDGEMENTS

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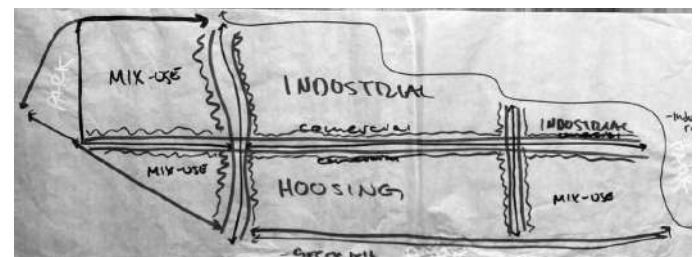
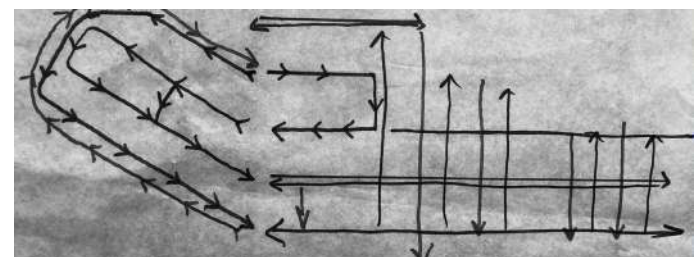
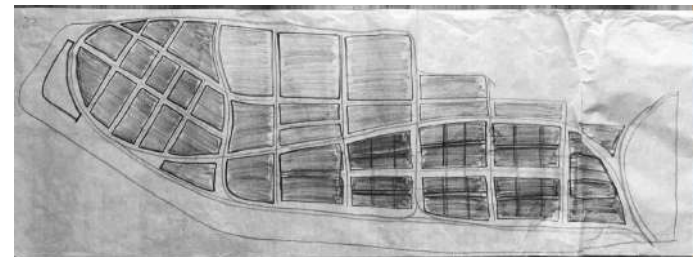
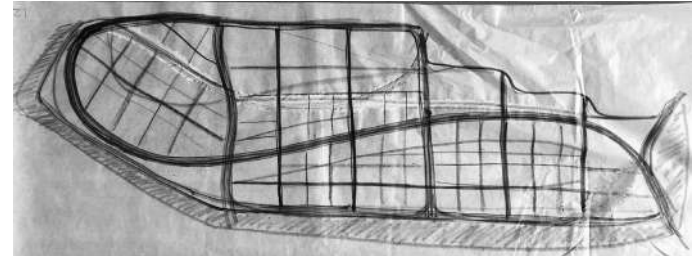
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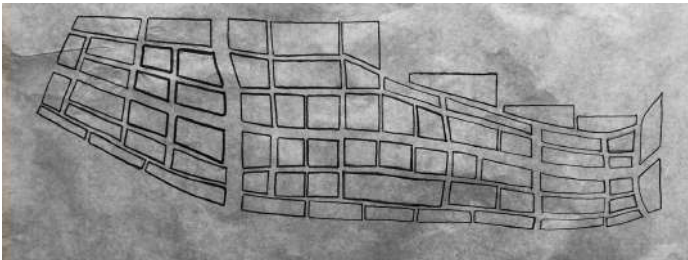
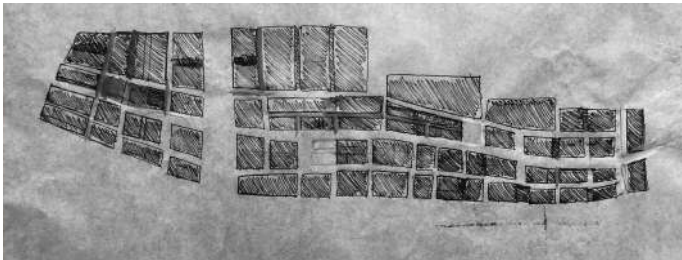
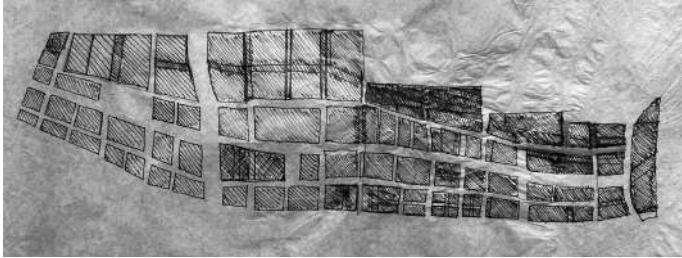
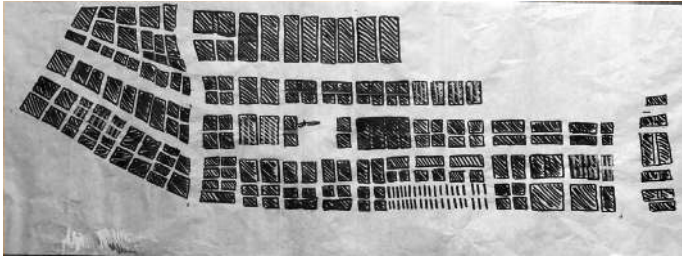




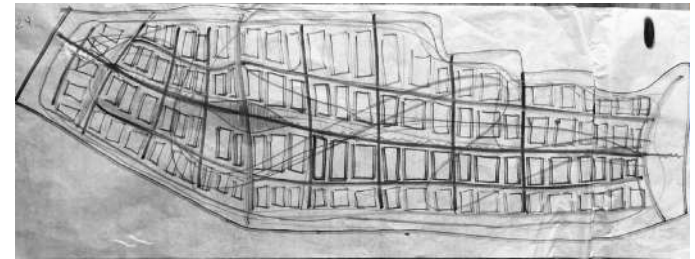
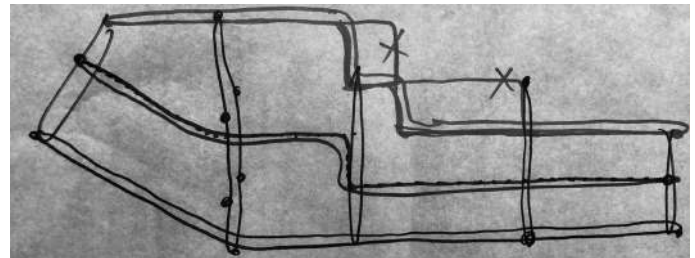
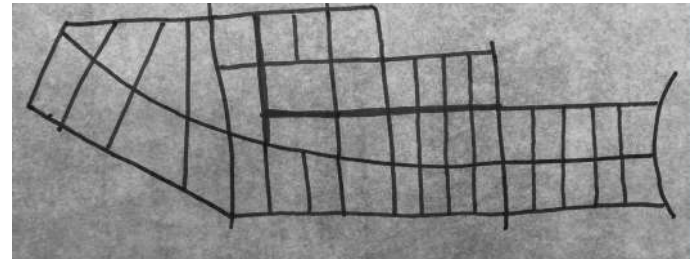
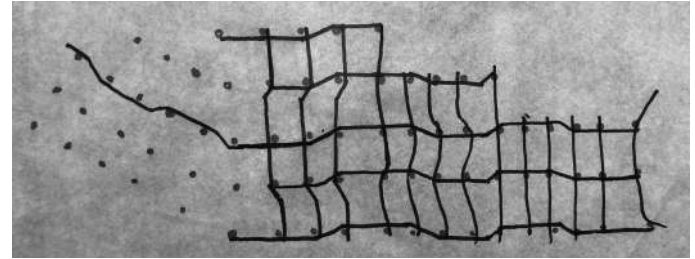
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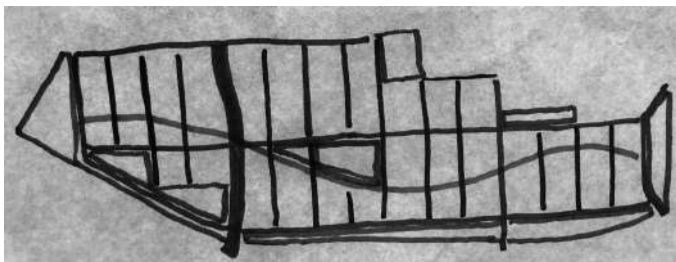
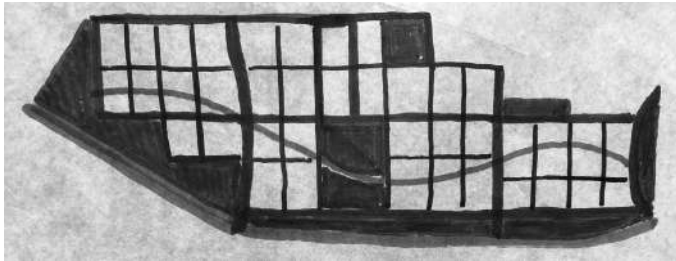
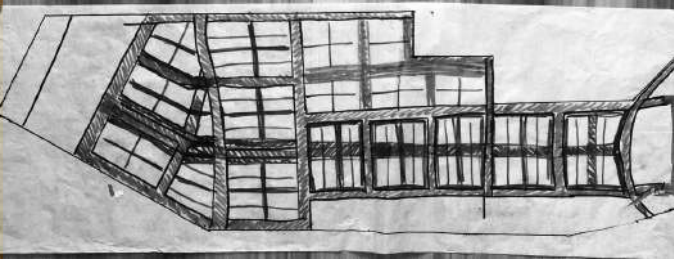
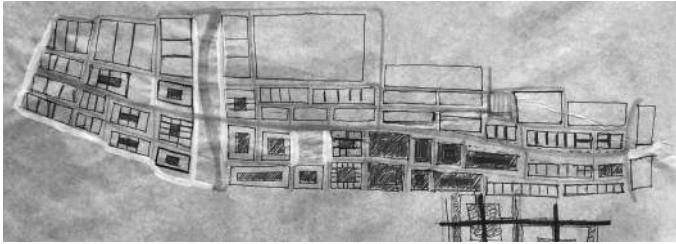


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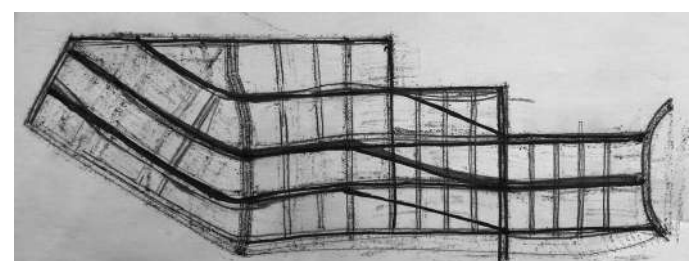
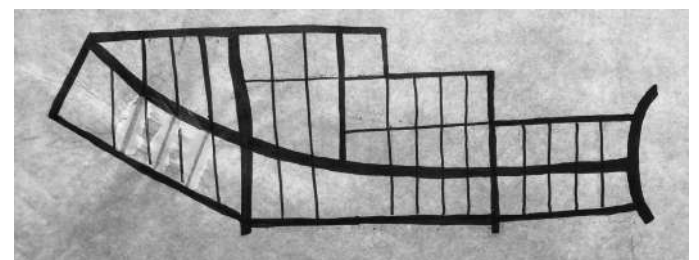
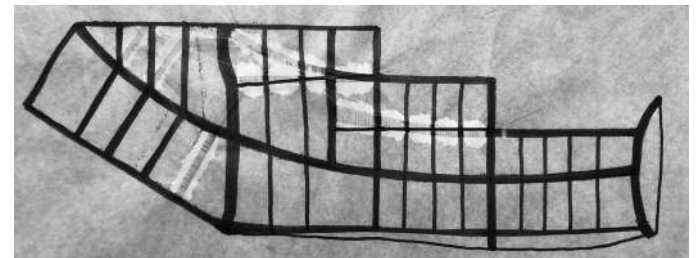
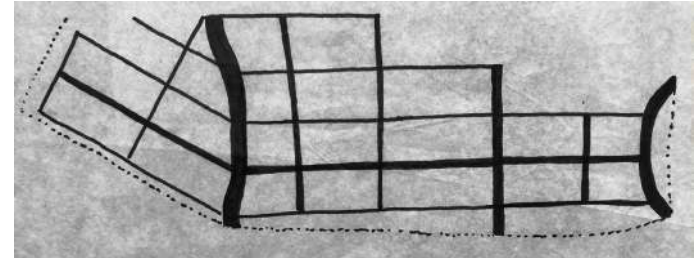


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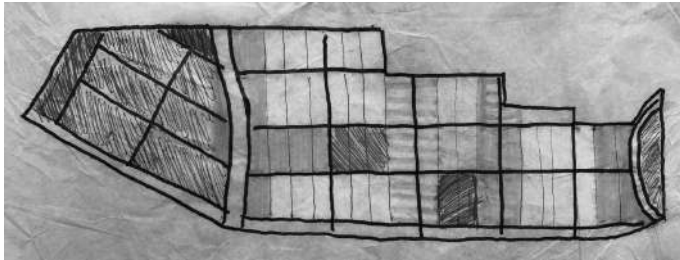
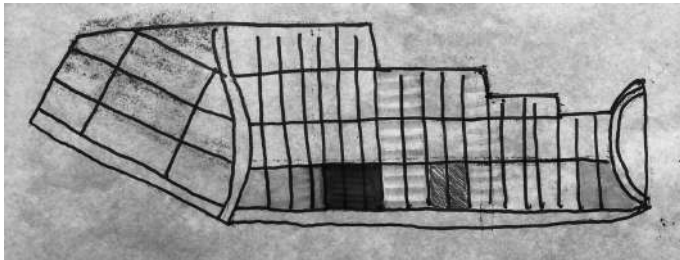
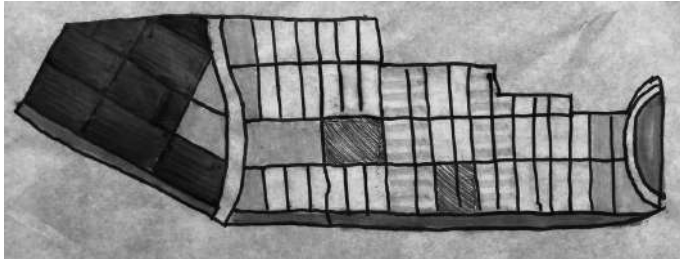
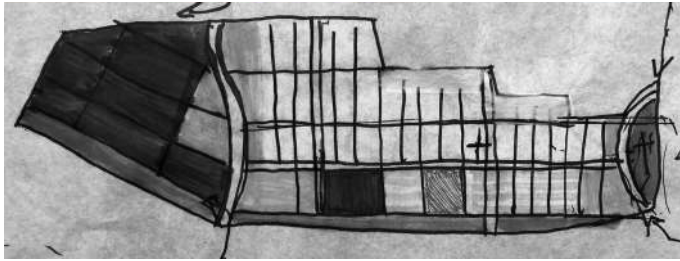


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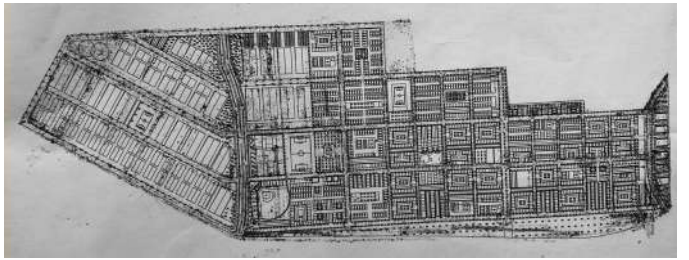
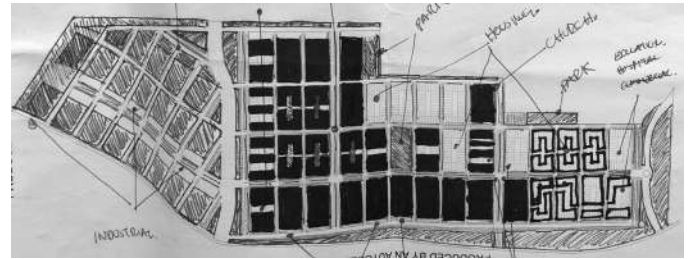
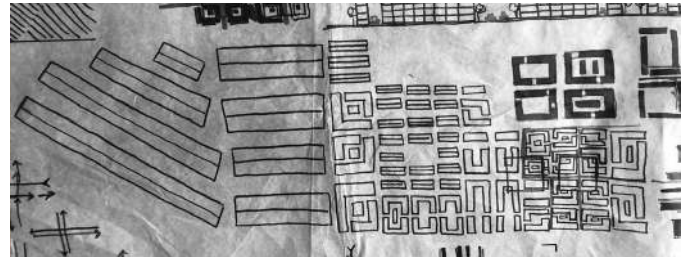
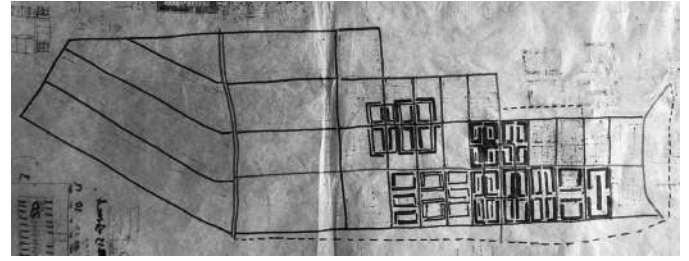


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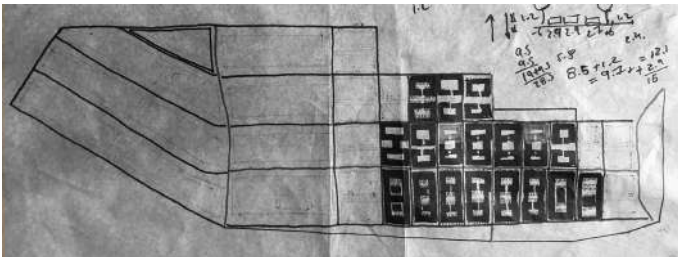
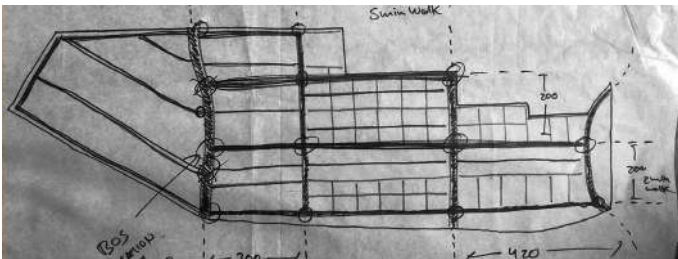
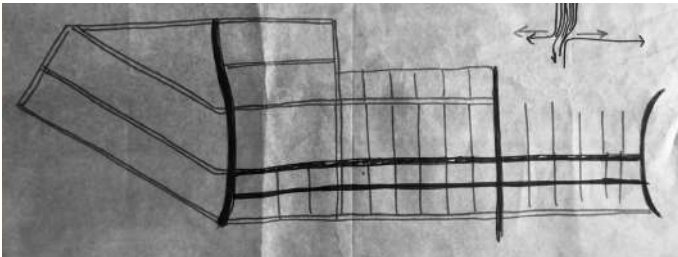
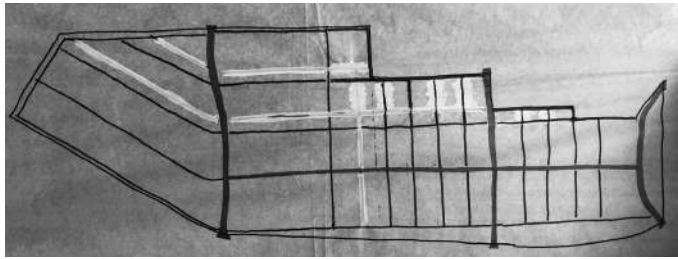




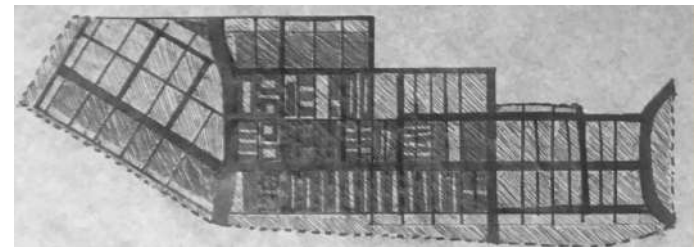
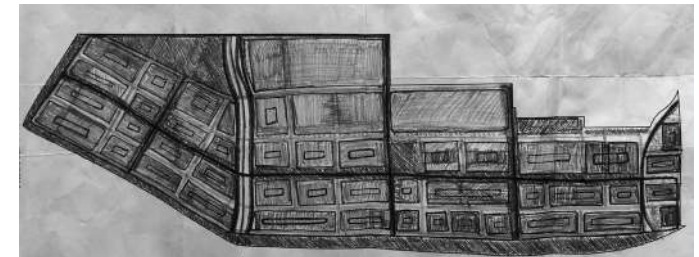
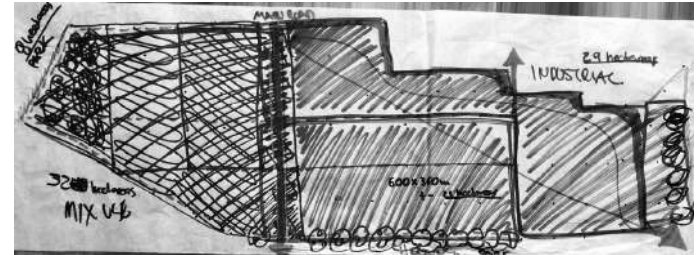
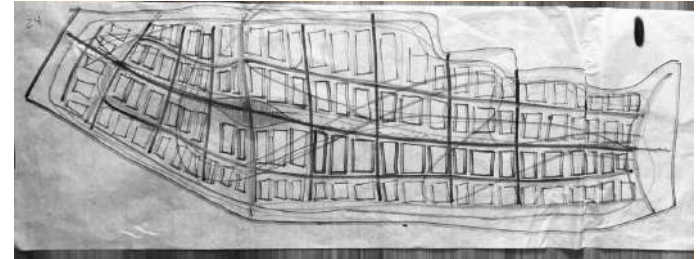
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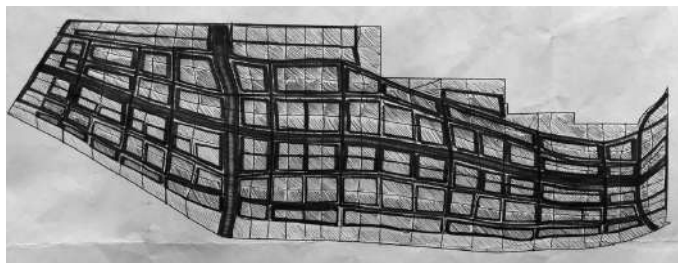
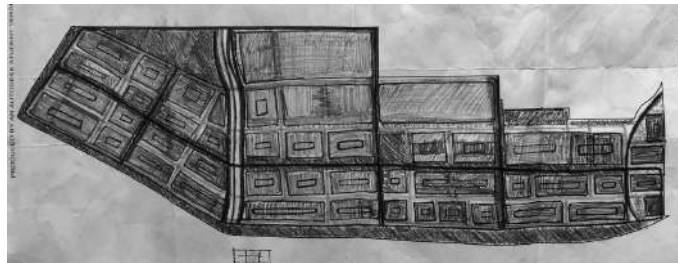
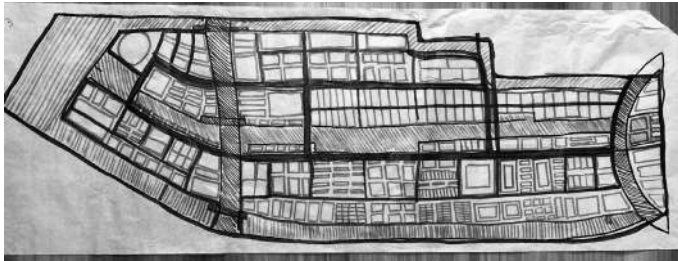
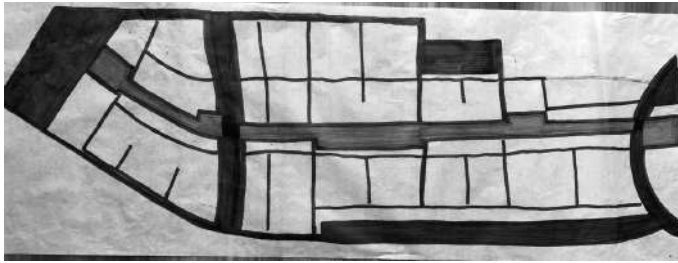


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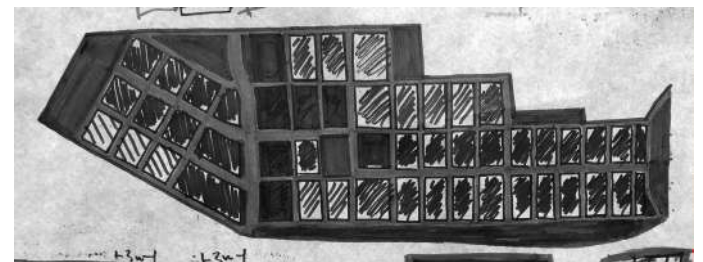
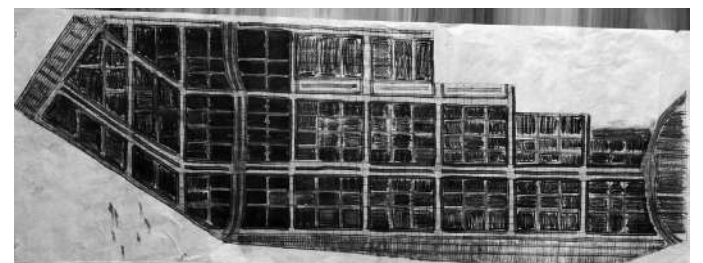
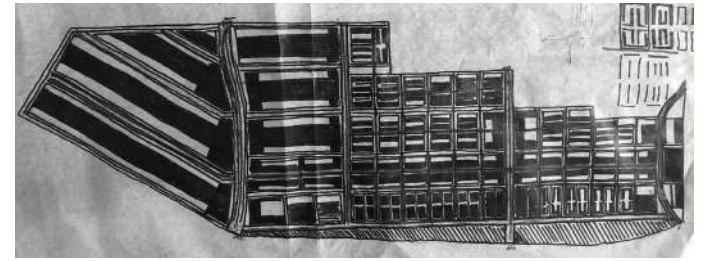
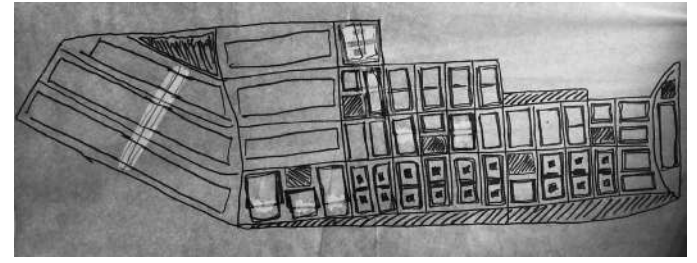


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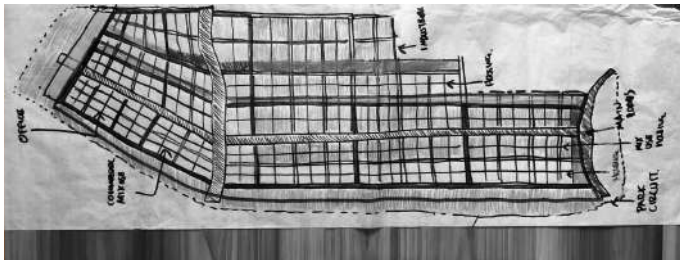
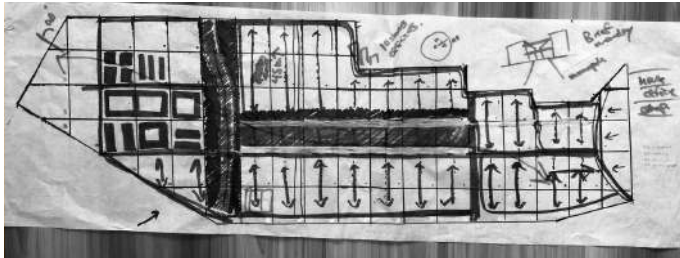
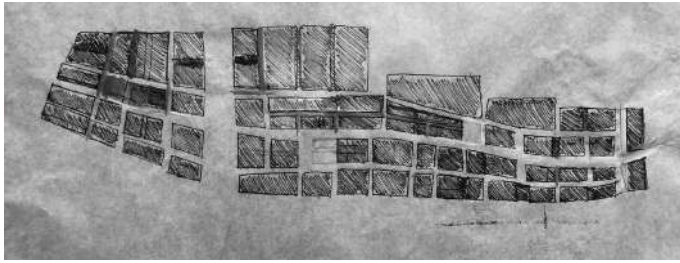


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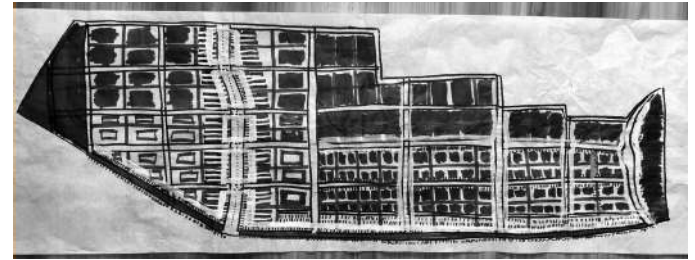
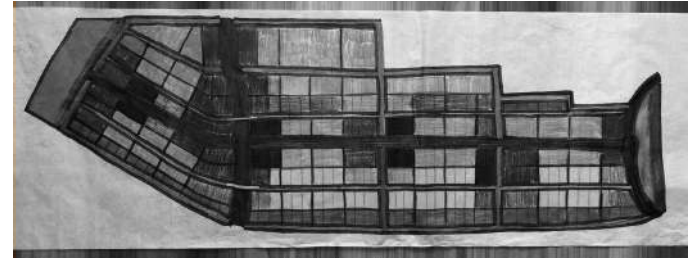
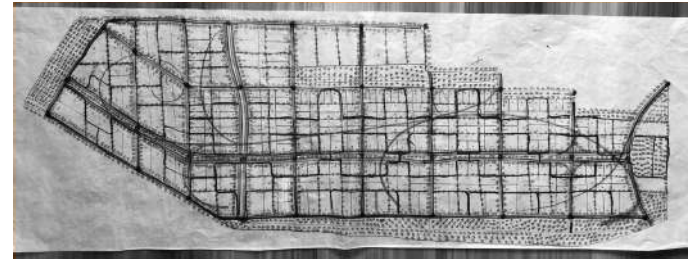


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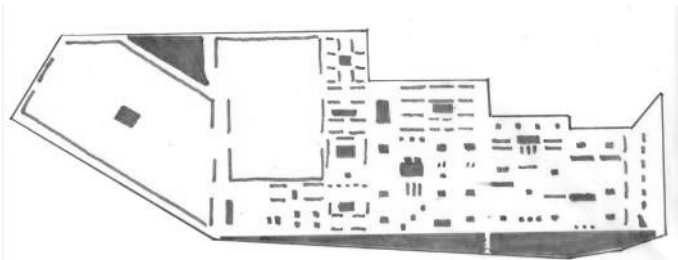
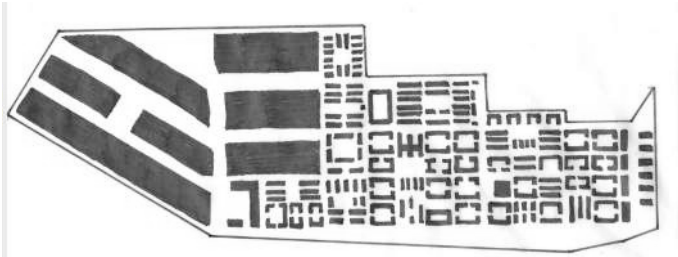
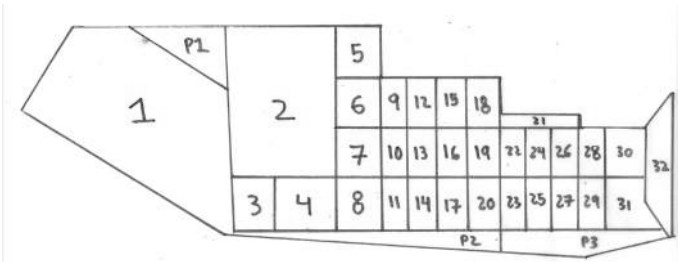




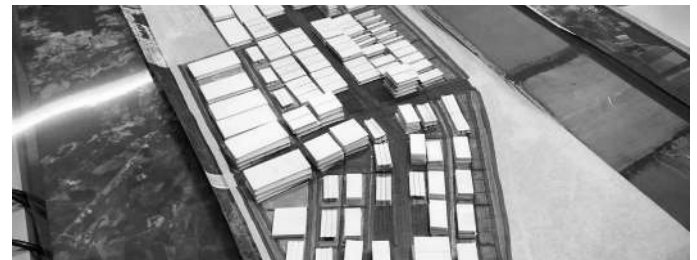
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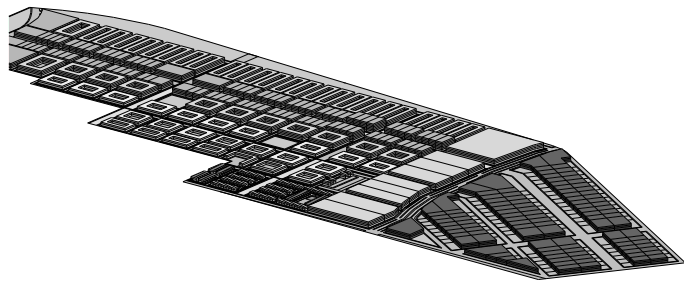
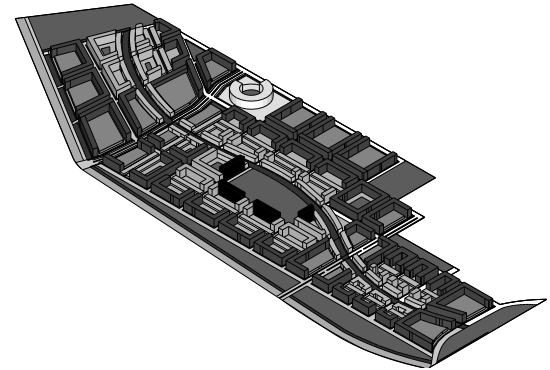
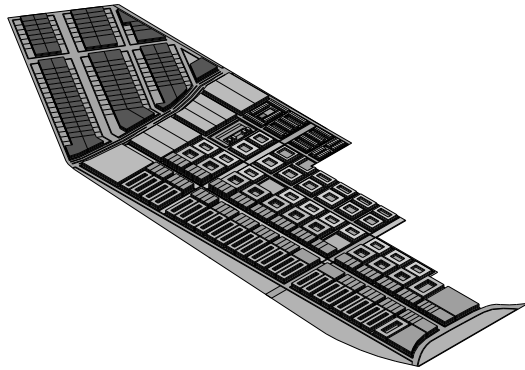
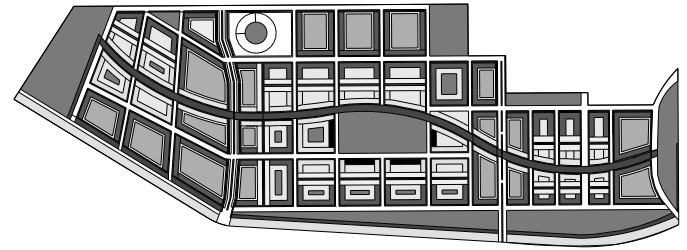
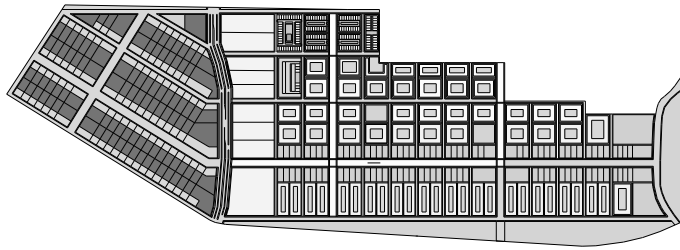
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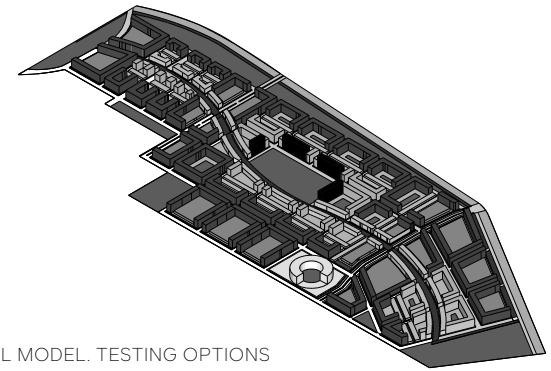
MASSING, PARKS AND MASTERPLAN PROCESS



WORKING PHYSICAL MODEL

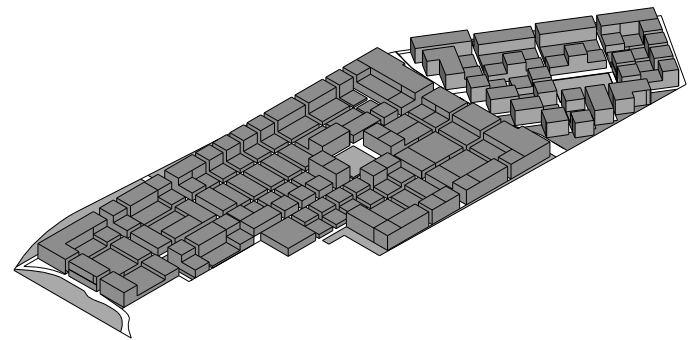
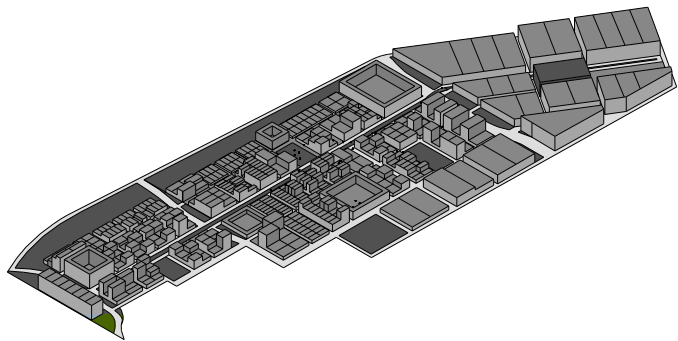
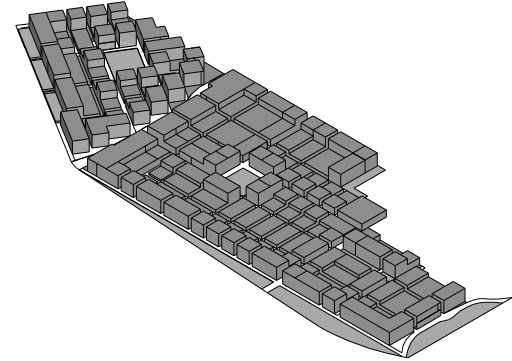
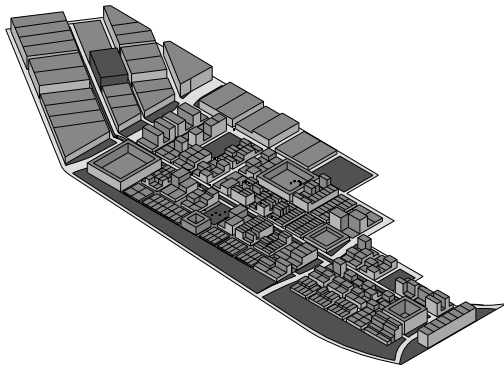
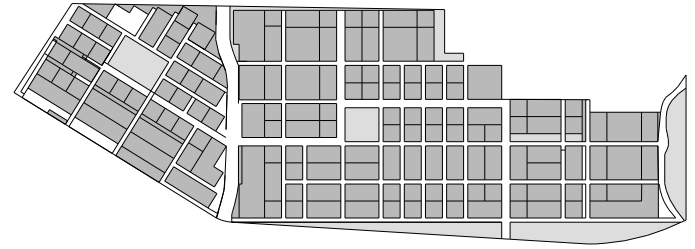
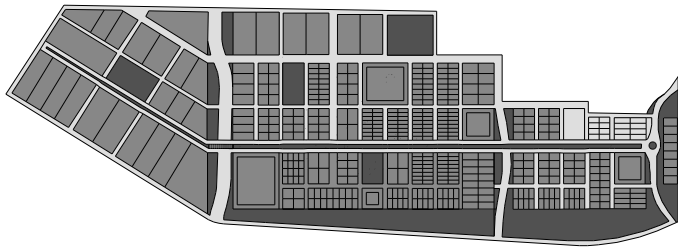


DIGITAL MODEL. TESTING OPTIONS



DIGITAL MODEL. TESTING OPTIONS

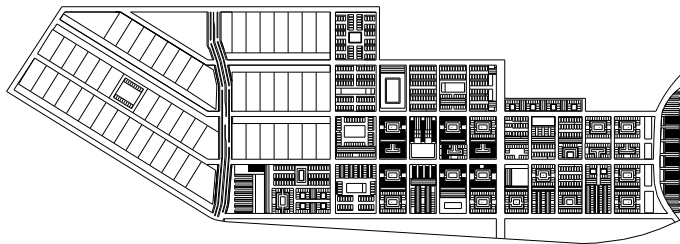
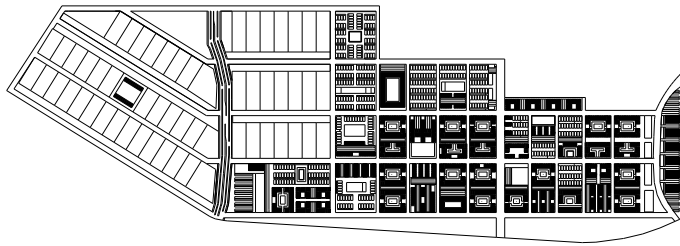
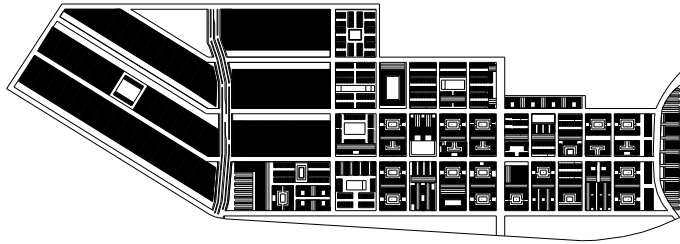




DIGITAL MODEL. TESTING OPTIONS

DIGITAL MODEL. TESTING OPTIONS

**FAILED PROPOSAL**

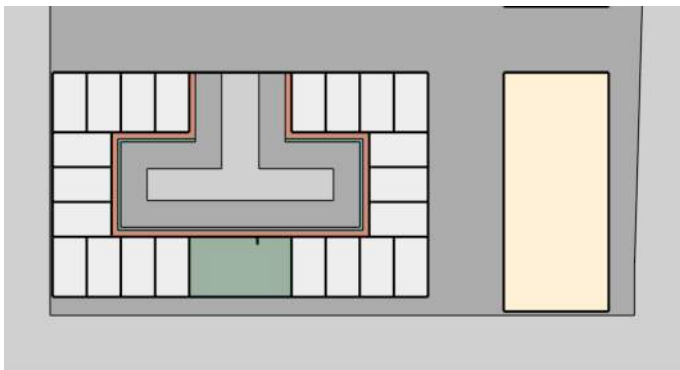
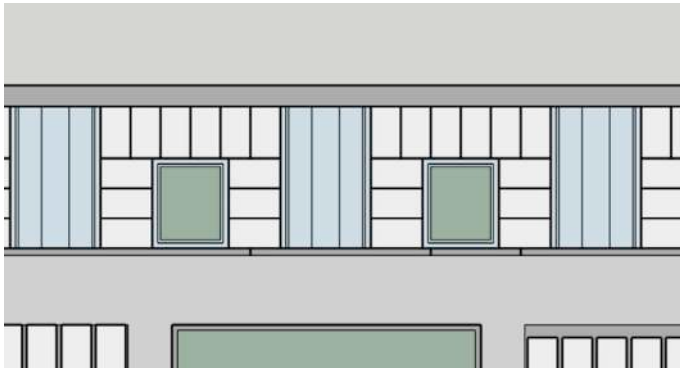


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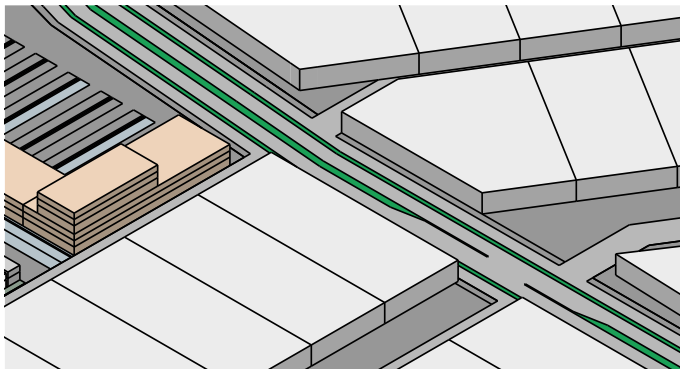
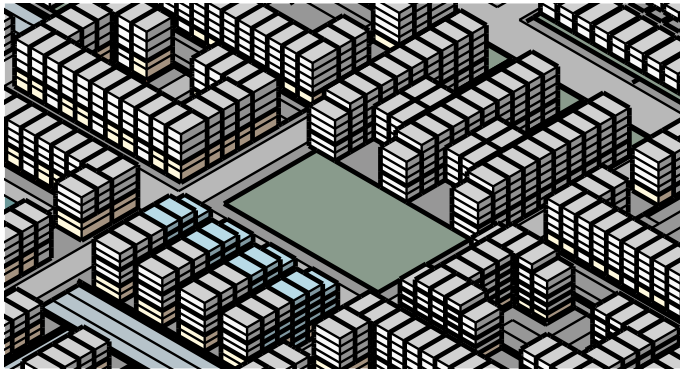
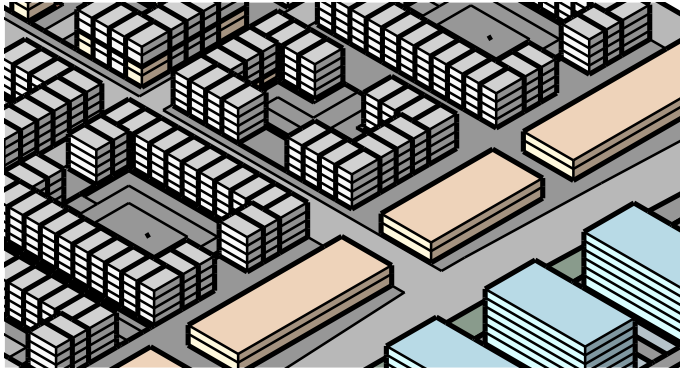




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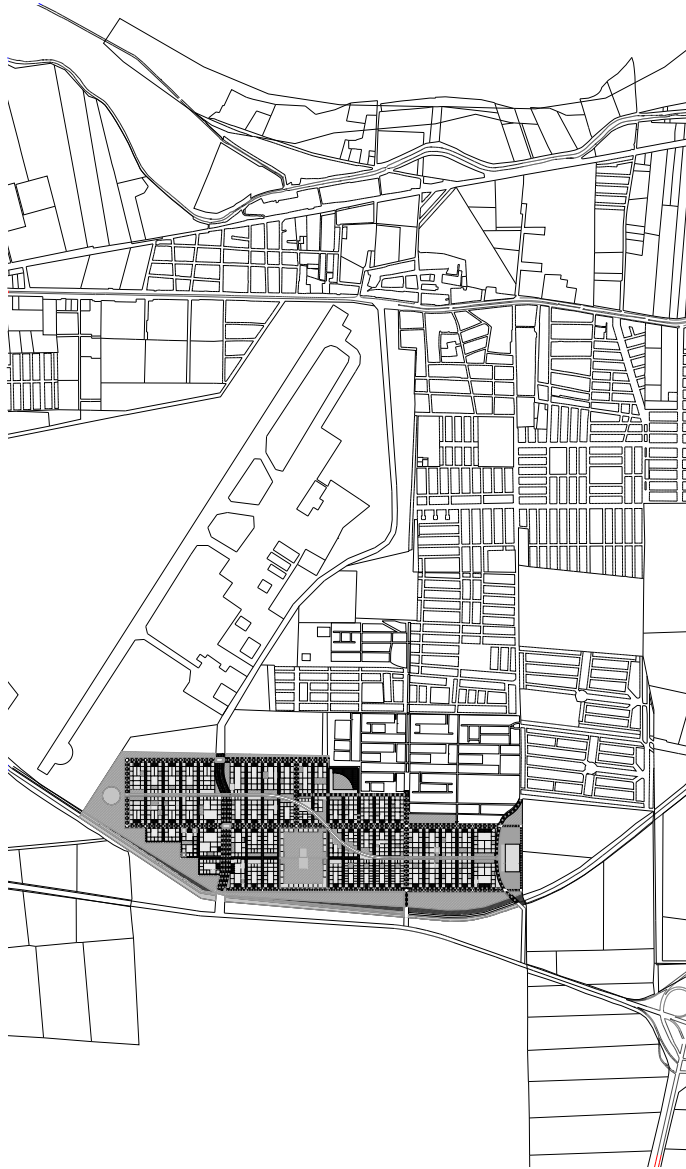
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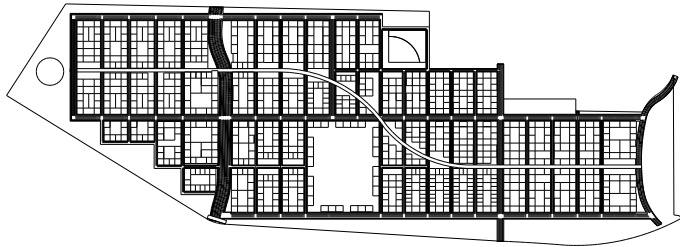
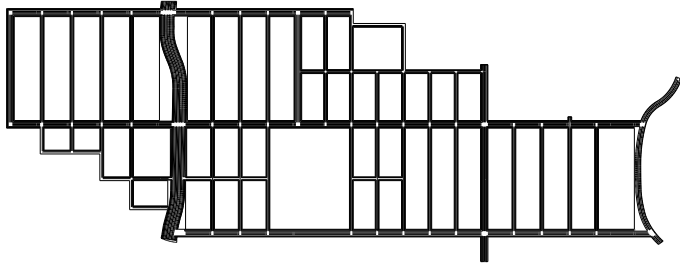
**FINAL PROPOSAL**



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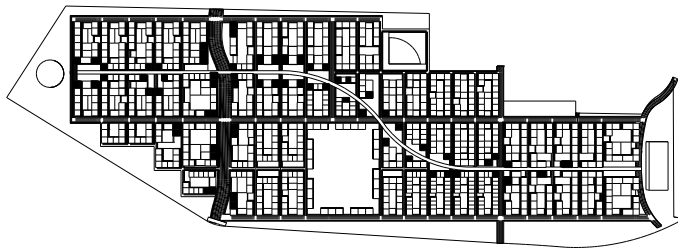
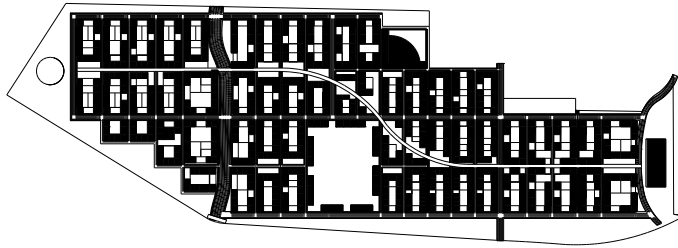
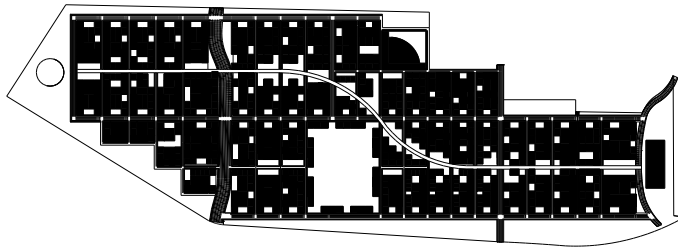


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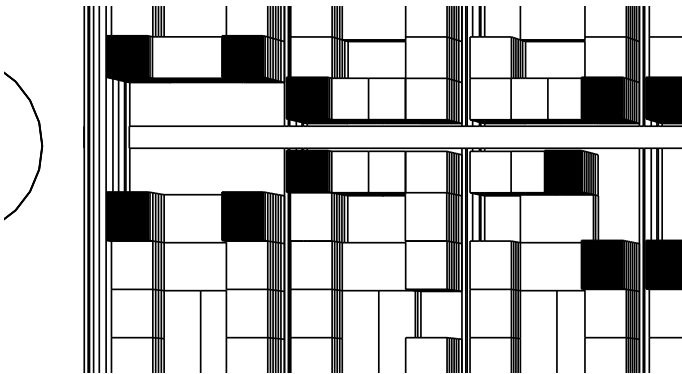
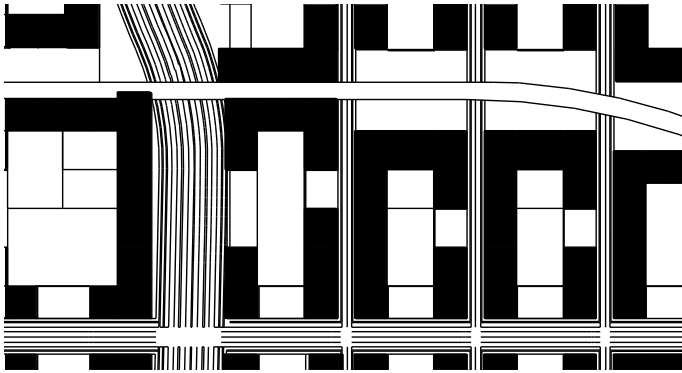
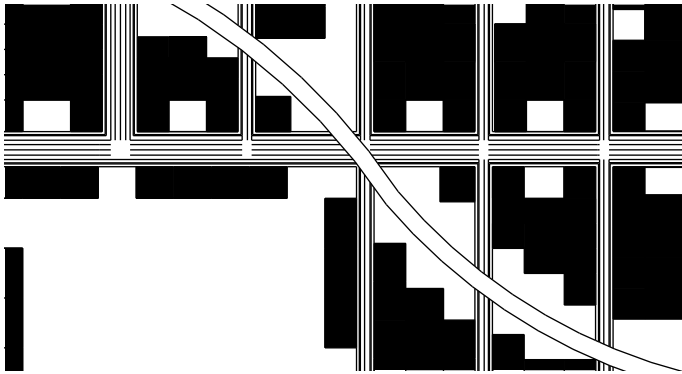




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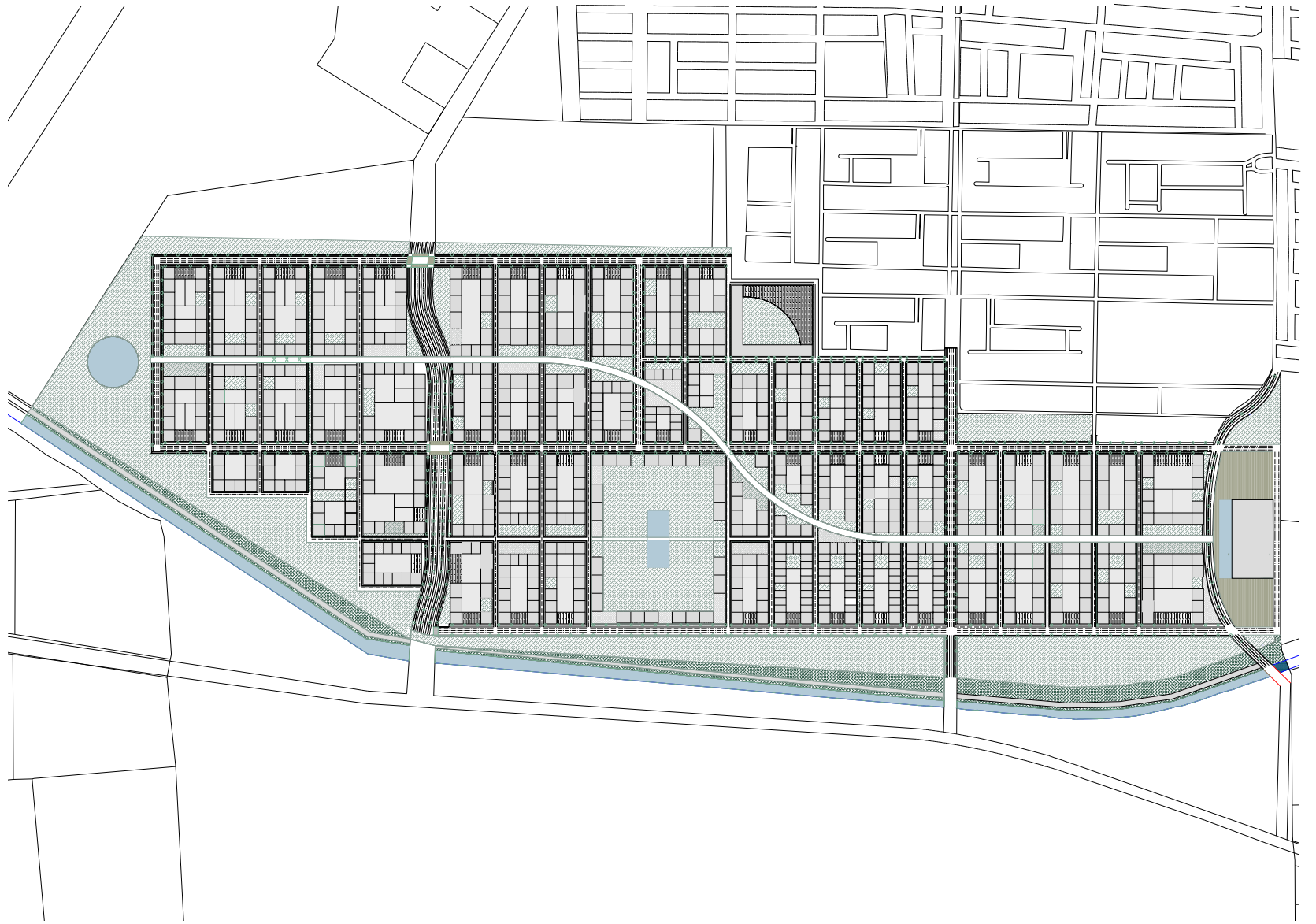
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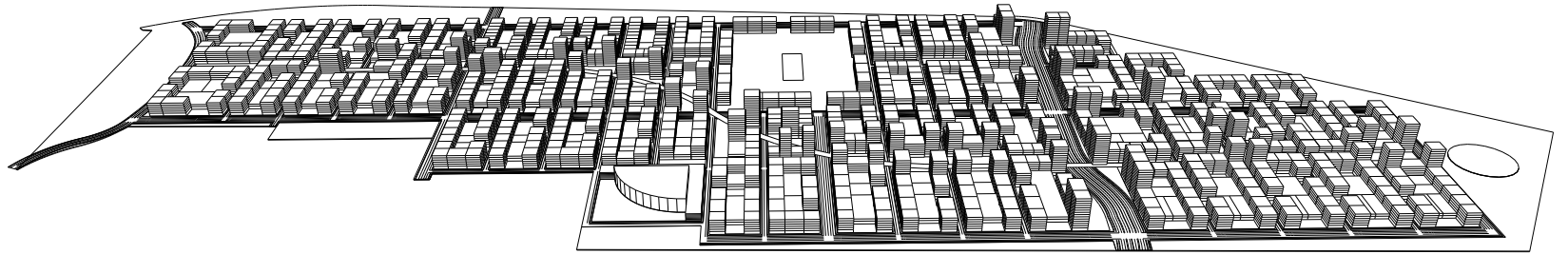
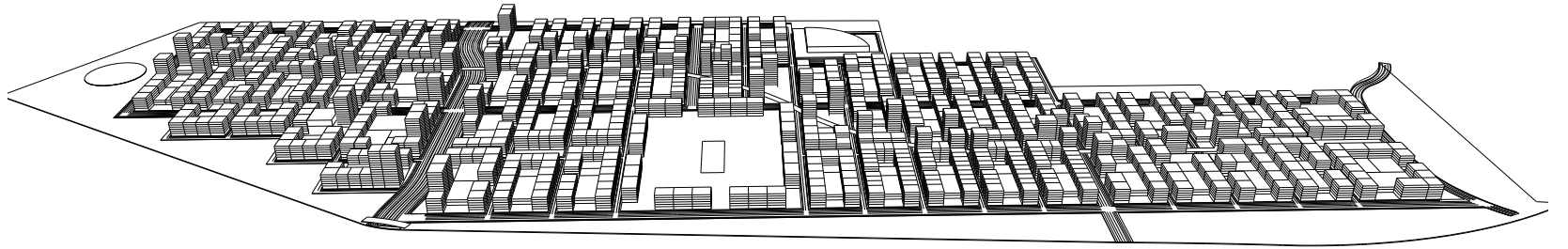
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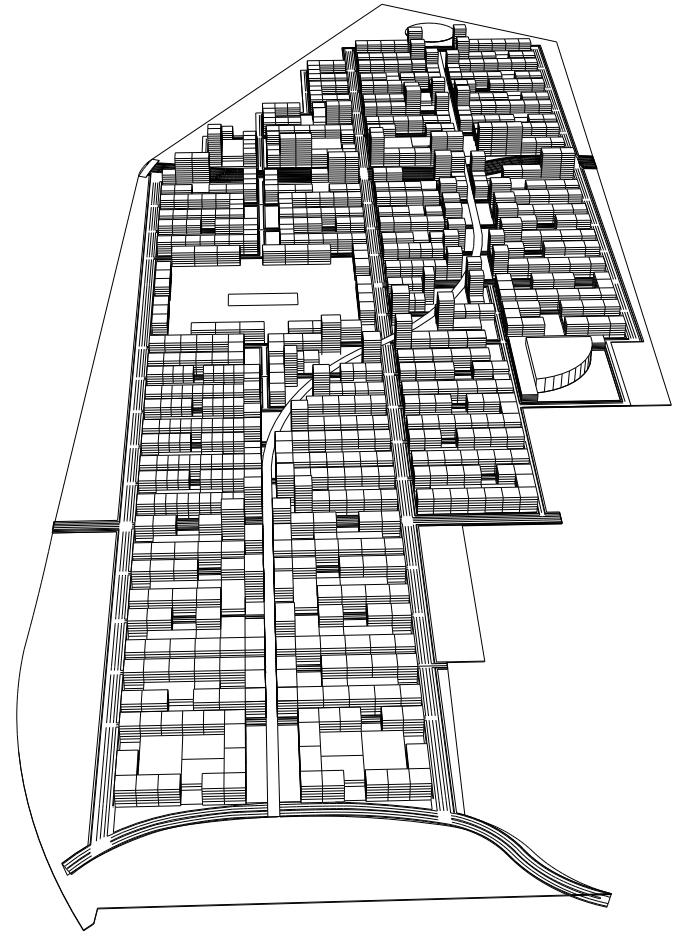
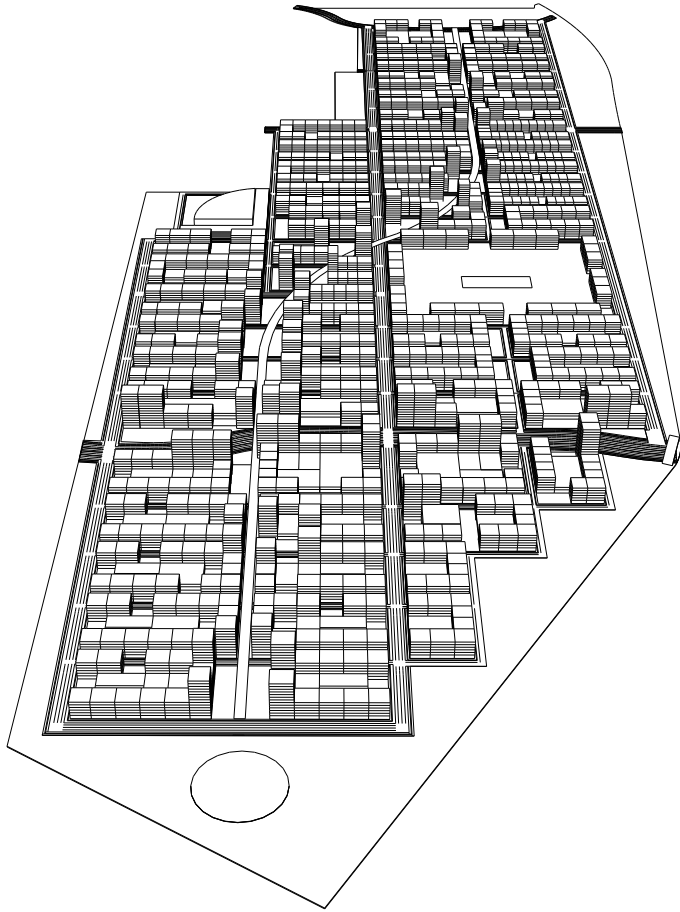
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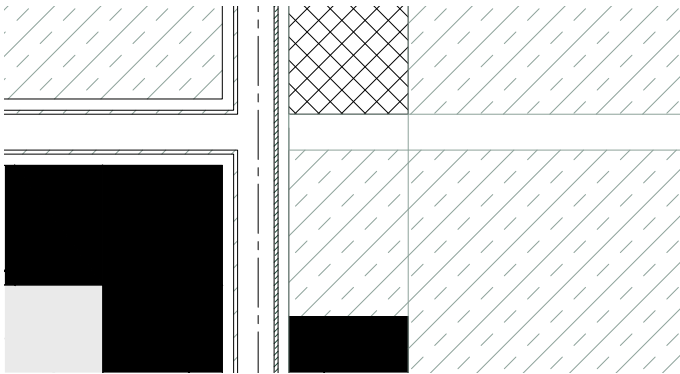
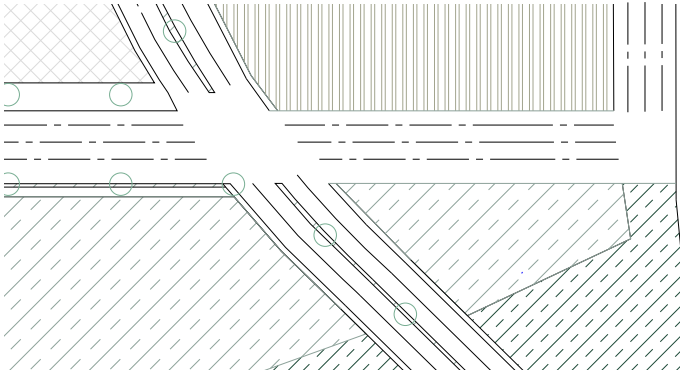
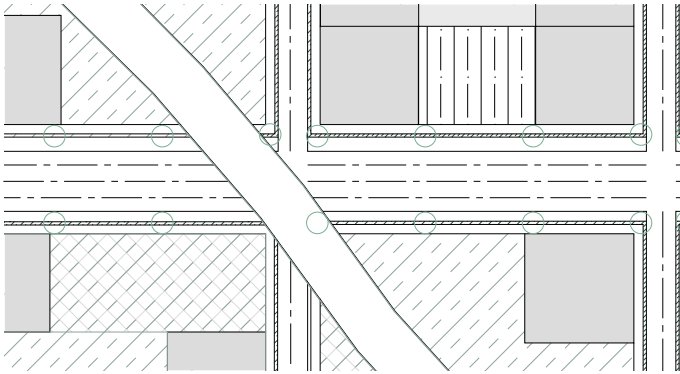
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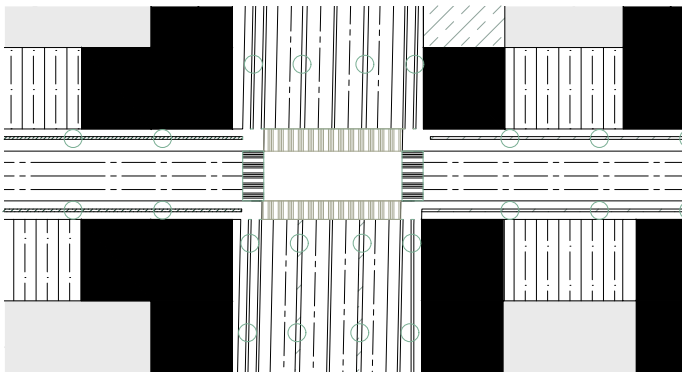
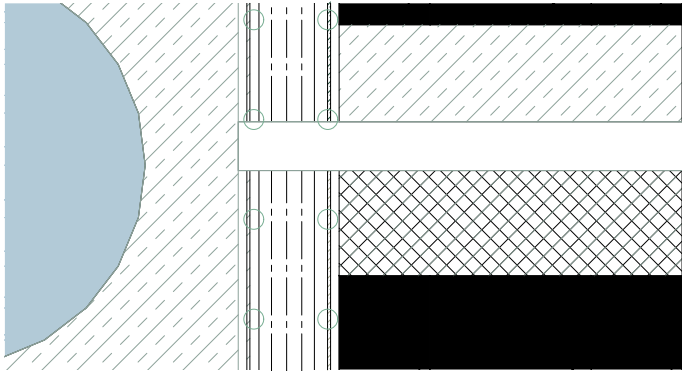
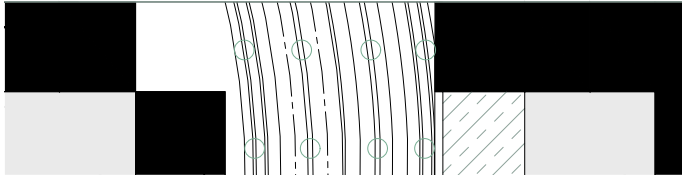
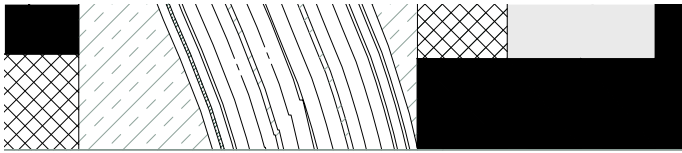




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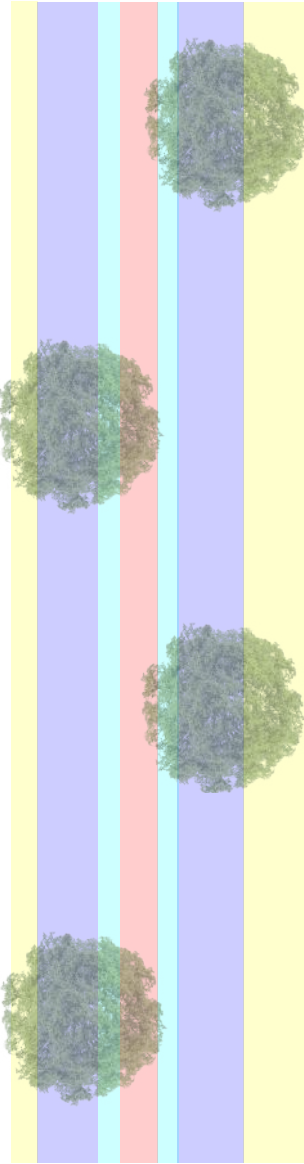




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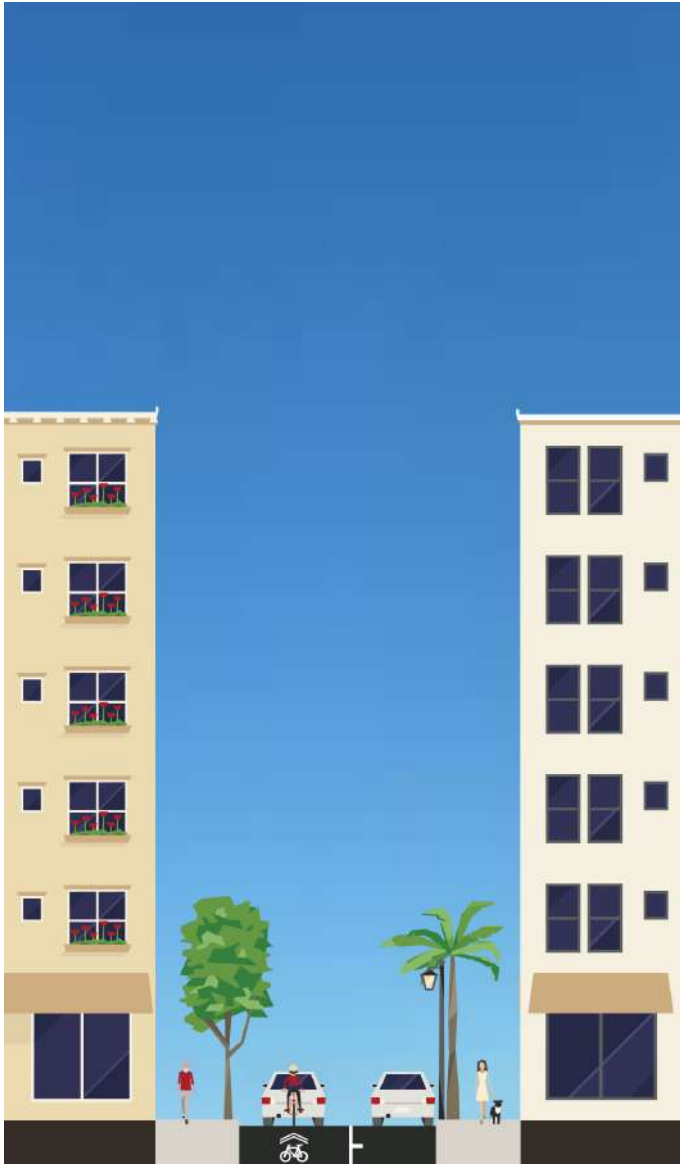
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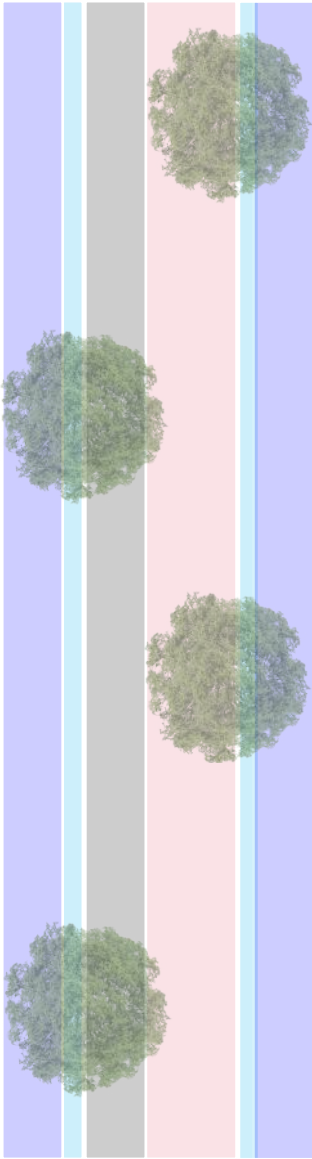
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196

10 meters

sidewalk: 170 cm

tree: 60 cm

car traffic: 300 cm

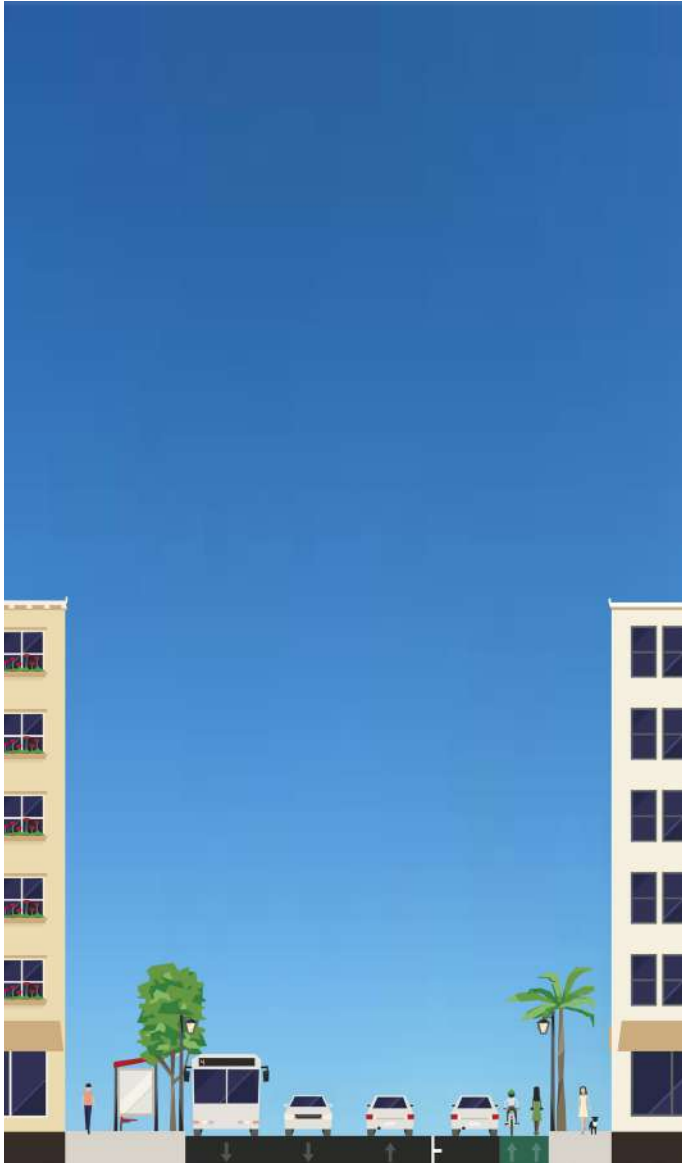
car parked: 240 cm

tree / light: 60 cm

sidewalk: 170 cm

197

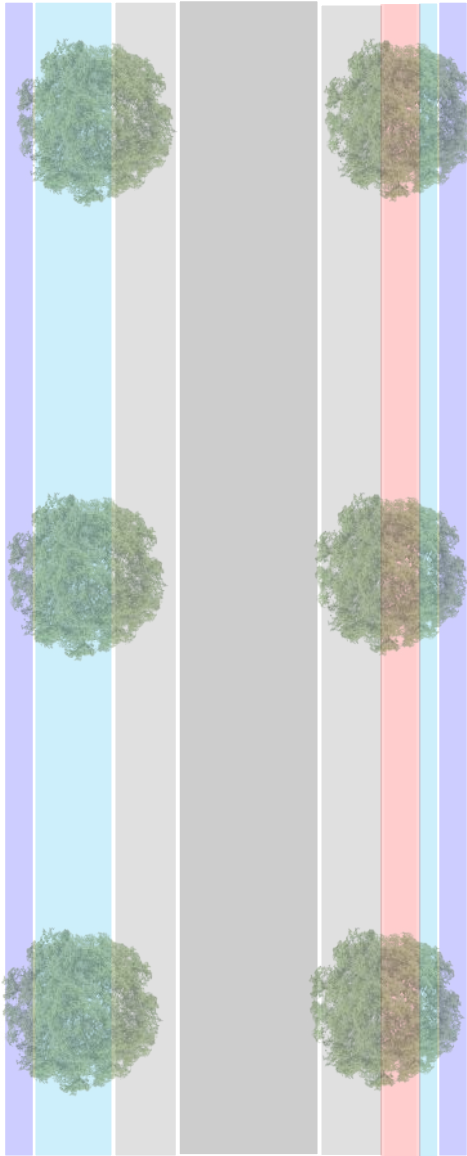




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200

20 meters

sidewalk: 170 cm

bus stop /sw: 210 cm

tree / light: 60 cm

bus lane : 300 cm

car traffic: 300 cm

car traffic: 300 cm

car parked: 240 cm

Bicycle lane: 180 cm

tree / light: 60 cm

sidewalk: 170 cm

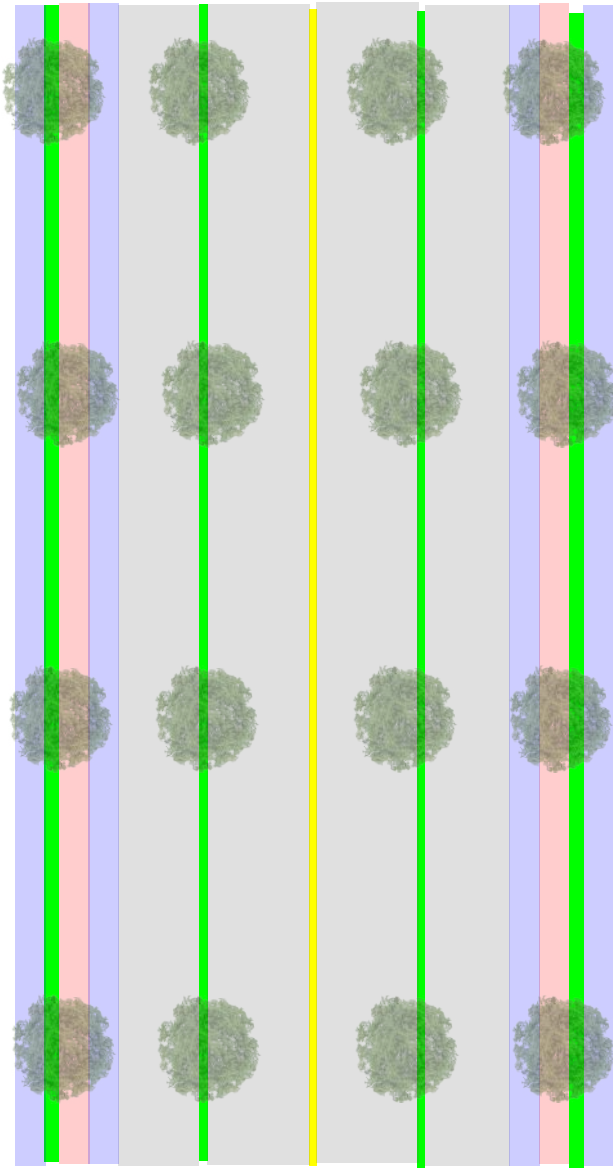
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40 meters

sidewalk: 260 cm

tree: 60 cm

Bicycle lane: 180 cm

tree: 60 cm

bus stop /sw: 240 cm

light: 30 cm

bus lane : 300 cm

car traffic: 300 cm

tree: 60 cm

car traffic: 300 cm

car traffic: 300 cm

light: 40 cm

car traffic: 300 cm

car traffic: 300 cm

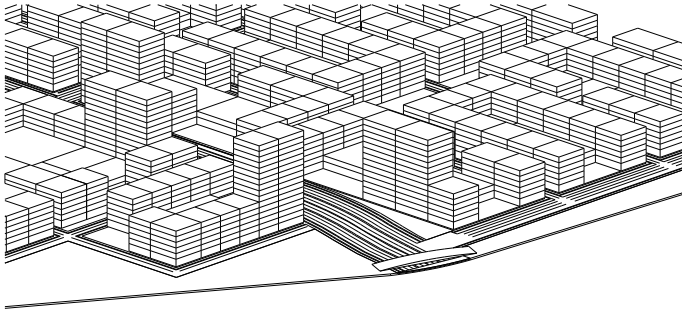
light: 30 cm

bus stop /sw: 240 cm

tree: 60 cm

Bicycle lane: 180 cm

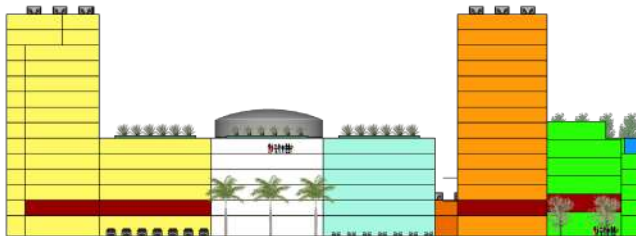
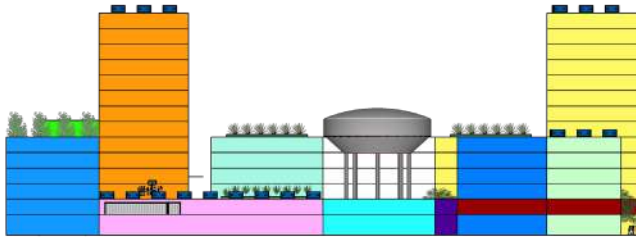
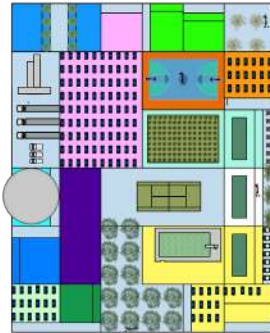




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