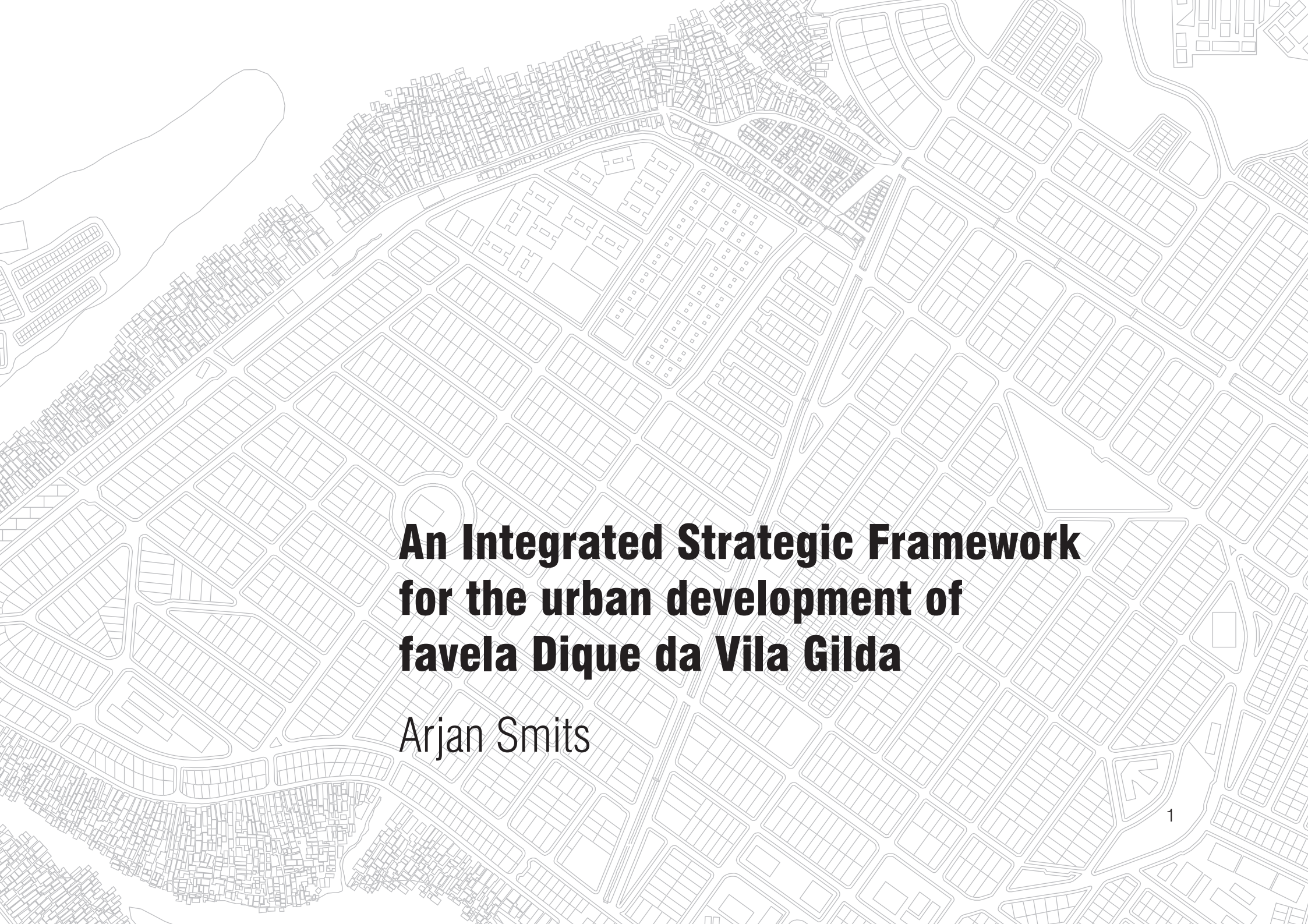

# An Integrated Strategic Framework for the urban development of favela Dique da Vila Gilda

Arjan Smits

# COLOFON

**An Integrated Strategic Framework for the urban development of favela Dique da Vila Gilda, in Santos, Brazil**
MSc thesis

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**Keywords:**
Slum, informal, slum upgrading, integration, , urban planning, strategic framework, morphology, socio-economic, environmental.

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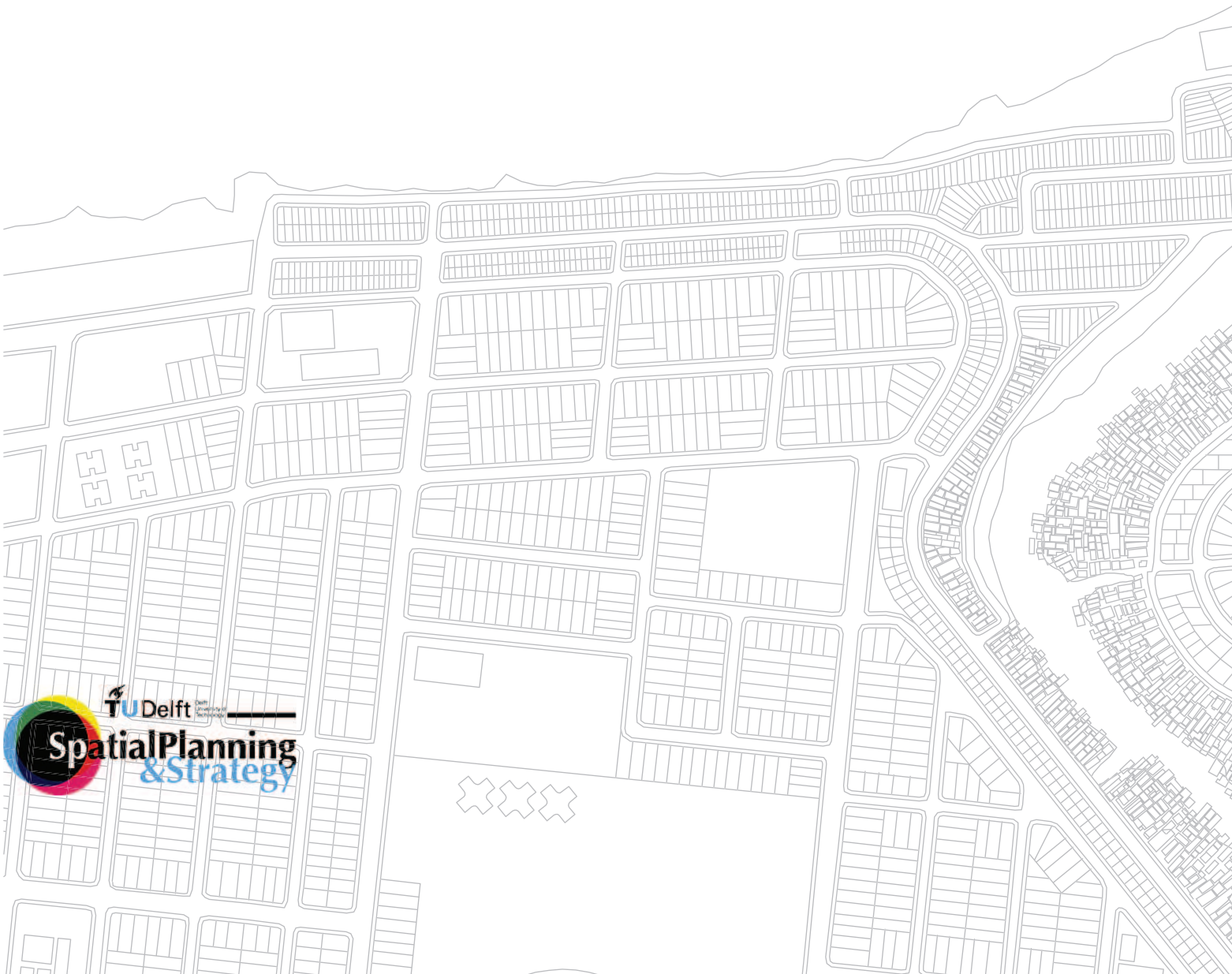

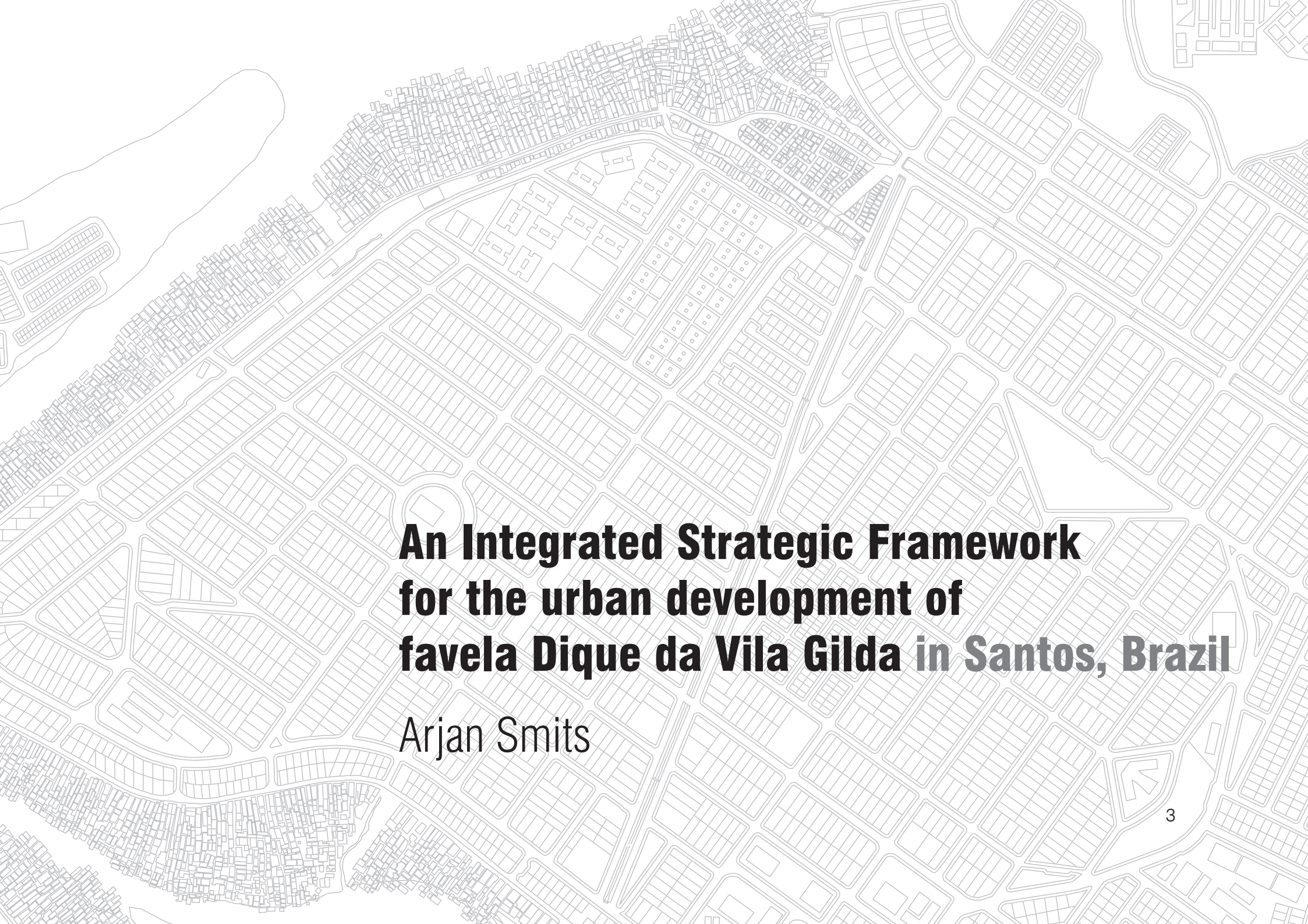

# An Integrated Strategic Framework for the urban development of favela Dique da Vila Gilda in Santos, Brazil

Arjan Smits

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Integrate with key stakeholders
Public session, develop integrated urban plan & confirm to catalog of urban guidelines
Set up participatory stratgic plan
Implement, monitor and evaluate
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# Part 00 / INTRODUCTION

Favela Dique da Vila Gilda is located in a complex region, having large areas of valuable natural environments which are put under pressure by the rapid urbanization processes. The slum areas in the region, among other Vila Gilda, are together with the industrial areas the main polluters of the environments. In turn, this is also affecting the living environments of the favelas themselves.

Current slum upgrading projects do not respond well to the living and environmental problems, and often result in fragmented diverse local interventions, executed by a various stakeholders. This research project aims to propose an integrated strategic framework for slum upgrading, that could be used to coordinate en integrate these developments.

This first part of the booklet present the background knowledge of the regional, city and local context in order to get involved in the area and understand the conditions in which the local intervention are developed.

# CONTENT


## Context

Metropolitan Region Baixada Santista
Island of São Vicente
Dique da Vila Gilda

## Relevance

Societal relevance
Academic relevance

# CONTEXT

## Metropolitan Region Baixada Santista

*Introduction*

Dique da Vila Gilda is located Metropolitan Area Baixada Santista, along the coast of Brazil in the State of São Paulo. The slum area is formed along a river on the border of the two biggest municipalities of this region, São Vicente and Santos. The other municipalities in the region are Bertioga, Cubatão, Guarujá, Itanhaém, Mongaguá, Peruíbe and Praia Grande.

Santos is the most important city of them, functioning as the economic motor while the others are functioning as commuter towns. The region is home to about 1,6 million people, while in summer the amount of people in the region can triple because of the summer tourism, one of the economic drivers of the coastal region. Other important economies are the heavy infrastructure in Cubatão and, most importantly, the biggest port of Latin America in Santos.(Zündt, 2006)

*History*

The first settlement in Baixada Santista was São Vicente, founded in 1532, shortly followed by Santos in 1543. As they are coastal towns, they always have been associated with fishing and port activities, especially Santos. Through the port, Santos established a close economical relation with São Paulo, and became the economic driver of the region. From 1822, when Brazil was declared independent, the international trade increased. Powered by the production of coffee in São Paulo in the 19th century and automobiles from the second half of the 20th century, Santos became the largest port of Latin America. (Zündt, 2006)

*Natural environment*

Baixada Santista is an estuarine area and large parts of it are protected environmental areas, such as the mangroves in the estuary and the Mata Atlântica (Atlantic Forest) on the Serra do Mar (for-

Localization of Metropolitan Region Baixada Santista near the city of São Paulo.
source: Climate Change Adaption Planning for Santos, Brazil. ICF GHK.

Localization of Metropolitan Region Baixada Santista near the city of São Paulo.
source: Google Earth.

**“The rapid urbanization process is putting natural environments in the region under pressure.”**

mation of mountains parallel to the coastline). These protected areas, especially the mangroves, are under heavy pressure caused by the increasing urbanization in in the 20th century. Due to inadequate land use as a result of a lack of integrated spatial and urban planning, the area now has to cope with environmental problems such as erosion, floods, silting and contamination of watercourses. (Zündt, 2006)

*Economy and demography*

The economic growth of Brazil in the second half of the 20th century, caused cities to expand rapidly, as well as in Baixada Santista, resulting in large population growths putting a high pressure on the natural environments. Attracted by the opportunity of labor in the port and industrial sector, many poor immigrants where attracted to Baixada Santista. However, the spatial planning frameworks of the municipalities did not cope with this massive population growth, and so a process of unorganized urbanization started, resulting in the formation of many illegal settlements (favelas, as they are called in Brazil). As the pressure on space was high, caused by the spatial claim of the regular urbanization and the port and industries, the favelas were driven to the fringe of the urban and industrial areas, often areas with a high environmental risk such as landslides and floods.(Zündt, 2006)

The complex relationship between the natural environment and the rapid urbanization process driven by economic and demographic growth form a huge challenge for the urban and spatial planning in the region. The response to the problems as a result of conflicts between the trends should ignore the administrative limits of the municipalities and integrate the demands of the different sectors.

## Island of São Vicente

*Introduction*

The island of São Vicente is the

Island of São Vicente.
source: Google Earth.

most densely habited part of the Metropolitan Area of Baixada Santista, housing approximately 700.000 people, which is a large share of the total amount of inhabitants of the region. The island is divided by the municipalities of São Vicente on the west and Santos on the east, two of the oldest cities in the region.(Bloch and Papachristodoulou, 2012) The urban area can roughly be divided in to 5 parts: the port in the north, the commercial area in the east, the touristic area in the south, the residential area in the west and in the middle the Morros de São Vicente, a rock formation rising above the rest of the island. The clear division of the island in these different areas are a result of economy-driven spatial and urban planning in the past decades. Currently, the segregation between the areas is clearly visible in the socio-spatial structures on the island.

Municipal plan for the urban expansion of Santos.
source: Nascimento et al., 2013, p 120

Saturnino de Britos plan for the urban expansion of Santos.
source: Nascimento et al., 2013, p 122

*History*

Through history, Santos has always been the most important city of the two in the island of São Vicente, thanks to its flourishing port industry. Like most cities in Brazil, it started growing rapidly at the end of the 19th century, as the formation of the Brazilian republic stimulated the export and industrialization of the country. The cities in Brazil became the stage of new economic development, resulting in rapid population growth. However, the old colonial cities did not have the capacity to absorb this, having obsolete infrastructure and a shortage of housing resulting in the outbreak of epidemics. To fight these problems, a process of modernization of Brazilian cities was initiated. As the regeneration mainly had to focus on infrastructure and sanitation, sanitation experts and engineers became responsible for the urban expansion projects. This moment, around the turn of the 19th to 20th century can be seen as the birth of urbanism as a profession in Brazil, mainly driven by the question of sanitation infrastructure. Of all the engineers working on urbanization projects in Brazil, Saturnino de Brito became the

most influential.(Faria and Júnior, 2012)

Saturnino de Brito was a Brazilian engineer who did many urban sanitation projects in Brazil, around the turn of 19th to 20th century. He was born in 1864 in Campos dos Goitacazes in the state of Rio de Janeiro and died in 1929. In his early career he worked as a railway engineer but subsequently he dedicated himself to sanitation and urbanism, working for 53 cities in Brazil. Besides his projects, he published many scientific articles about sanitation and urbanism, as well as about the relation of cities with the economy, sociology and public governance. His writings and projects show clear references to urban development and sanitation projects developed in Europe. One of his most famous project became his urban expansion and sanitation plan for Santos, developed in the early 20th century.(Nascimento et al., 2013)

A few years earlier, in 1896, a urban expansion project to the cope with the recurrent problems of population growth and public health was already presented by the municipality. It was based on a geometric grid which was extremely dense, regular and monotone, in order to maximize urban occupation on the island. The proposal did not consider the natural characteristics of the site, and the basic principles of aesthetics, comfort and environmental risk reduction.(Nascimento et al., 2013)

Counteracting on to this proposal, Saturnino de Brito designed an alternative plan in 1910 considering the floods and drainage as key design criteria. The plan consisted of a system of canals, able to drain and store rain water, making occupation in the swampy area possible. As the canals were linked to the Bay of Santos, the cleaned themselves through the action of the tides. The sewage sanitation system and the rain water system were separated, therefore it became possible to create surface water within the city. Along these open canals, green areas with aesthetic as well as environmental functions were aligned, creating public spaces for leisure and acquaintances, referring to the Parisian boulevards of Haussmann.
The plan also was adapted to the steep hills on the middle of the island, by following their lines with the urban pattern and creating parks on their basis. The large part of the island is flat, therefore a regular grid was chosen as a basis, but to prevent designing a monotone area, the lines of the draining system were used as guides to adjust to grid. Also, referring to Camillo Sitte, de Brito wanted to avoid long and straight streets by interposing gardens and squares.(Nascimento et al., 2013)

Overall, it was the first example of a urban planning project, integrating urban expansion with a draining system, sanitation system, continuous green areas, promotion of biodiversity and air circulation. This way of approaching an urban expansion project is linked to the vision and projects of W.N. Rose in Rotterdam. The project
for Santos was exemplary for Brito's design methods as it took full advantage of the morphology of the terrain, using the physical elements as design criteria for the project.(Faria and Júnior, 2012)

Currently, the structure of the plan of Saturnino de Brito is still visible in the urban plan of Santos. Little cities in Brazil which were planned, like Santos, have known such a continuity in urban development over the 20th century.

*Natural environment*

The island of São Vicente is formed as a sandbank around the rock formation, Morro de São Vicente in the middle. Therefore, it has a sandy and swampy soil which regularly flooded and therefore is difficult for occupation. Along the northern waterfronts used to grow mangroves, but these have been destroyed as the island became occupied by the two cities. Also the port and industrial developments in the area are putting a high pressure on the natural ecosystem as industrial waste has been spilled in the estuary.
The eastern side has been well developed, guided for a century by the urban plan of Saturnino de Brito. Its urban plan with the integrated canal system reduces the flood risk in this area, while the western side has known an unplanned development and therefore currently has a much higher flood risk. Due to a lack of urban planning, many informal settlements have formed in this area. As these settlements do not have basic sanitation infrastructure, domestic waste is being dumped in the vegetation and watercourses, leading to high levels of pollution. Together with the industrial waste this is putting the ecosystem as well as living conditions at high risk. (Bloch and Papachristodoulou, 2012)

*Economy and demography*

The island can be divided into four core socio-economic zones, which are related to the spatial development of the occupation on the island. The western part, of São Vicente and Zona Noroeste of Santos, is mostly residential and some cores of illegal occupation. In the northeast is the old historical core of Santos, which is the most commercial area of the island. Along the waterfront of the area, stretches the port of Santos. The south is the most dynamic area, having the most investments, highest densities and is attractive for its summer tourism.
The past decades the total population growth of the island and the total region has slowed down, as it is becoming saturated. However, the mobility of the population is still high in terms of intra and inter-metropolitan migration flows. Santos is attracting higher income population while the poor is pushed towards the periphery in cheaper and informal settlements with high environmental risk.(Bloch and Papachristodoulou, 2012)
This trend is strongly related to the social and economic policy decisions related to urban development, resulting in a higher level of socio-spatial segregation. A disinvestment in poorer regions constrains the development possibilities of these areas, leading to high social as well as environmental problems.

**“A disinvestment in poorer regions constrains the development possibilities of these areas, leading to high social as well as environmental problems.”**

## Dique da Vila Gilda

*Introduction*

Dique da Vila Gilda is the largest slum on stilts in Brazil, presenting high social and environmental problems. The settlement developed itself on the border of the municipalities of São Vicente and Santos, on a stretch of land on a dike along both sides of the river Rio do Bugres. As the settlement kept growing, due to the high migration of poor laborers to the region, it expanded on stilts over the river. Vila Gilda is home to approximately 7,000 families, all living in extremely poor conditions, being exposed to high environmental risk and having a lack of social and economic opportunity.

Dique da Vila Gilda, view from the water, Rio dos Bugres
source: GAM. http://gamemrede.wordpress.com/2010/10/22/cores-no-dique/dique_barco_021/

source: Instituto Eco Faxina. http://www.institutoecofaxina.org.br/2014/05/santos-quer-frear-ritmo-de-invasoes-em-favelas.html?m=0

View from the water. source: Instituto Eco Faxina. http://www.institutoecofaxina.org.br/2014/05/santos-quer-frear-ritmo-de-invasoes-em-favelas.html?m=0


source: Google Earth

source: Google Earth

# RELEVANCE

## Societal relevance: slum residents are living in poor living and environmental conditions, and are often forcefully evicted for the benefit of infrastructure projects

Many slums are situated in areas with high environmental risk, having their residents exposed to floods and landslides, constraining their development opportunities, living in abominable construction without basic infrastructure.
Due to the enormous pressure on of urbanization, slum inhabitants are often evicted for the benefit of more profitable projects, without proper compensation. (Timmeren and Henriquez, 2015)  Mostly to social housing compounds in the periphery of their city, cut of from public services. Their is a need for an alternative, a multi-objective and multi-actor approach, (Braga, 2001) improving the living and environmental conditions in the slum areas, and including the slum in the citiy structure and systems in such a way that development opportunities for the slum inhabitants, as well as the city are expanded. (Brennan, 1999)

Slum on stilts in the Amazon, Brazil
source: still from youtube videa: Palafitas em Tefé - Amazônia

Slum on stilts in Recife, Brazil
source: Eraldo Peres. http://acertodecontas.blog.br/

## Academic relevance: fragmented responses do not provide a long term solution for the development opportunity of slum inhabitants

Currently, many housing programs around the world are attending the urban poor by providing social housing. However, many of these projects do only consider the short term question of the quantity of housing, without considering the long term question on the urban and architectural quality of housing. This is resulting in the exhaustive repetition of monotonous housing blocks in the periphery of cities around the world, constraining access to the city and with a lack of quality in the living environment.
Also in Brazil, many popular housing settlements like this have been developed in the past decades, as being a cheap solution for offering social housing. However, on the long term many of these settlements are being abandoned after some years, or are having troubles with social problems.
Still, these type of projects are being developed in Brazil and in other countries with a large poor population. As these projects always are presenting the same type of problems on the long term, a new approach is needed, providing the basic infrastructure and shelter, but also provide access to the city, integration with the environment and opportunity for the residents to develop. (Bathla, 2014)

**“Nao basta dar uma casa, tem que dar cidadania”**

**“Not just provide a house, you have to provide citizenship”**

Héctor Vigliecca, 2015, in Die Deutsche Welle
Source: http://www.dw.de/

Social housing blocks in Belford Roxo, Rio de Janeiro.
Source: Secretaria de Ciência e Tecnologia

# Part 01 / RESEARCH DEFINITION

CONTENT

Problem statement
Objective
Research questions
Approach

# PROBLEM STATEMENT

Statement:

Due to a lack of coordination within the urban planning framework, current local developments of diverse active stakeholders in the region are not integrated with each other.

This results in fragmented urban, environmental and socio-economic developments, causing a loss of opportunities for slum upgrading developments.

The current urban planning governance structure in Brazil stimulates the upgrading of slums with a short term vision, only responding to quantity of the housing demand of the poor. The current developments do not provide urban quality, considering the morphological structure, the socio-economic system and the ecological system within the local, urban and regional context. In this way, the design constrains the long term development possibilities of the inhabitants and determine future functional problems for the city. Also, other local developments in the city are not integrated with each other. A diverse range of active stakeholders are developing their own projects, without integrating with the existing context and other future projects, due to a lack of coordination within the urban planning framework.

On the right page a diagram explaining the problem statement is presented.

Keywords:

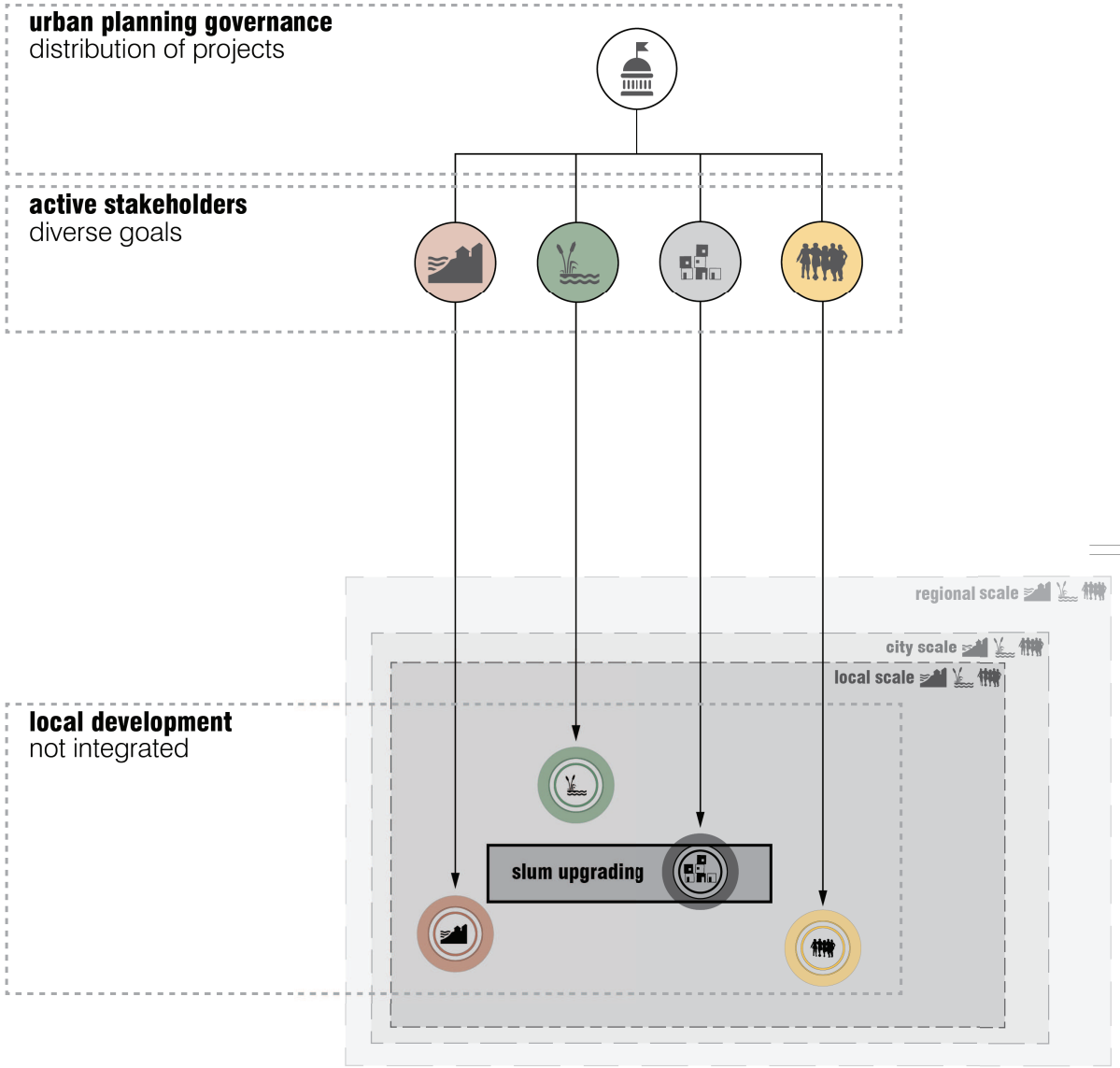

morphological structure


socio-economic system


environmental system


urban planning governance


slum upgrading




Problem statement diagram.
Source: authors own

# OBJECTIVE

## Statement:

Formulate an integrated strategic framework based on diverse stakeholder goals, integrated with the challenges found through socio-spatial analysis of the morphological structure and environmental and socio-economic systems, which could be used as a tool to within the urban planning framework to coordinate future projects and provide better opportunities for slum upgrading development.

What currently is lacking in the urban and slum upgrading developments is the coordination of and integration between different projects (see problem statement). In order to help coordinate and integrate future projects, an integrated strategic framework will be developed. This framework will be based on the diverse goals of currently active stakeholders, redefined by the challenges found through spatial analysis. The spatial analysis is the tool to evaluate the stakeholder goals and adjust the projects to the existing context. This is a link which is missing in the current urban planning framework.

Using the integrated strategic framework, diverse local stakeholder initiate can be integrated with each other, in order to help achieve shard concerns and expand the opportunites for development.

Keywords:

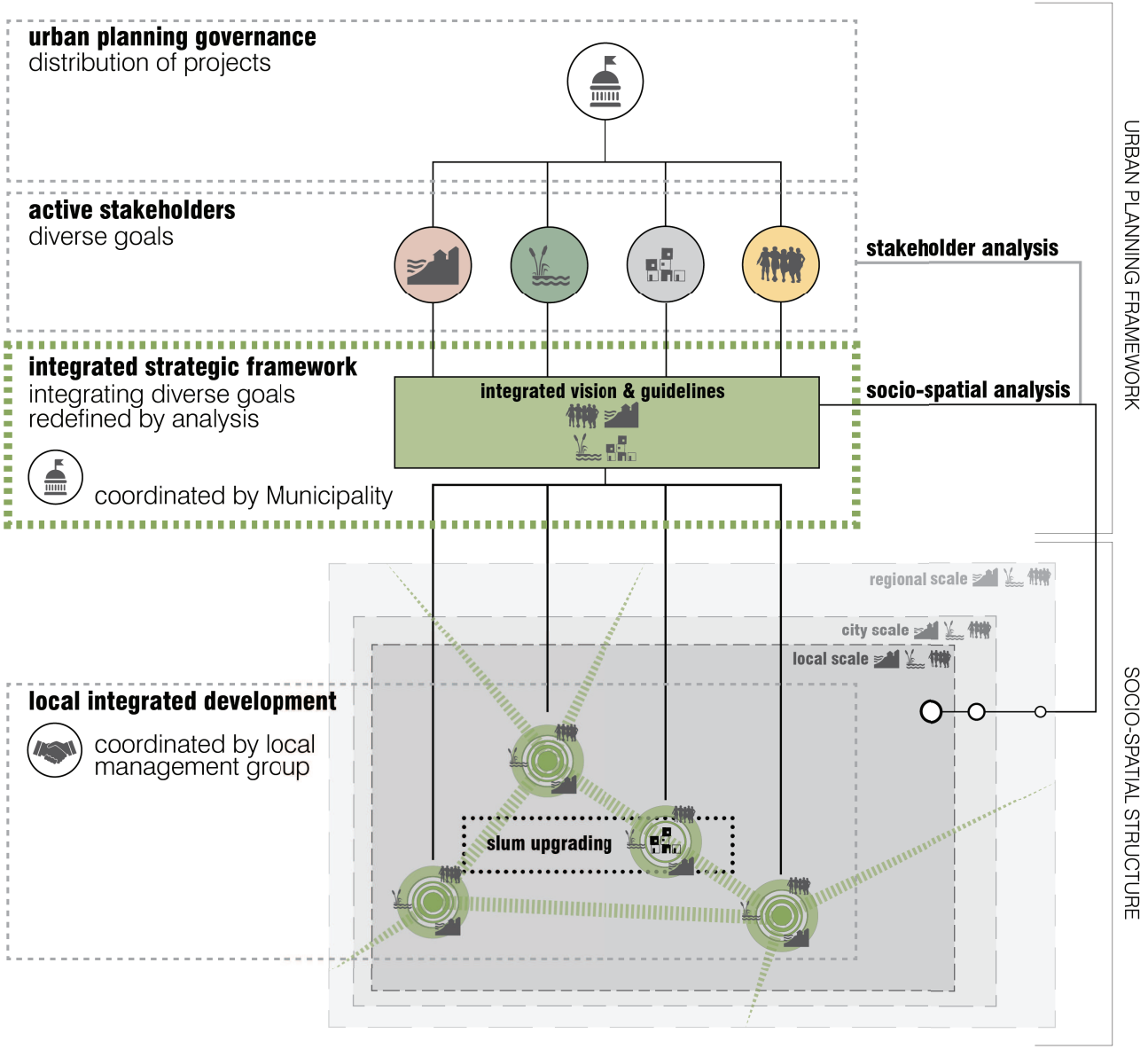

morphological structure


socio-economic system


environmental system


urban planning governance


slum upgrading




Objective diagram.
Source: authors own

# RESEARCH QUESTIONS

MAIN How to formulate an integrated strategic framework based on a diverse range of stakeholder goals, redefined by challenges found through morphological, environmental and socio-economic analysis, and how could this be used as a tool within the urban planning framework to coordinate and integrate urban and slum upgrading projects?

What are the challenges for the development of the morphological structure and environmental and socio-economic systems within the different scales and how to integrate them in an integrated strategic framework?

What are the diverse stakeholder goals within the current urban planning framework and how to integrate them in an integrated strategic framework?

What are the slum upgrading alternatives for standardized social housing models and how are they implemented?

# APPROACH

## Developing an integrated strategic framework for local development, on the basis of literature studies, socio-spatial analysis and analysis of the urban planning framework

The base of the integrated strategic framework are the projects of currently active stakeholders. These from the inspiration for the project and those are the projects that need to be adjusted and integrated with each other in order to achieve a higher quality of local developments.

In order to evaluate and eventually integrate these projects, knowledge of the area need to be gathered. This is done by doing extensive socio-spatial analysis, on three different scales:

- regional scale
- city scale
- local scale

The challenges found through the regional and city scale analysis do not have a direct effect on the developed strategic framework, but the did shape the project and the way of thinking during the process. Also, those analyses stimulated the engagement in the area and provided the knowledge to be able to evaluate the stakeholder projects, and to be able to meet with local experts during the fieldtrip.

During the regional and city scale analysis, related research was consulted, which provided recommendations for further analysis and for the translation of the analysis in to concrete challenges.

The city scale analysis has been conducted after the regional and city scale analysis, when the project started to take a more concrete shape, this was needed in order to develop a sharp analysis on the local scale. The conclusions from this analysis, local challenges and problems, have a direct influense on the strategic framework.

So, based on the diverse stakeholder goals, redefined by the challenges found through socio-spatial analysis and the recommencations provided by relevant literature, an integrated strategic framework could be formulated.

This framework exists of a local integrated vision, and complementary actions and involved stakeholders.

By applying this framework, proposals for local initiatives could be adjusted and integrated with each other, by setting up cooperations between the active stakeholders and the local communities.

In this way, instead of the current fragmented developments, multiple local interventions could form a strong  socio-economic and environmental neighborhood network, including favela Vila Gilda.

# APPROACH

The project approach displayed in the diagram. This research book is organized in the same way as this approach diagram, consisting of four main sections:

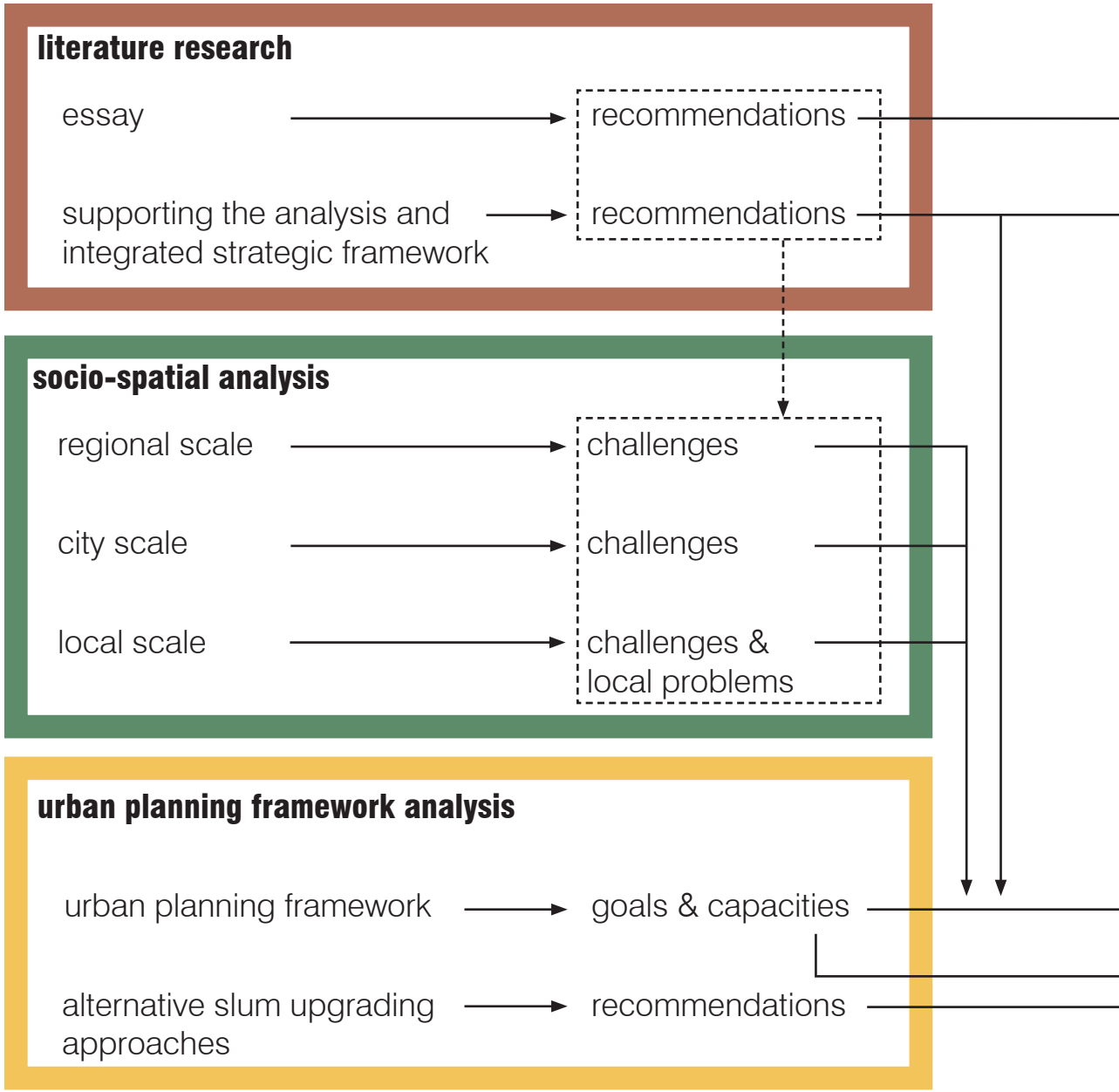
literature research

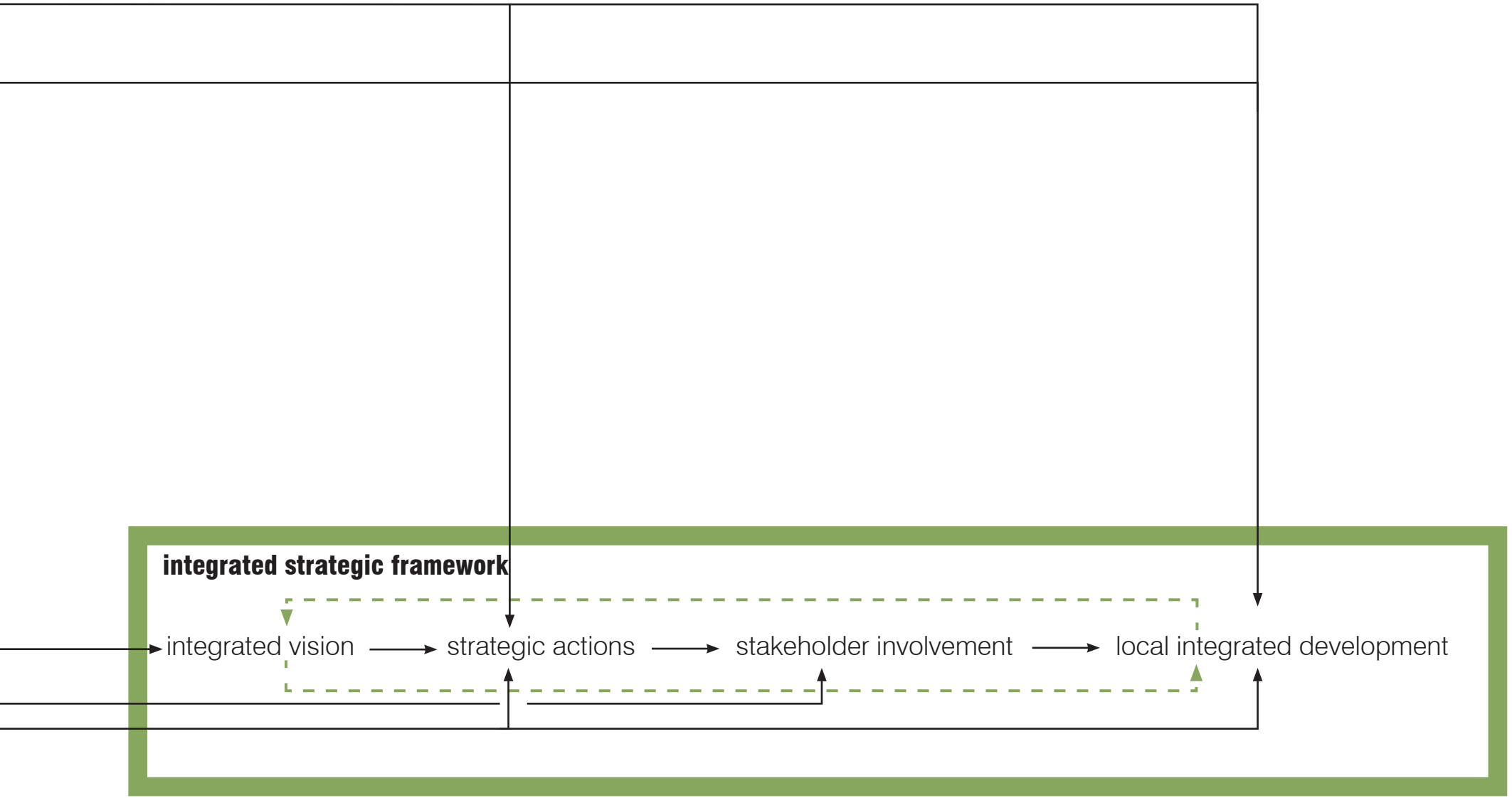
socio-spatial analysis

urban planning framework analysis

integrated strategic framework

The opening pages of each of the chapters correspond with the on this page displayed color of the particular section.




integrated strategic framework
integrated vision
strategic actions
stakeholder involvement
local integrated development

# Part 02 / LITERATURE RESEARCH
## ESSAY

Since the 1960s, affordable mass housing complexes have been implemented in Brazil as a solution for the housing shortage. However, after implementation, these settlements are having huge social and economical problems and are gradually informalizing as a consequence of their spatial configuration. Through history, the design of the complexes has not changed and currently, with the execution of the current federal housing program Minha Casa Minha Vida, a new wave of similar projects is being constructed. Studying the former informalized mass housing projects, confirms that the standardized model which is still being used, should be altered towards a more versatile model, considering the needs of the inhabitants and the particularities of the locations.

# SLUM DEVELOPMENT APPROACH IN BRAZIL

## Mass social housing and informalization patterns

*1 Introduction*

As was explained before, affordable mass housing complexes have been developed in large numbers in Brazil, and have had a huge impact on society. Still, these complexes are being developed applying the same models which have been used since the 1960s. Many authors have written on how these complexes were designed, their spatial characteristics and how they have developed during their implementation. The design of affordable mass housing complexes was often based on the principles of modern urbanism, promoting the individualistic consumer society and imitating the lifestyle of the middle and upper class. (Hehl, 2013) These principles result in designs which do not consider the needs of the popular Brazilian culture and the particularities of each location. (Angélil and Siress, 2013) Through history, the model of the design for mass housing complexes has not been revised and is nowadays repeated exhaustingly within the federal housing program *Minha Casa, Minha Vida* (MCMV). (Rolnik and Pereira, 2014)

The most mass housing settlements which were implemented decades ago, are currently completely informalized. As the initial program did not meet the needs of the inhabitants, small informal interventions have been implemented, gradually changing the formal framework in order to meet their needs. According to Chrysoula Koumantou, these patterns of informalization should be studied, so to develop a formal solution which already includes the actual needs of the inhabitants and the particularities of the location. (Koumantou, 2013)

This review will describe the ideals behind Brazilian mass housing, its spatial characteristics, how they have informalized and what lessons can be learned from history. This is elaborated using the case of the mass housing complex Cidade de Deus as an historical example described by Stella Dimitriadou. (2013) The current federal housing program *Minha Casa, Minha Vida** is used as a contemporary example of the mass housing developments. The settlements produced within this program are showing the same characteristics as the Cidade de Deus complex. Recognizing this, Mutzke and Monsalve rise the question why there are no lessons learned from the mistakes of the past in order to provide a more versatile and varied model. (Mutzke and Monsalve, 2014) The review will conclude with lessons which can be learned from mass housing and slum upgrading in history.

* *Minha Casa, Minha Vida*: a mass housing program launched by the Brazilian federal government in 2009, that would be able to resolve the country's huge housing deficit and at the same time stimulate economic growth. (Helh and Angélil, 2014)

ANGÉLIL, M. & HEHL, R. (eds.) Cidade de Deus! Working with Informalized Mass Housing in Brazil. Berlin: Ruby Press Berlin.

*2 Development of modernist mass housing in Brazil*

In his essay on standardized mass housing in Brazil, Rainer Hehl (2013) includes a quote from British architect John Turner (1968), who stated:

"What has been considered as a problem, the favela, offers very specific solutions to the question of housing the masses – what is meant to be the solution, state-sponsored mass housing, represents the real problem for urban developments." (p. 133)

Up to the 1960s, slums in Brazil were still seen as a temporary, provisional and illegal response towards the constrained access to housing for the poor. Neglected by public policies they kept expanding and multiplying throughout the cities. In the late 1960s, a policy that consisted of the replacement of informal settlements with standardized and modernized public housing emerged in Brazil. (Whitaker and Leitão, 2012) Despite John Turners words, these models for mass housing – based on modernist principles – became, until today, the common response to the housing shortage.

*2.1 Influence of modernist ideals in Brazil*

Rainer Hehl (2013) describes in his essay on standardized mass housing why the modern principles for mass housing for the poor are still thriving in Brasil, while in Europe and the United States the negative effects of these principles on the social conditions of a city have been discussed since the 1950s, reaching its peak with the demolition of the Pruitt-Igoe housing complex in St. Louis, Misouri. In Brazil however, the post modern critique did not endure and modern ideals of mass housing currently still seem to be associated with social progress. This can be partly explained by the

political instrumentalization of modern aesthetics, which is obviously visible in the city of Brasília where the implementation of modernist buildings was used as a political act to represent the countries progressiveness and new identity as an economic and political power. This political message was also reflected in the modernist housing for the working class, as it represents the progressiveness of the middle and upper class and in this way increases social status.

However, Hehl states, the modernist principles where actually never really implemented in mass housing for the working class. Mostly, the models were whittled down by cost saving measures, resulting in poorly executed housing units, which also is a reason why the post modern critique from Europe and the United States was easily overlooked; the principles were not even applied in the first place.

The cost-saving measures bring up another explanation of the persisting influence of modernism, which is the profitability of large-scale construction and real estate development for constructors and developers. The success of the mass housing expanded with the privatization of markets, securing higher profits. State-developed housing nowadays is still led by the market, and thus still producing for profit instead of seeking to meet the needs of the poor. (Hehl, 2013)

*2.2 Power of the private sector*

The power of the constructors and developers is evident in the currently carried out federal housing program *Minha Casa, Minha Vida*. The MCMV program started in 2009 to stimulate the construction sector of the Brazilian economy and aiming to resolve the current housing shortage. In different phases, 5.8 million new houses are being build across the country. The program subsidizes occupants as well as developers and constructors. Thus, it is up to the private sector to develop private housing, stimulated by incentives and guarantees of the public sector. (Becker, 2014) Nascimento Neto (2012) describes in his paper on Brazilian housing policy how the construction of the MCMV program abates the power of the municipal government to coordinate the urban housing policy. He states that although notions concerning the democratization of urbanized land and the quality of housing have been appointed in the Brazilian Housing Policy, urban policy goals have not been integrated in the program of MCMV. Thereby, it are the cost saving calculations of the civil construction companies and real estate developers who play a key role in not only defining the location and the target groups but also the design, type and quality of the plans, leading to standardized housing units of poor quality in a peripheral location. (Neto et al., 2012)

**“There is a need for tailor-made approaches in order to better include the housing projects within the local context.”**

Rolnik and Klink (2011)

*2.3 History repeats*

Thus, stretch Raquel Rolnik and Alvaro Pereira (2014), through history housing policies in Brazil have been increasingly associated with the private sector gaining profits in the low income residential markets, instead of supporting social rights. Current mass housing projects, of which MCMV is the largest in Brazil, are repeating this pattern. (Rolnik and Pereira, 2014)

Chrysoula Koumantou (2013) approves in her essay about the MCMV program that there seems to be a historical repetition in the way of producing mass housing in Brazil, stating that the current projects show striking similarities with former mass housing complexes such as Cidade de Deus, that was constructed in the 1960s. (Koumantou, 2013)

## *3 The case of Cidade de Deus; mass housing informalized*

Stella Dimitriadou (2013) wrote a historical description about Cidade de Deus and how the housing complex evolved through the years, from a formal mass housing project to a hybrid between the formal planning framework and informal practice.

*3.1 Modern suburb for the working class*

The Cidade de Deus project was completed in 1965 and accommodated more than 3,000 families, which were relocated from the favelas in the centre of Rio de Janeiro to the modernist housing complex in the periphery of the city. It was implemented as a response to the expansion of illegal settlements on the valuable land in the centre of Rio. Nowadays, one can hardly identify the original configuration and constructions of the area, as it is completely informalized.

Cidade de Deus was one of the many formal settlements that were constructed in the peripheries of Brazilian cities in the 1960s. The development of these areas marked the beginning of the implementation of policies addressing informal settlements. These policies were set up to stimulate the resettlement of slum dwellers to modern suburbs, by promoting access to the middle and upper class lifestyle and promoting the individualistic consumer culture in order to boost the economy. Thus, slums were eradicated and residents were relocated to the newly constructed modernist suburbs, consisting of individual housing units and apartment blocks in the outskirts of the cities, of which Cidade de Deus is an example.

*3.2 Inappropriate design as a cause of decay*

Soon after construction, the physical and social conditions in Cidade de Deus became precarious due to the cost saving measures of private constructors and developers, which was symptomatic for the governmental housing programs. Cidade de Deus was caught by criminality and social decay and became known as one the most violent places in Brazil. What was meant to facilitate a modern lifestyle, transformed into a ghetto.

Besides the difficult economic, social and political situation, Dimitriadou mentions that the decay also was related to the architectural and urban design which ignored the popular Brazilian way of life. Appropriation of outside spaces, social interaction and multiple generations of a family living together are key characteristics of this culture. But as the design was developed by profit maximizing companies and based on modernist ideals, these characteristics were not considered. As a consequence, the designs of the individual units and the apartment blocks did not fit to the needs of the res-

idents, resulting in rather cheap replicas of the modern architecture that was propagated.

Apart from the design of the housing, the complex also coped with a lack of services, employment possibilities and public transport. Thus, the Cidade de Deus settlement did not provide the conditions to generate income and respond to the popular Brazilian culture, resulting in a rapid decline of the economic and social conditions within the complex.

*3.3 Formal framework informalized*

Years of social violence led to the police pacification in 2009 and since then, social and economic programs have stimulated the improvement of the situation. Nowadays, one can hardly recognize the original structure of the area, as it has been transformed by 50 years of informal building activities. By taking advantage of the formal layout of the complex, a layered city has been created through added program which meets the small scale of the individual housing units and the large scale of the collective spaces. The modernist apartment blocks have been adjusted with housing extensions and collective spaces to accommodate multiple generations of families living together, social activities and the appropriation of outside spaces, which is common in the popular Brazilian culture. By adding those informal interventions, the needs of the residents have slowly gained space within the formal framework, resulting in a hybrid between modernist structure and favela inventiveness. (Dimitriadou et al., 2013)

## *4 Characteristics of modernist mass housing and the informalization process*

*4.1 Modernist principles of mass housing*

The Cidade de Deus project is the most famous housing project in Brazil, but many others having the same characteristics, have been realized all over the country. Rainer Hehl (2013) describes in his essay the spatial design of the housing complexes. He poses that the typologies of the standardized housing units were based on the modernists principles of ordering urban expansion, providing light, natural ventilation and elementary living standards for all layers of society. Principles which do not fit within the popular Brazilian culture, but by assuming that modern living standards signify a higher social status, modernist housing typologies were projected upon the poor, instead of devoting effort to respond to their actual needs. This is a pattern which still appears in the current Brazilian housing programs. (Hehl, 2013)

Establishing the relation with Cidade de Deus and other informalized social housing projects, Koumantou is concerned that these patterns of modernist mass housing are still repeated in Brazil. She questions if the currently executed *Minha Casa, Minha Vida* program will end the current housing shortage, or if it will reproduce a new generation of informalized suburban ghettos across the country. (Koumantou, 2013)

*4.2 Informalization of recent mass housing projects*

According to her, the MCMV program produces monofunctional neighborhoods with which are poorly connected to surrounding areas. As there are no services and employment available, residents every day have to commute for hours. Like happened in Cidade de Deus, informalization of the areas according to the needs of the residents started soon after the construction. In the first round of MCMV settlements,

small businesses have already been added to the homes of the residents to generate income. Others, extended the living area of their homes, because the general layout of the houses did not provide the means to cope with changes in family structure or own businesses. (Koumantou, 2013)

This is description of informalization is interchangeable with that of the development of Cidade de Deus and other previous federal housing programs, as well as other public housing complexes which are currently developed independent from the MCMV program.

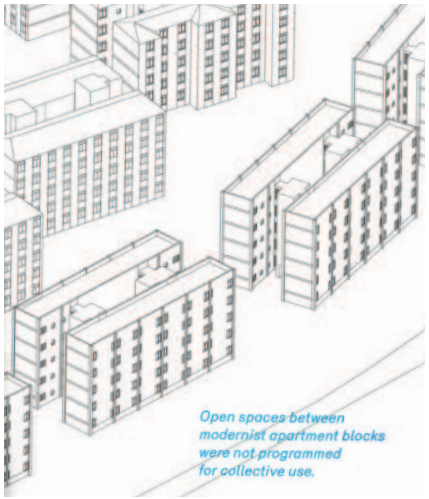
*4.3 Models of informality*

Analyzing the MCMV settlements, can be stated that, they have a lack of urban as well as architectural design solutions in order to incorporate the needs of the urban poor. As a result, self-organization and self-construction is the only way for them to accommodate their needs within the neighborhoods.

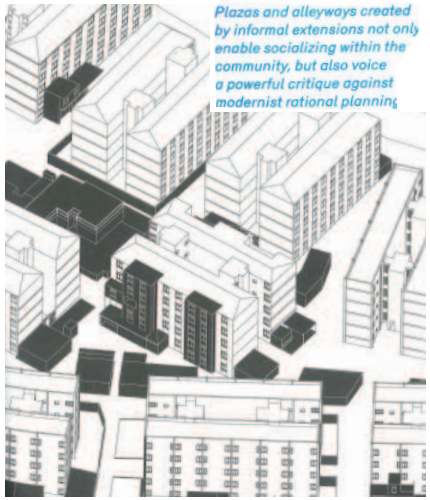
Understanding the evolution of previous mass housing programs and projecting this on currently development mass housing programs, Koumantou suggests that the informalization of the projects can be used as a model for a formal translation of urban informality, in order to provide better public housing and improve living conditions. (Koumantou, 2013) This suggestion corresponds with the words of Nitin Bathla (2014) in his essay Progress or "Déja Vu"?:

"As we still see the same kind of models repeated endlessly throughout the country, the lesson from history should urge us to think about updated solutions for social housing that meet the necessities and specific conditions that popular Brazilian culture is calling for today." (p. 69)

Learning lessons from history means here that the informalization patterns, should be formulated into design principles for future projects. Whitaker and Leitão (2012) have assembled certain lessons which will be illustrated in the next section of this paper. In the book Slum Upgrading: Lessons Learned From Brazil, edited by Magal-








ANGÉLIL, M. & HEHL, R. (eds.) Cidade de Deus! Working with Informalized Mass Housing in Brazil. Berlin: Ruby Press Berlin.

**“Fading the border between the formal and the informal should become the most important objective of urban planning policy.”** França (2012)

hães and Villarosa, it is stated that based on previous housing projects, a body of empirical knowledge on how to develop informal practice has been created. This knowledge needs to be organized, so that we can learn from it and develop better housing policies and projects. (Whitaker and Leitão, 2012)

*5 Learning lessons from informalized mass housing*

*5.1 Policies responding to local conditions*

To update the current responses within the mass housing programs, changes need to be made in the existing policies and programs, as well as in the urban and architectural qualities of the complexes. Elisabete França (2012) , from the secretary of habitation of São Paulo endorses that urban policies need to change in her writing for the 5th International Architecture Biennale in Rotterdam. She involves not only the mass housing programs, but contemporary urbanism as a whole, stating that we should build upon knowledge and information developed in and about the city and step away from modern urbanism, which was based upon theories about non-existing cities and abstractions. This can be done by treating the consolidated city as an integral part of the solution of improving the informal and setting the fading of the border between the formal and the informal as the most important objective. From this point of view she states that current policies need to change and that policymakers are required to change their way of thinking on the city. Therefore, they need to gain knowledge about what the city really is about. (França, 2012)
Focussing on housing, Whitaker and Leitão (2012) state that housing projects always have to be designed considering their context and that universal parameters should not be used. This also determines a variety in policy, based on the local particularities such as social demands or physical structures. (Whitaker and Leitão, 2012)
This is supported by Rolnik and Klink (2011), who reviewed the current state of housing policies and programs as well. They also pose, in line with Whitaker and Leitão that there is a need for tailor-made approaches in order to better include the housing settlements within the local particularities. (Rolnik and Klink, 2011)

*5.2 Design responding to local conditions*

In additions to the lessons learned on policies, the architectural and urban qualities of the output – the housing units – should also be reviewed. Mutzke and Monsalve (2014) stretch the importance of this by recalling the case of Cidade de Deus:

“One need only look at the similarities of Cidade de Deus sixty years ago to the current MCMV settlements to understand that time can turn barracks into neighborhoods. However, learning from the past, and problems encountered then, why not undo the current standards in favor of a more varied and versatile model?” (p. 66)

In the book Slum Upgrading: Lessons Learned From Brazil, Whitaker and Leitão (2012) pose an overview of criteria for a more varied and versatile model is described.

From an architectural point of view the book describes that the housing units need to be flexible and allow for expansion. The minimal area of a unit should consider at least good conditions for social coexistence, family integration and human development. In order to provide opportunity for human development, spaces for income generation should be incorporated in the projects. Besides the benefits of generating income and employment for the community, businesses will vitalize the area, provide social control and may activate the area at night as well.

From an urban perspective, the book covers that it is important to look beyond the project border during the design, in order to not only improve the conditions within the settlement, but also its surroundings. This can be achieved by assuring that the quality of the build housing units and public spaces match the quality of the neighboring urban areas and providing a good connectivity of the location with the surrounding urban network. Furthermore, housing programs are also highlighted from a social perspective, noting that existing social structures should be maintained by keeping the residents close to their original neighborhoods and their jobs. (Whitaker and Leitão, 2012)

**“The answer begins with building on existing social and physical structures, by retrofitting them in order to better integrate vulnerable communities into the greater urban fabric.”**

Angélil and Siress (2013)

*5.3 Lesson learned*

The lessons of Whitaker and Leitão can be applied in all types of mass housing projects, whether it is in situ slum upgrading or a resettlement, or whether it is within the MCMV program or an independent project. The essential message of this book and the other literature reviewed is, as stated similarly by John Turner in 1968, to build upon the existing knowledge by learning from solutions which are already offered in favelas and informalized mass housing areas. These solutions should be based on the needs of the inhabitants and the particularities of the location. Marc Angélil and Carey Siress (Angélil and Siress, 2013) summarize it as follows:

“The solution comes from within rather than beyond, that is, from grassroots communities already in place. Instead of outright expulsion [. . .], or demolition and rebuilding [. . .], the answer begins with urbanizing existing contexts as they are, building on existing social and physical structures that do work – however informal they may be – by retrofitting them in order to better integrate vulnerable communities into the greater urban fabric.” (p. 142)

# Part 03.1 / SOCIO-SPATIAL ANALYSIS
## REGIONAL SCALE

Dique da Vila Gilda is situated in the metropolitan area of Baixada Santista which is home to the largest port of Brazil, having a strategically strong position along the coast near mega-city São Paulo. The area is facing a rapid economic and demographic growth, triggered by expected port expansions.

Baixada Santistas natural environment exists mainly of wetlands and mangrove vegetation. The mangrove ecosystem has an important function as protecting against floods, reducing erosion and sedimentation and maintaining the biodiveristy in and around the region.

In order to recognize the diverse conditions and trends in the metropolitan area of Baixada Santista, socio-spatial analysis has been done, exploring the value of the natural envionment and the impact of the urbanization process on this system.

CONTENT

Região Metropolitana da Baixada Santista
Topography
Infrastructure
Infrastructure: expected projects
Expected demographic change
Land use
Land use: legislation
Zoom. The spatial consequences of fragmented urban development
Estuary: dynamics
Estuary: pollution
Estuary: mangroves
Conclusions

# REGIÃO METROPOLITANA DA BAIXADA SANTISTA

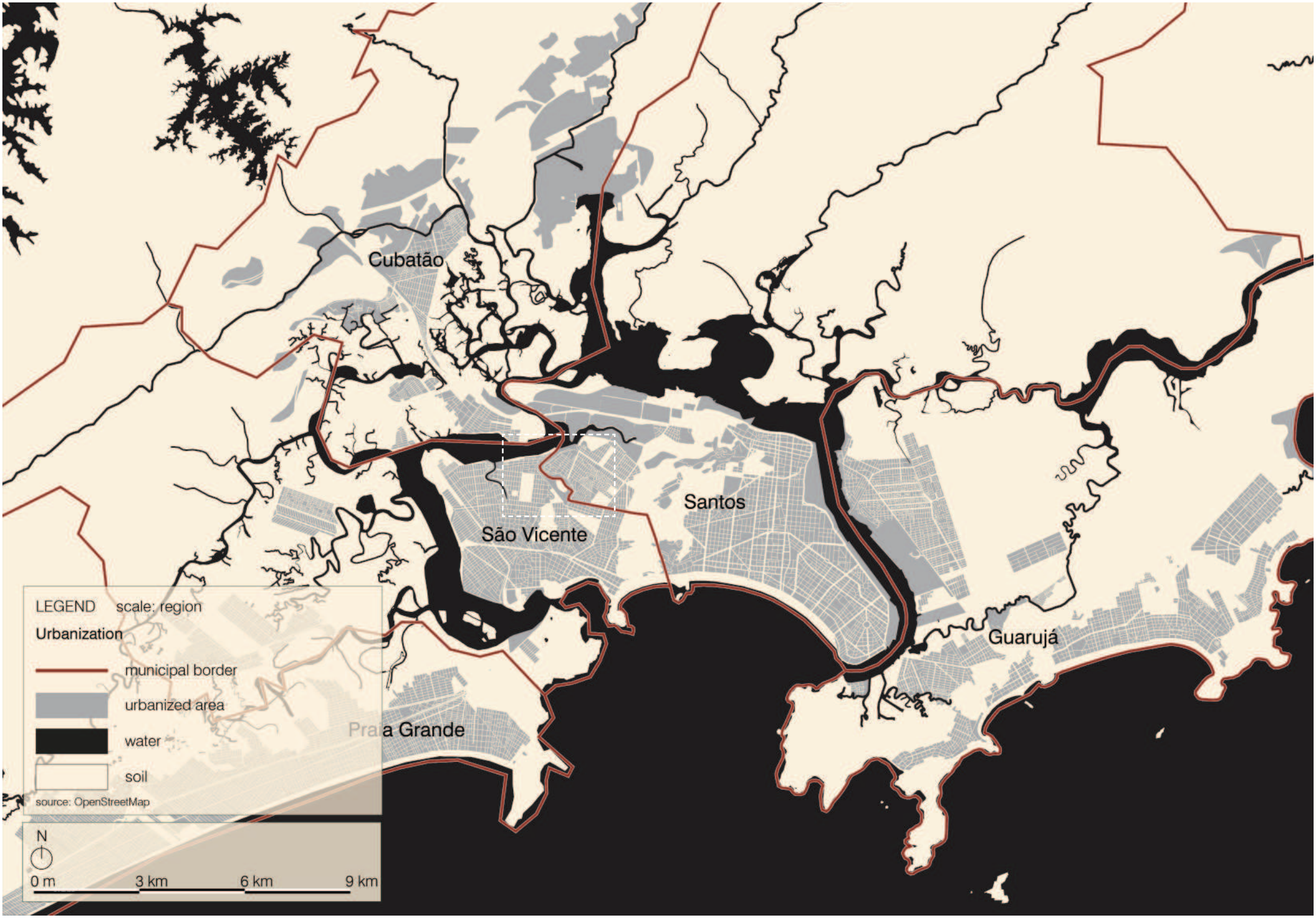
## Economic cluster in the region of mega-city São Paulo

Metropolitan Area Baixada Santista consist of nine municipalities, of which Santos and Cubatão are the most important for the economy. Cubatão has one of the most important heavy industries of Brazil and Santos is home to the largest port of Latin-America, both are driven by the demand and production of the city of São Paulo which is situated about one hour travelling by car from the region. The other cities of Baixada Santista function as commuter towns for Santos and Cubatão.(Zündt, 2006)

The enormous growth of the population in the past decades, driven by the port and industrial economies, has caused a conflict in the complex relation between urban area, industrial area and natural environments. (Bloch and Papachristodoulou, 2012)


Metropolitan area Baixada Santista is located in the proximity of mega city São Paulo. source: Google Earth

Santos is home to the largest port of Latin America. source: Center for Latin American Studies, University of California, Berkely. http://clas.berkeley.edu/

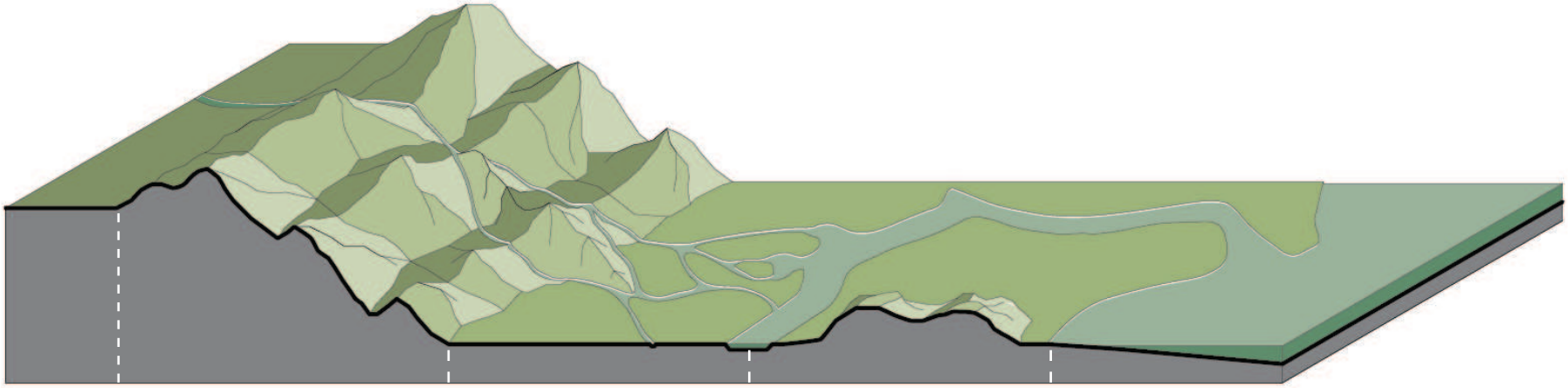

Cubatão
Santos
São Vicente
Guarujá
Praia Grande
LEGEND scale: region
Urbanization
municipal border
urbanized area
water
soil
source: OpenStreetMap
N
0 m
3 km
6 km
9 km

# TOPOGRAPHY

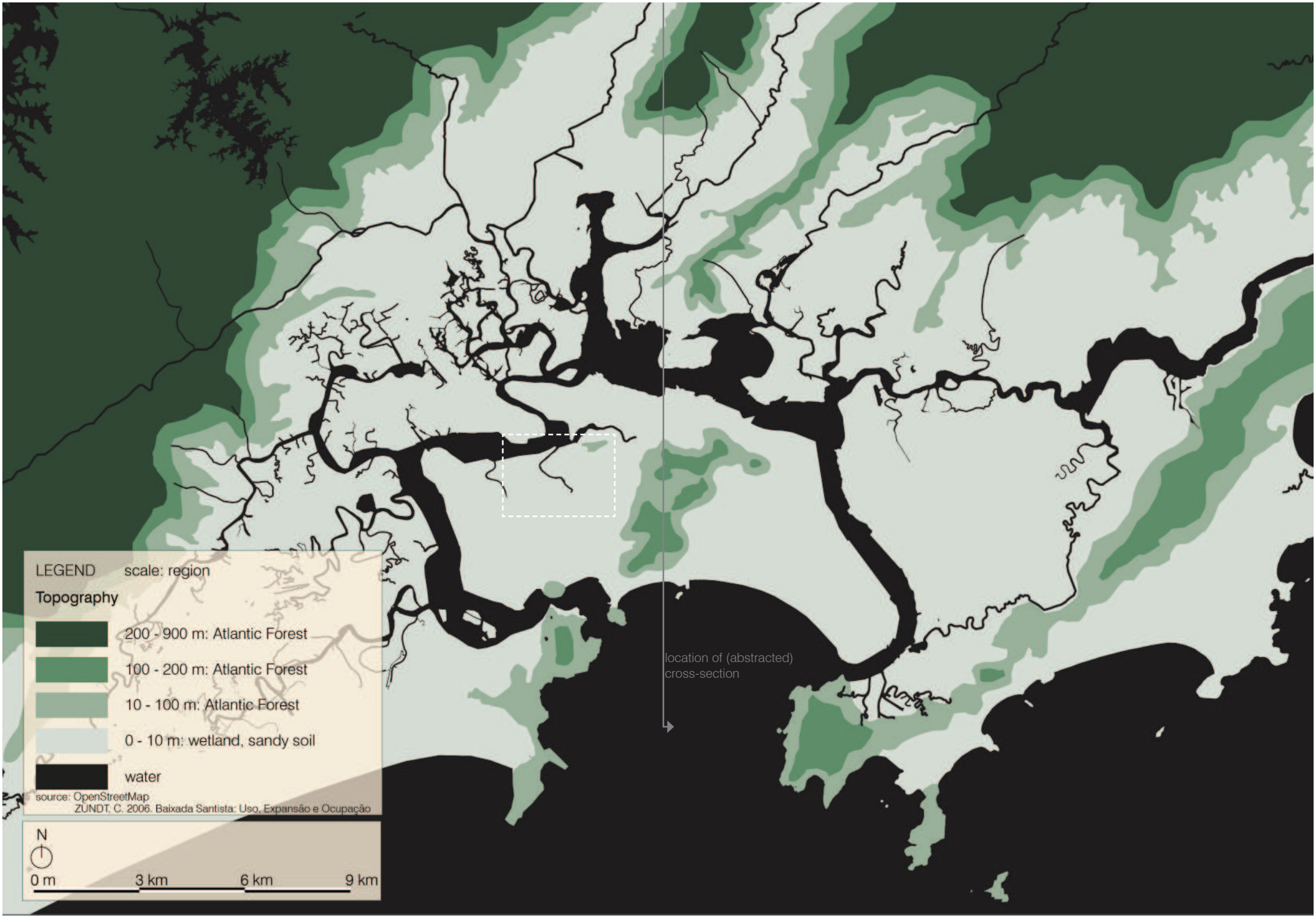
## Urban area surrounded by the ocean, wetlands and mountains

The coastal area along the southeast of Brazil is characterized by a formation of mountains parallel to the coast, named the Serra do Mar. The mountains are up to 900 m high and are covered by the Mata Atlântica (Atlantic Rainforest). In the region of Baixada Santista, various rivers are descending from the Serra do Mar into the estuary lowlands around the island of São Vicente. This is a wetland area consisting of sandy soil and mangrove vegetation. (Zündt, 2006) Currently, these mangroves are under heavy pressure of the ever growing urbanization.


Topography of Santos. In the background the Serra do Mar with the Atlantic Forest and SãoPaulo. source: Presentation of Santos Novos Tempos, Municipality of Santos.




Cross-section illustrating the topography of Baixada Santista (abstracted). Source: authors own


LEGEND
scale: region
Topography
200 - 900 m: Atlantic Forest
100 - 200 m: Atlantic Forest
10 - 100 m: Atlantic Forest
0 - 10 m: wetland, sandy soil
water
source: OpenStreetMap
ZUNDT, C. 2006. Baixada Santista: Uso, Expansão e Ocupação
location of (abstracted)
cross-section
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0 m
3 km
6 km
9 km

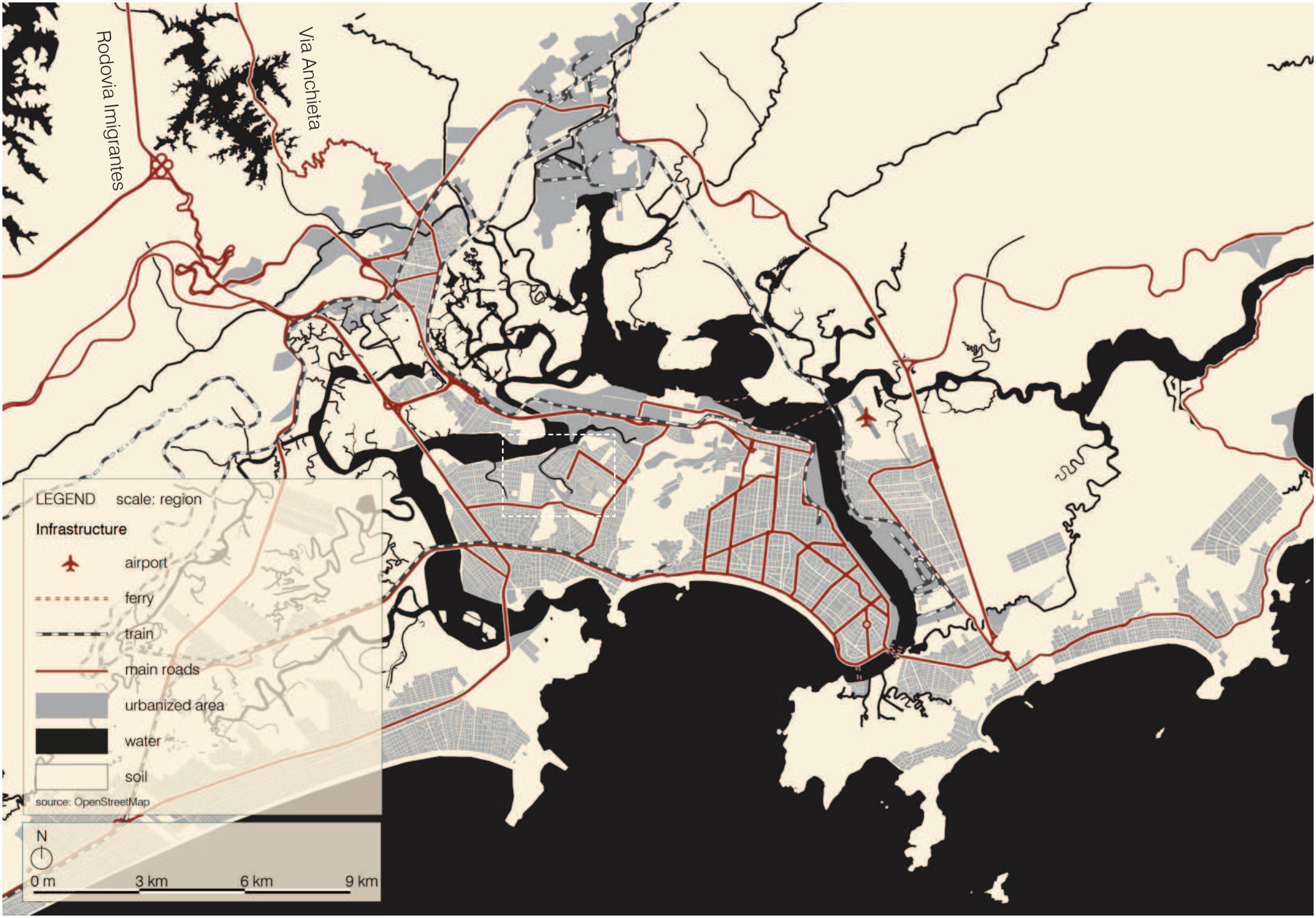
# INFRASTRUCTURE

## Infrastructure as catalyst for urban and industrial growth

Regionally, the two most important highways are the Rodovia Anchieta and the Rodovia dos Imigrantes, because they connect the Metropolitan Area of Baixada Santista with the city of São Paulo. Historically, these two highways have been important for the development of the industries of Cubatão and the port of Santos as they then could profit from the demand and production of São Paulo. This also was the occasion already in 1867, when the Railway Company connected Santos with the coffee farms in São Paulo, giving a boost to the economy of the region.(Bloch and Papachristodoulou, 2012)
In 1976, after the Rodovia dos Imigrantes constructed, it not only boosted the port and industrial activities, but even more the tourism along the beaches. The new highway provided a rapid connection for the inhabitants of São Paulo with the coastal region, boosting the summer tourism economy and real estate speculation.(Zündt, 2006)
Other important highways are the ones connection the coastal cities of the region.

Large infrastructure has been developed (here: descending from the Serra do Mar) to connect Baixada Santista to São Paulo. source: R.C. Branco. http://www.renatacastellobranco.com.br/


Heavy traffic on the way from São Paulo to Cubatão and the port of Santos.
source: Authors own


Rodovia Imigrantes
Via Anchieta
LEGEND scale: region
Infrastructure
airport
ferry
train
main roads
urbanized area
water
soil
source: OpenStreetMap
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0 m
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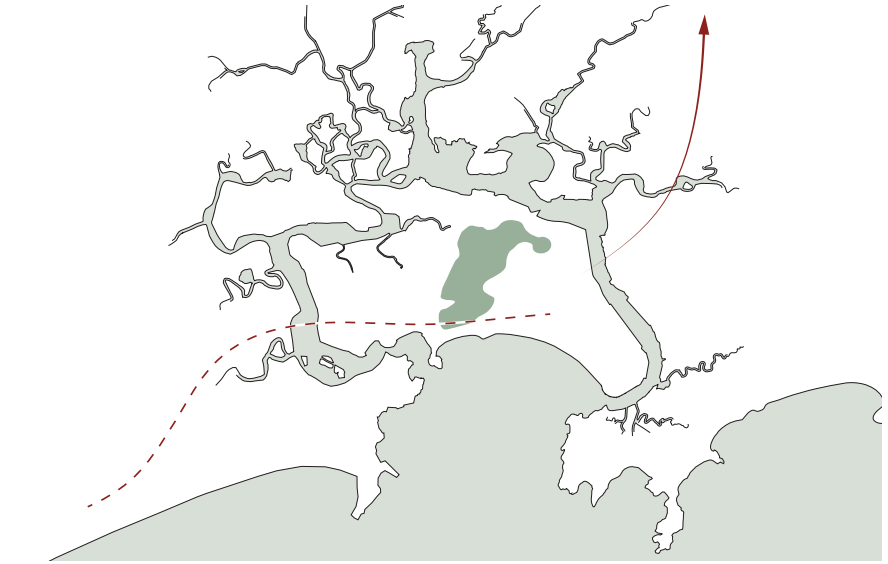
# INFRASTRUC-TURE: EXPECTED PROJECTS

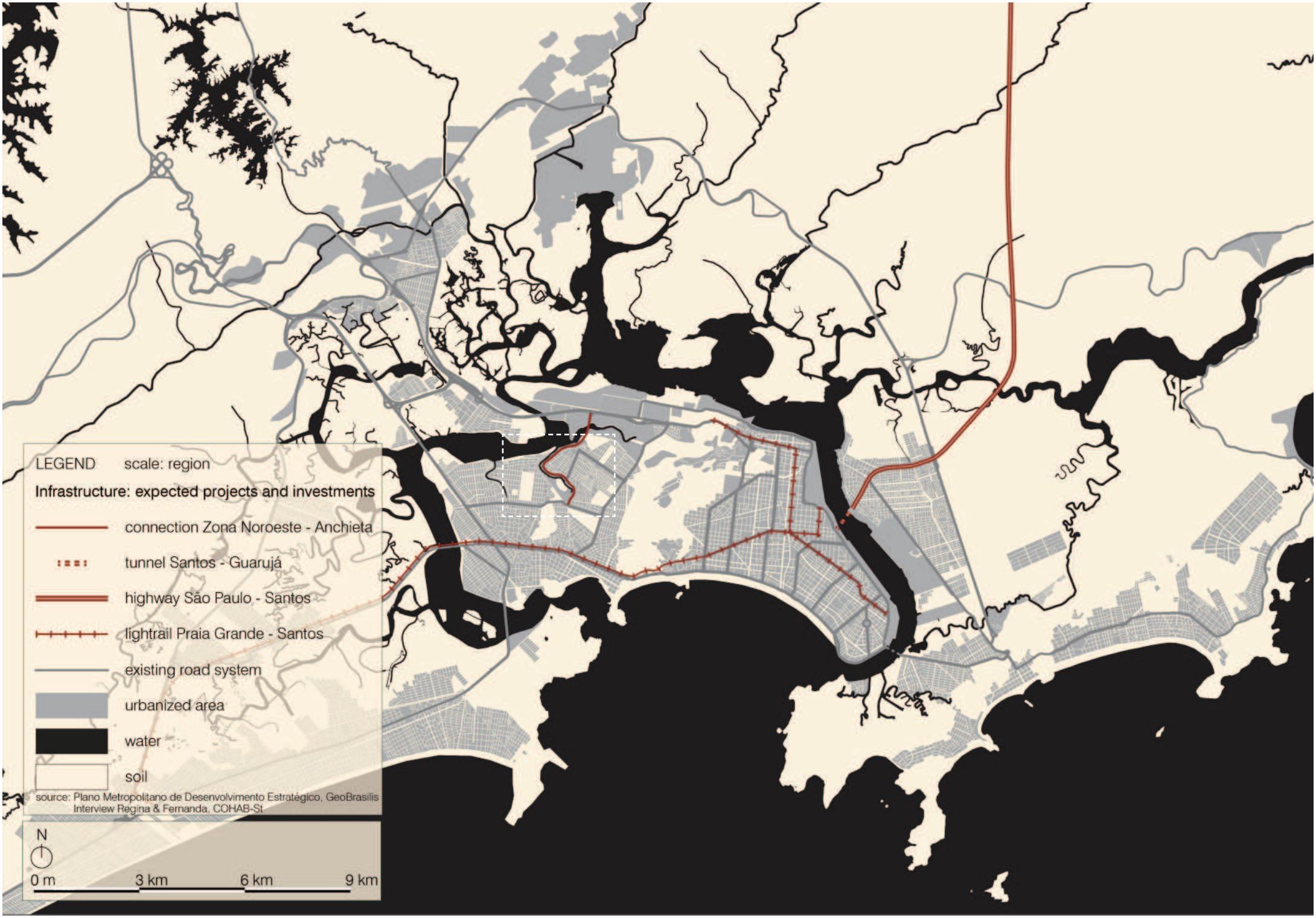
## Investments to improve the connectivity of the region

The most eye-catching project in the region currently is the light rail which is connecting the Island of São Vicente with Praia Grande. It was meant to connect even more cities along the coastal area of Baixada Santista but this proposal has been canceled. The light rail is currently under construction and will run from the old city center of Santos towards the touristic southern districts of the island, down to Praia Grande.
Another important project, which currently is on hold, is the highway to connect Santos with São Paulo, through a tunnel from Santos to Guarujá. This will relieve the pressure of traffic on the busy highways (Via Anchieta and Rodovia do Imigrantes) towards São Paulo, which are important for the port and industrial economy of the region. Also, it will improve the connection of Santos with the municipality of Guarujá, which is an important commuter town. Nowadays, the only direct connections possible between Santos and Guarujá are by ferry.

Lightrail from Praia Grande to Santos.
source:http://g1.globo.com/sp/santos-regiao/



Conclusion: The mobility within the region is being improved by the lightrail track. Also, the connection with São Paulo will be improved with another highway. Source: authors own


LEGEND scale: region
Infrastructure: expected projects and investments
connection Zona Noroeste - Anchieta
tunnel Santos - Guarujá
highway São Paulo - Santos
lightrail Praia Grande - Santos
existing road system
urbanized area
water
soil
source: Plano Metropolitano de Desenvolvimento Estratégico, GeoBrasilis
Interview Regina & Fernanda, COHAB-St
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6 km
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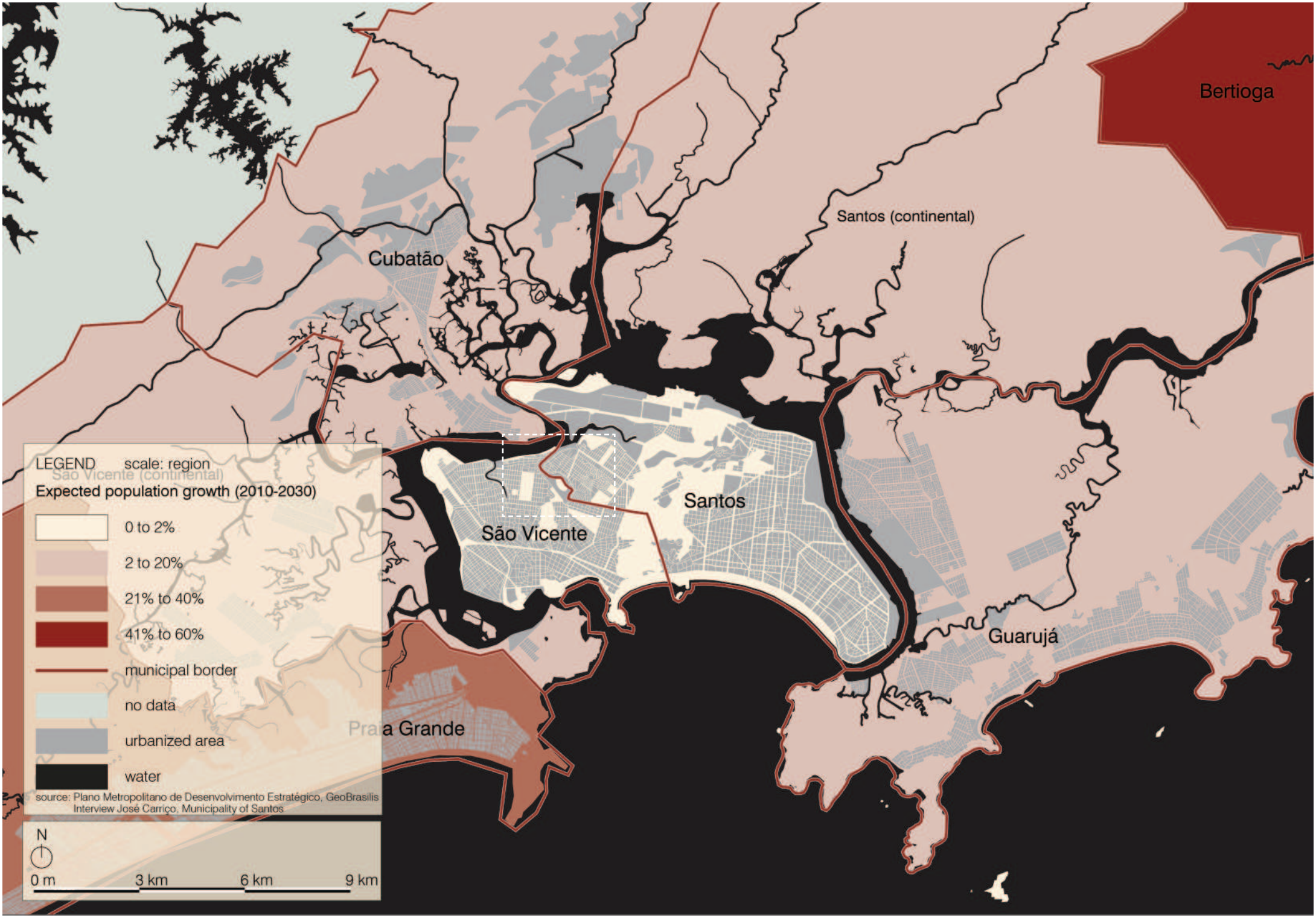
# EXPECTED DEMOGRAPHIC CHANGE

## High income population moving to the island of São Vicente, pushing the low incomes towards the periphery of the region.

The projected population growth for the next two decades shows a pattern of suburbanization. As the island of São Vicente is getting saturated, the population growth has to be absorbed in the outskirts of the region. The municipalities of Praia Grande and Bertioga are expected see the largest population growth. (Santos, 2014)
On the island of São Vicente itself, the population is expected to change. It is projected that, as real estate prices are going up, Santos will have an influx of high income population, while the low-incomes will be pushed towards the peripheries and to the cheaper neighbor cities. This projected demographic change is a result of the current social and economic governance, which stimulate investments in the high end real estate and, thus, is driving up the land prices.(Bloch and Papachristodoulou, 2012)
The little demographic growth which still has to be absorbed on the island will be directed vertically.


Conclusion: Investments and in-migration of high income population groups on the island, push vulnerable groups to the peripheries. Source: authors own

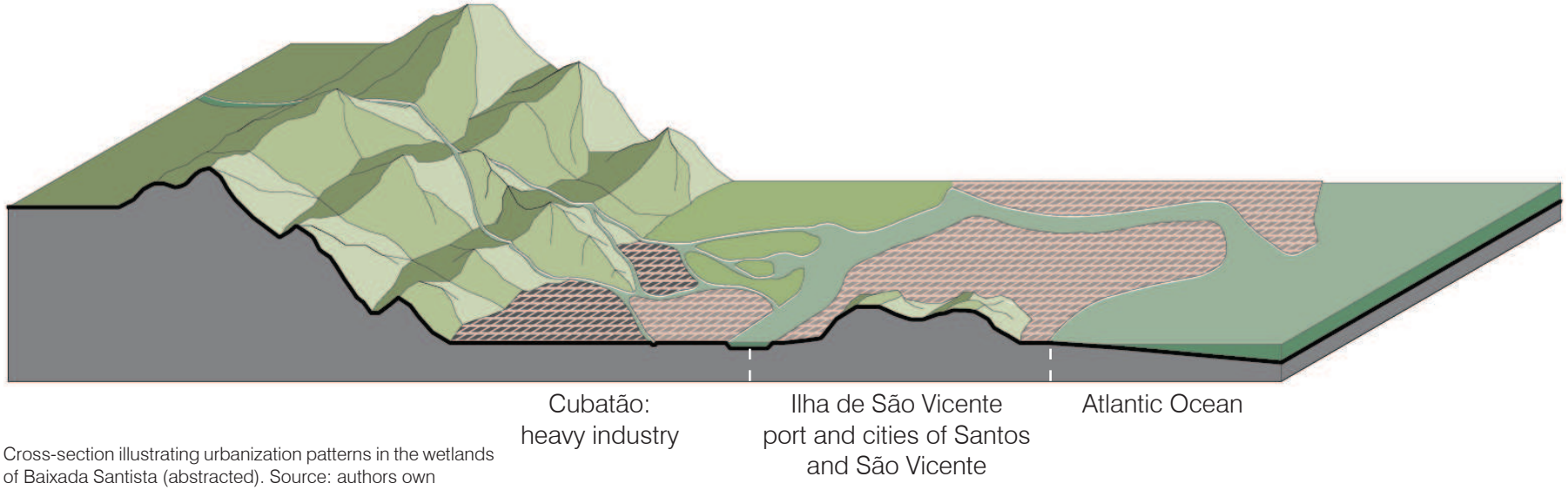

Bertioga
Santos (continental)
Cubatão
São Vicente (continental)
Santos
São Vicente
Guarujá
Praia Grande
LEGEND scale: region
Expected population growth (2010-2030)
0 to 2%
2 to 20%
21% to 40%
41% to 60%
municipal border
no data
urbanized area
water
source: Plano Metropolitano de Desenvolvimento Estratégico, GeoBrasilis
Interview José Carriço, Municipality of Santos
N
0 m
3 km
6 km
9 km

# LAND USE

## Urbanization and industrial activities are putting a high pressure on natural environments

The region can roughly be divided in to areas: residential urbanization along the beaches, and the port and industries in the estuary. The port of Santos has been growing from the southern tip along the canal, up to the north. Cubatão has been developing close to Via Anchieta, expanding into the mangroves. The extensive urbanization and industrialization have caused enourmous damage to the original environment; the wetlands and their mangrove vegetation.

The industries of Cubatão have a great impact on the living and natural environments in the region. source: Quintin Lake. http://quintinlake.photoshelter.com/




Cross-section illustrating urbanization patterns in the wetlands of Baixada Santista (abstracted). Source: authors own


LEGEND
scale: region
Land use
industrial
port
urbanized area
non-urban use
evironmental conservation
water
sourc: Plano Metropolitano de Desenvolvimento Estratégico, GeoBrasilis
location of (abstracted)
cross-section
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3 km
6 km
9 km

# LAND USE: LEGISLATION

## Fragmented urban and industiral developments are putting more pressure on environmental areas

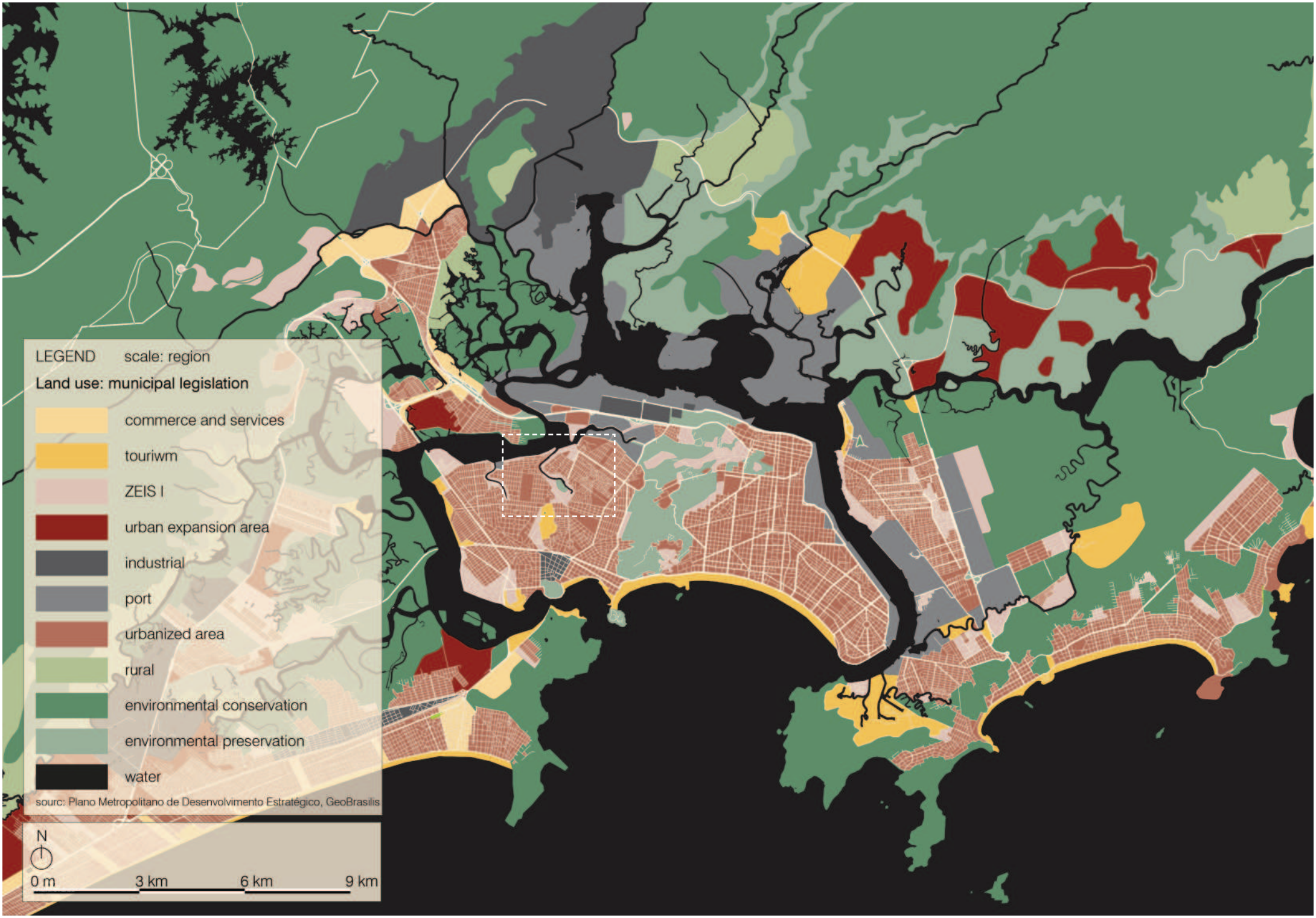
To guide further demographic and population growth, the municipalities in Baixada Santista have set legislation for the land use in the region, absorbing the growth and at the same time protecting valuable natural environments. Notable is that a large share of space is reserved for the port expansion, towards the north up to the industries of Cubatão, further destroying precious mangrove vegetation. Also, large urban expansion site are projected in the continental area of Santos, in the middle of protected natural environments.

In the legislation, the ZEIS* areas are appointed as well. These are zones of special social interest, mainly favelas and relocation areas. The development of these areas is getting special attention and is focused on providing basic infrastructure and cheap housing for the poor.

*ZEIS is a legal and urban policy instrument that outlines the precarious settlements that need to be urbanized or regularized by governments. Municipal government have to use the ZEIS in their masterplans and Land Use Acts (Carvalho, 2014)

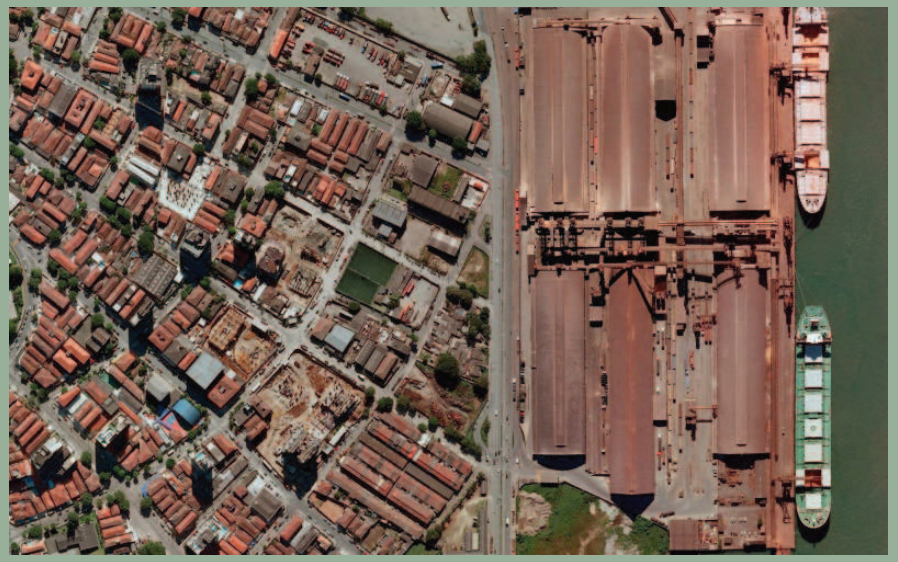
Current port expansion project.
source: Presentation André Neumann, Instituto do Mar

Conclusion: The port is expanding to the North, further affecting the natural environments, but relieving pressure on the island. source: authors own


LEGEND scale: region
Land use: municipal legislation
commerce and services
touriwm
ZEIS I
urban expansion area
industrial
port
urbanized area
rural
environmental conservation
environmental preservation
water
sourc: Plano Metropolitano de Desenvolvimento Estratégico, GeoBrasilis
N
0 m
3 km
6 km
9 km

# ZOOM
## THE SPATIAL CONSEQUENSES OF FRAGMENTED URBAN DEVELOPMENT

A quick zoom with Google Earth provides an interesting view on the urban structure of the metropolitan area of Baixada Santista, showing the spatial conflicts between ports, industries, regular housing, favelas and natural environments.



source: Google Earth

# ESTUARY: DYNAMICS

## Low dynamics and the encounter of sweet and salt water provide growing conditions for mangroves

The estuary around the island of São Vicente is characterized by its low dynamics. The rivers descending from the Serra do Mar have strong current, because they flow from about 600-900 meter down to sea level. But then, as they enter the plain grounds of the wetlands, the rivers start curving, gets more space, causing the current to slow down.
From the other side the Atlantic Ocean is delivering salt water to the continent, but because the Bay of Santos is protecting this strong current from directly bashing into the estuary, the estuary has a weak current. Being on the encounter of sweet and salt water and having a low dynamic, the waters in the estuary are the ideal place for mangrove species to grow. The mangrove vegetation is very important for the local ecosystem.

note: information obtained during an interview with André Neumann, Instituto do Mar, Santos

The estuary of Cubatão has low dynamics, as the rivers are curved and have a lot of space. source: Censo Neotropical de Aves Aquáticas. http://www.ceo.org.br/censo/fotos_2008.htm

Mangrove vegetation in Santos. The estuary provides ideal conditions for mangroves to grow. source: Jornal da Orla. http://www.jornaldaorla.com.br/


LEGEND scale: region
Salt & sweet water
salt water
sweet water
calm water
dynamic water
soil
source: Interview André Neumann, Instituto do Mar, Santos
N
0 m
3 km
6 km
9 km

# ESTUARY: POLLUTION

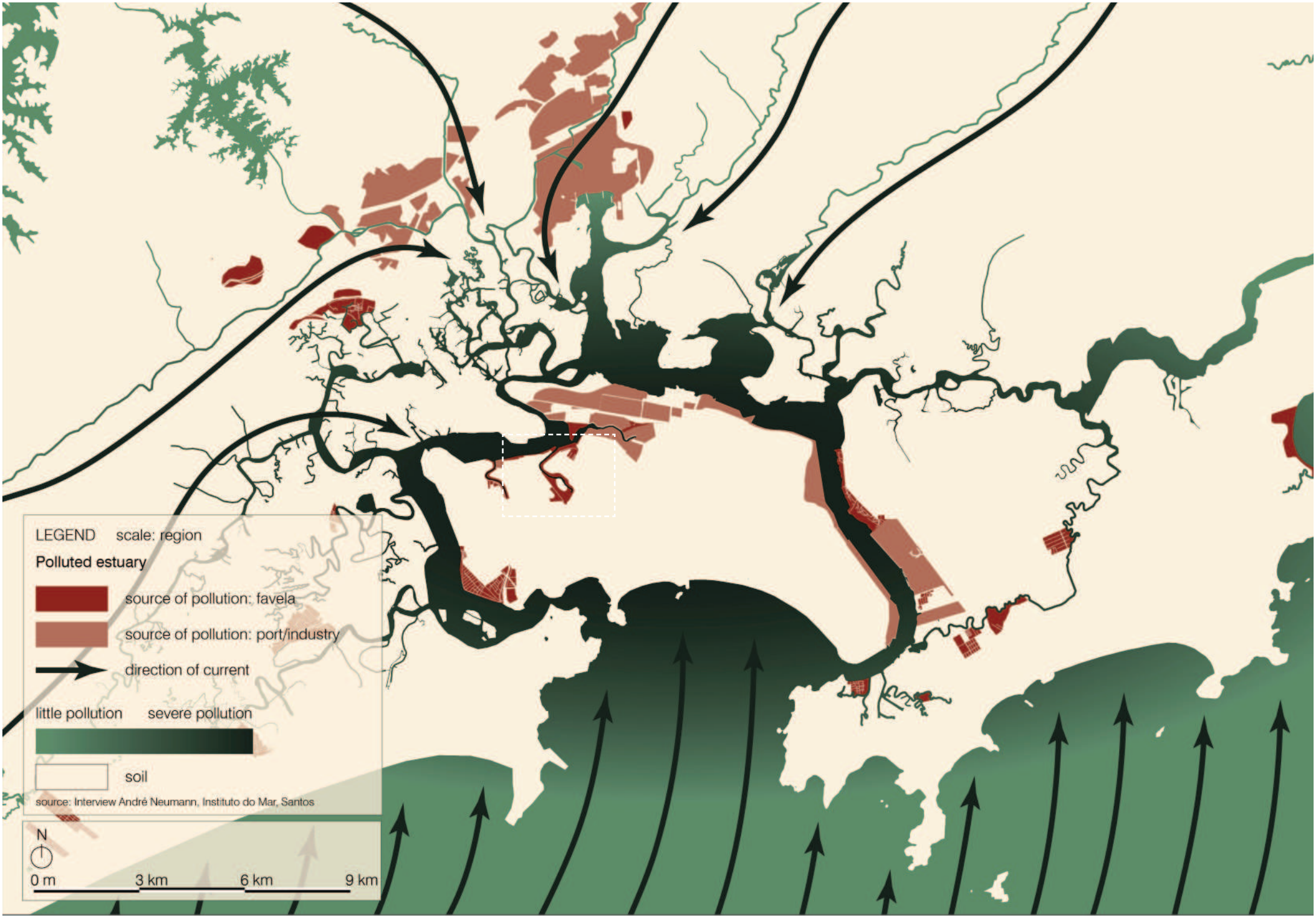
## The low dynamics are causing the pollution to get trapped in the estuary

Over the past decades the estuary has become extremely polluted, because of the industrial and domestic wasting which spilled and dumped into the watercourses. Because of its low dynamics, and the directions of the currents of the inflowing rivers and the ocean, many of the pollution gets trapped in the estuary.
Due to a lack of environmental regulations during the time of rapid industrial developments, the industries of Cubatão and the port of Santos have had severe environmental consequences causing serious air and water pollution. Besides the industrial waste, the domestic discharge should not be undermined, as it accounts for high levels of pollutants coming from sewage water. Slums along the watercourses are contributing strongly in this, as they do not have sanitation infrastructure all the domestic discharge get dumped into the estuary.
The industrial and domestic discharge have been the cause of serious environmental degradation in the region at such a level that, in the 1980s the metropolitan region even became known as one of the most polluted in the world. This highly affected the tourism and fishing industry.

note: information obtained during an interview with André Neumann, Instituto do Mar, Santos

Volunteers of Eco Faxina cleaning the mangroves.
source: Pensameno Verde. www.pensamentoverde.com.br/

Environmental disaster after a tank caught fire in the port of Santos.
source: Instituto Eco Faxina Facebook


LEGEND scale: region
Polluted estuary
source of pollution: favela
source of pollution: port/industry
direction of current
little pollution severe pollution
soil
source: Interview André Neumann, Instituto do Mar, Santos
N
0 m
3 km
6 km
9 km

# ESTUARY: MANGROVES

## Mangroves are a source of biodiversity and provide ecosystem services

In the estuary around the island of São Vicente there is still many mangrove vegetation to be found. Unfortunately, a large share of the vegetation has already been destroyed caused by the urban and industrial developments in the region.

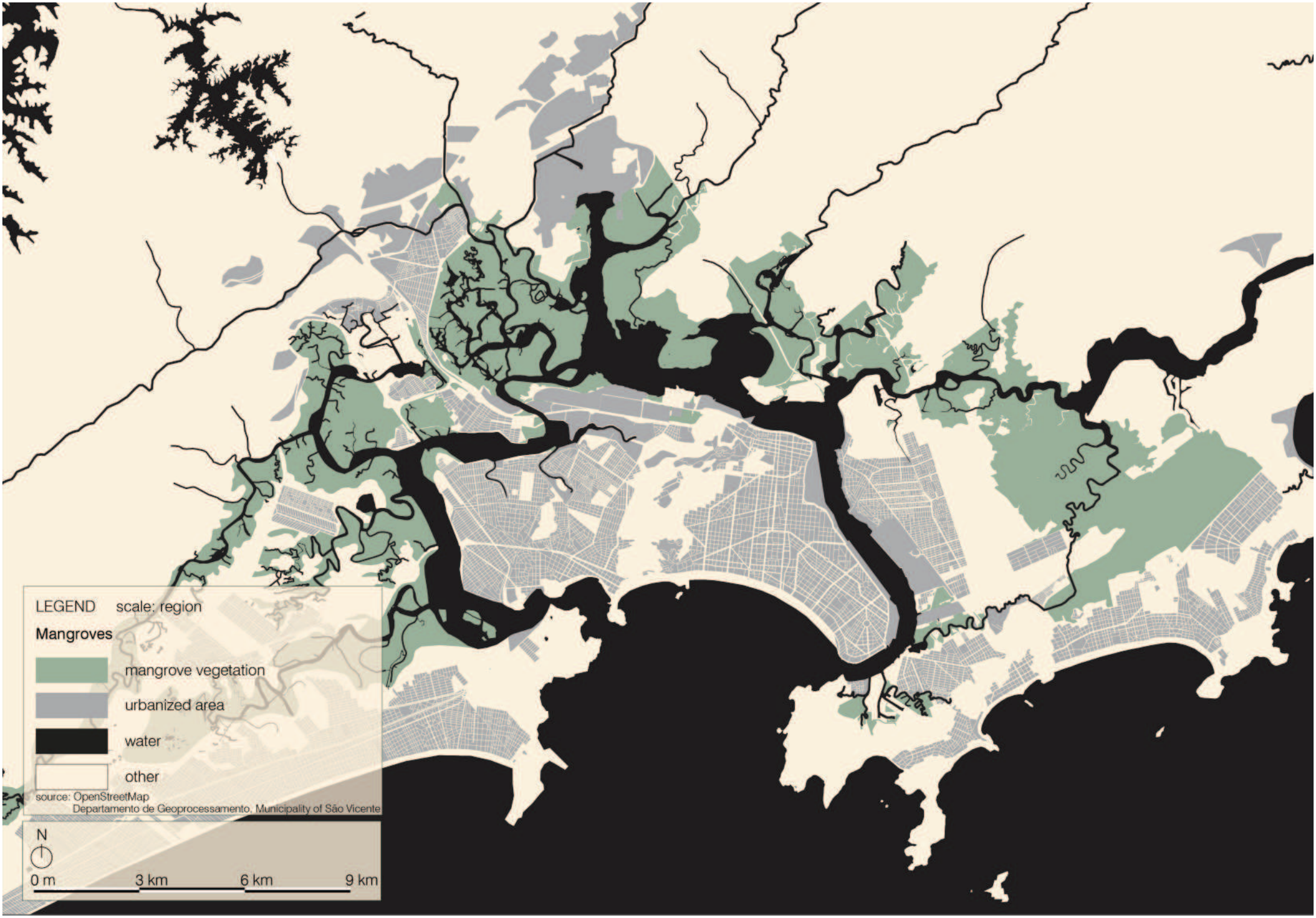
*Characteristics*
Mangroves are extremely important for the local ecosystem, because they have the capacity to filter the water and provide nutrients. Also, they are a birth chamber for many fish species and therefore they are also important for the fishing industries. Besides, mangroves prevent erosion, as their roots keep the sediments stuck. Around the world, the attention for the importance of mangrove vegetation is growing and which results in the reforestation of mangrove areas.

*Habitat*
For mangroves to grow, a key factor is clean water. Furthermore, natural conditions need to be provided which in the case of this region is already prevalent: salt-sweet water and muddy/ sandy soil. To foster the growth of mangroves, pioneer plants (for example: Porterasia Coarctata, a type of reed) can be used to bind the soil and secure the establishment of the right micro-organisms.

note: information obtained during an interview with André Neumann, Instituto do Mar, Santos

Mangrove vegetation in São Vicente.
source: Blog Caiçara. http://www.blogcaicara.com/

Mangroves are a birthchamber for fish species
source: Escola Britannica. http://escola.britannica.com.br/

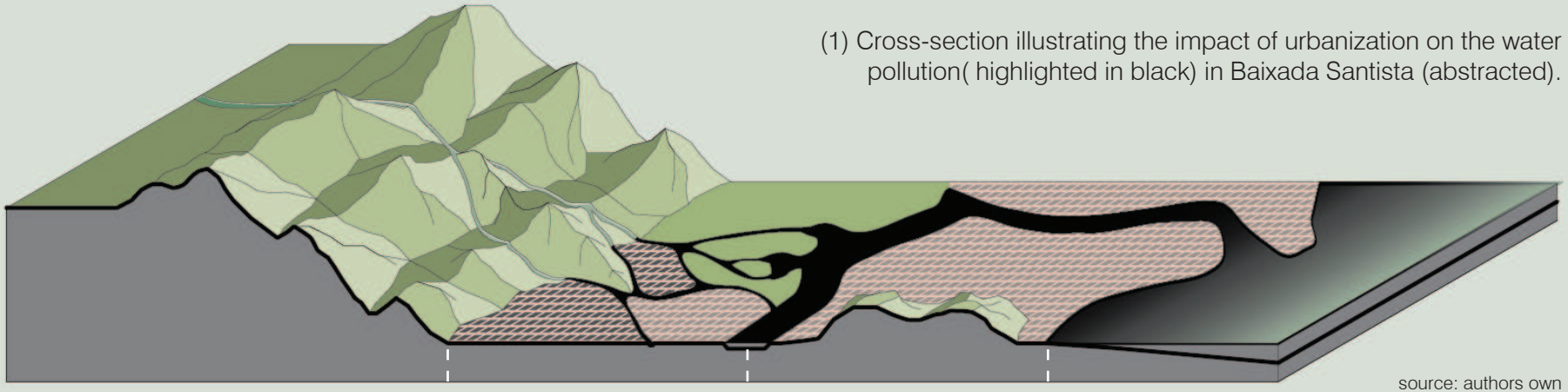

LEGEND scale: region
Mangroves
mangrove vegetation
urbanized area
water
other
source: OpenStreetMap
Departamento de Geoprocessamento, Municipality of São Vicente
N
0 m
3 km
6 km
9 km

# CONCLUSIONS
## REGIONAL SCALE

Due to rapid economic and demographic growth, the cities and industries in the metropolitan area of Baixada Santista continue expanding. Within the existing urban planning system, in which environmental damage is not considered, this goes at expense of large areas of wetlands and mangroves, which are valuable natural environments.*
A key challenge for the region is to structure the urbanization patterns (through all the scales) in a way that environmental damage is limited and that it provides the opportunity for the ecosystem to restore itself. Therefore, urban development policies should not emphasize the conflict between the urban and environmental systems, but the opportunity to integrate them, adapting a multi-objective planning process (considering the environment) and involving multiple decision makers (Braga, 2001)

*The main impacts on the natural environment are: (1) the increased water pollution, affecting the biodiversity, the living quality along the waterfronts and the quality of the beaches and (2) the increased erosion and sedimentation, affecting the maintainence of the port areas, beaches and resedential waterfronts.

(1) Cross-section illustrating the impact of urbanization on the water pollution( highlighted in black) in Baixada Santista (abstracted).



source: authors own

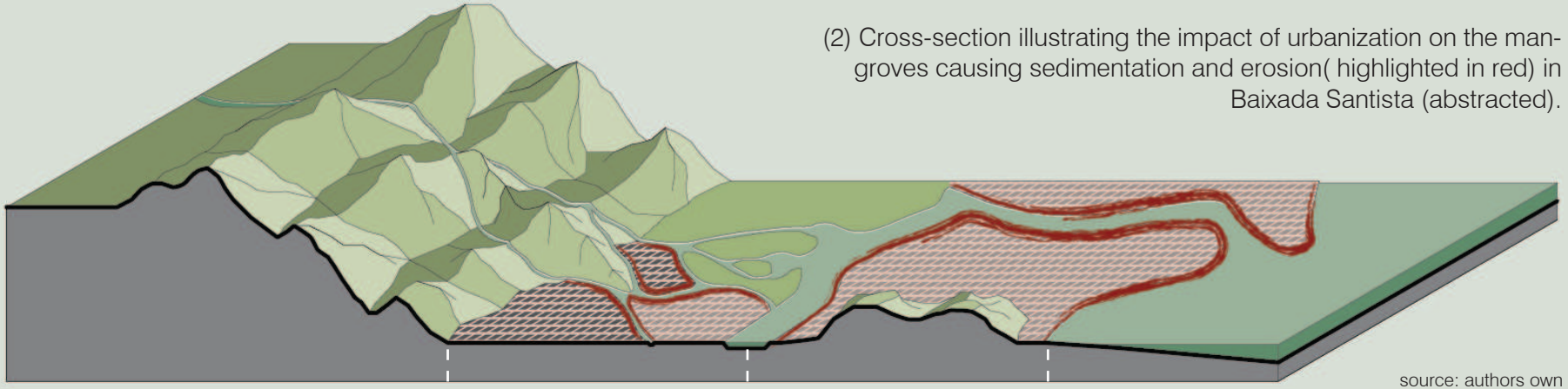
Serra do Mar, having relatively clean rivers

heavy industries of Cubatão polluting the wetlands and rivers

urbanization on Ilha de São Vicente polluting the rivers

Atlantic Ocean

(2) Cross-section illustrating the impact of urbanization on the mangroves causing sedimentation and erosion( highlighted in red) in Baixada Santista (abstracted).



source: authors own

heavy industries of Cubatão destroying the mangrove vegetation

urbanization on Ilha de São Vicente destroying the mangrove vegetation

Atlantic Ocean

# Part 03.2 / SOCIO-SPATIAL ANALYSIS
## CITY SCALE

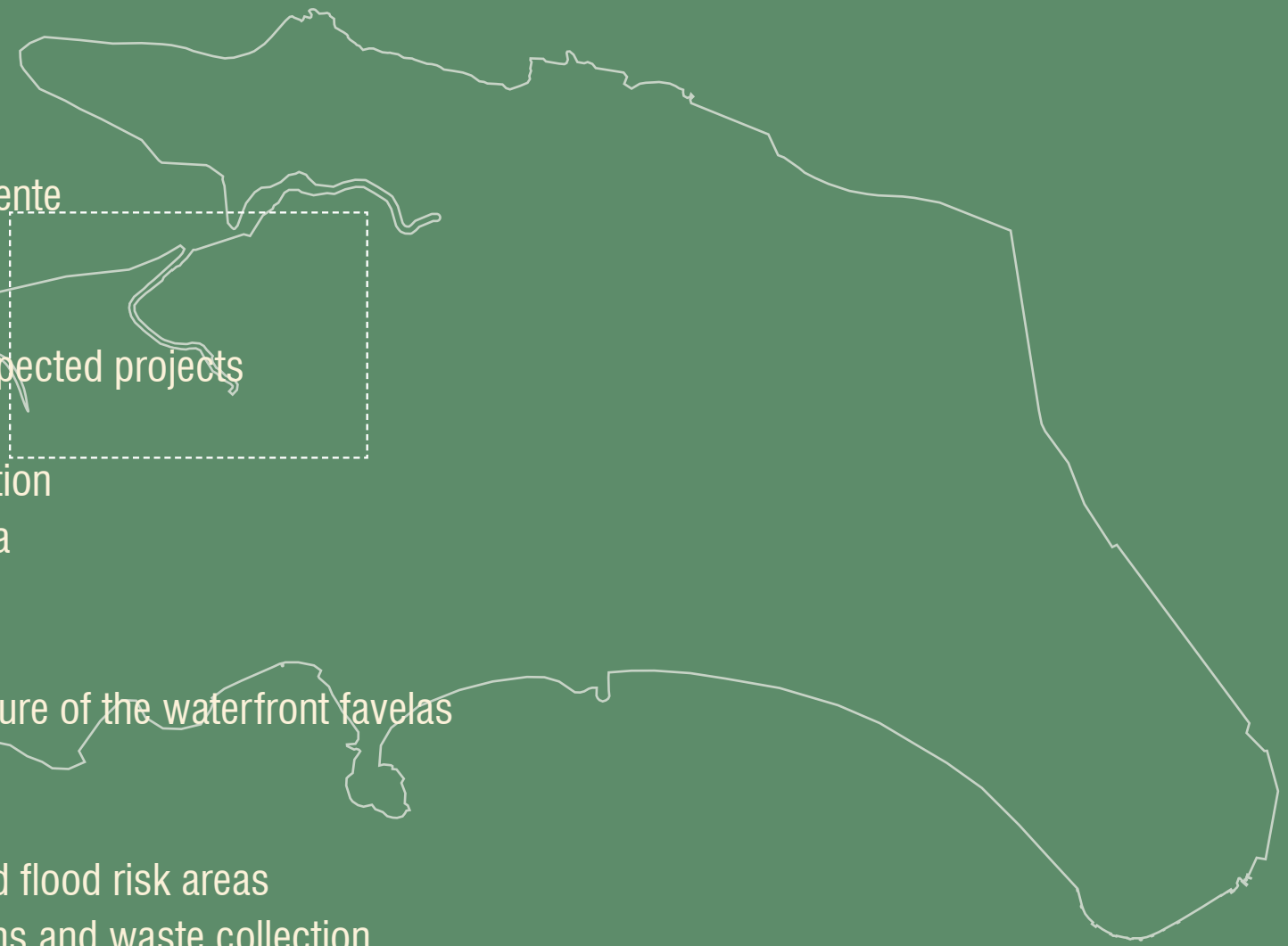
Dique da Vila is situated on the island of São Vicente, which is shared by the municipalites of São Vicente and Santos. The island used to be covered by wetlands and mangroves, however almost all of this native environment has been destroyed by urban, industrial and port areas as a result of the rapid growth of the municipalites.

As stated in the regional analysis the urban planning has mainly been economically driven, which has had a large influence on the distribution of environmental, urban and living qualities on the island.

Socio-spatial analysis has been done, in order to recognize the diverse conditions and trends and to explore to what exact environmental and socio-economic consequences the rapid development of the cities, industries and port has led.

CONTENT

Island of São Vicente
Topography
Infrastructure
Infrastructure: expected projects
Land use
Land use: legislation
Income per capita
Density
Favelas
Zoom. The structure of the waterfront favelas
Green spaces
Canal system
Canal system and flood risk areas
Sanitation systems and waste collection
Conclusions



# ISLAND OF SAO VICENTE

## Two municipalities dividing a fully urbanized island

Both the municipalities of Santos and São Vicente are partially situated on the island, which is named after São Vicente. The island is home to about 700.000 people, which is a large share of the total amount of inhabitants of the Metropolitan Region Baixada Santista. Therefore, the island is the most significant economic and commercial hub of the region. Especially Santos is important because as it has the largest port of Latin America as well as many employment in the service industry. Sao Vicente is functioning as the commuter town of Santos, which becomes apparent when seeing the direction of the daily traffic commute on the island. (Zündt, 2006) Zone Noroeste of Santos, where Dique da Vila Gilda is situated, is a neighborhood which is actually more connected to São Vicente then to Santos, from a spatial as well as a socio-economic perspective.

View from the hills on the island of São Vicente. The island is fully urbanized.
source: Paulo Carmona Sanches Neto. http://en.wikipedia.org/wiki/Santos


Santos: Zona Noroeste
São Vicente
Santos
LEGEND scale: city
Urbanization
municipal border
water
soil
source: OpenStreetMap
N
0 m 1 km 2 km 3 km 4 km

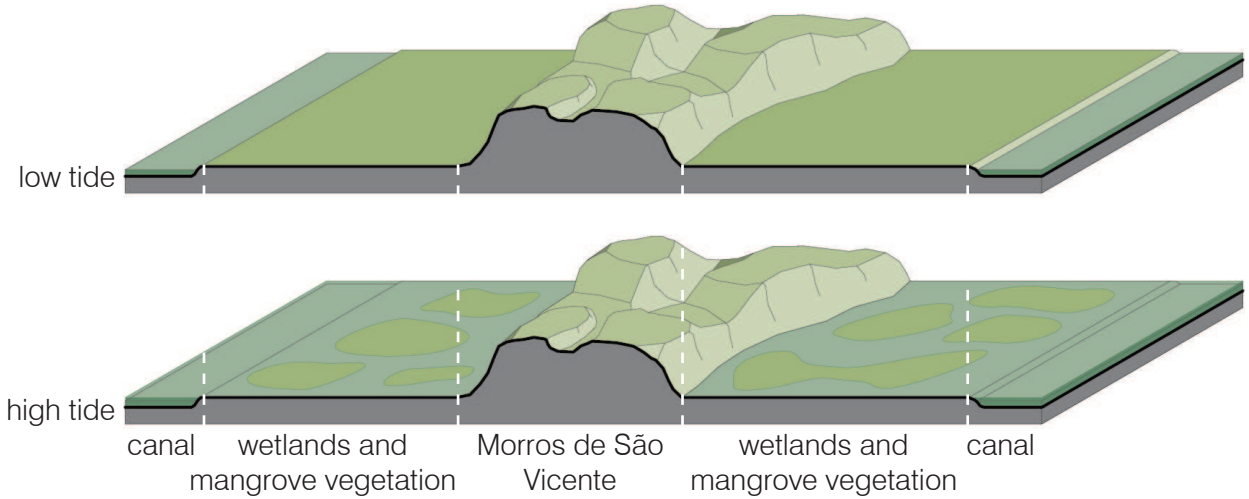
# TOPOGRAPHY

## The island is divided in two parts, by the Morros de São Vicente

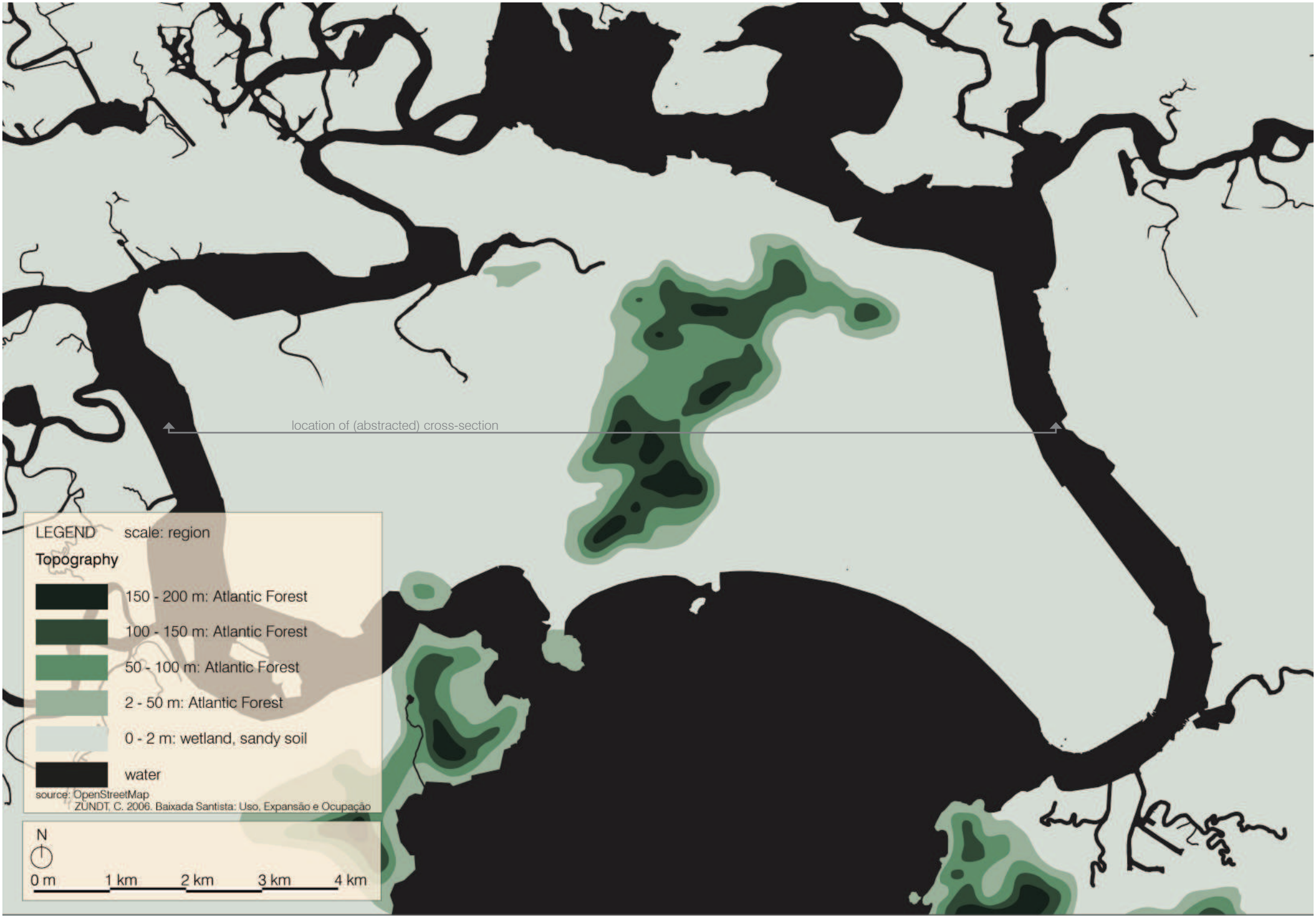
The island of São Vicente has been formed as a sandbank around a rock formation, which is named the Morros de São Vicente. The area around these rocks consists of sandy soil and used to be grown with wetland vegetation like mangroves. As it is a plain area, the sandbank used to flood regularly, which is why Santos and São Vicente have recurrent problems with floods. Also, the wet sandy soil is difficult for occupation.(Zündt, 2006)

The rock formation is the middle is covered by Atlantic Forest, but is currently being occupied by irregular settlements, causing landslides and environmental degradation.(Bloch and Papachristodoulou, 2012)

Morro de São Vicente. The hill in the middle are dividing the island in two. The plane part of the island used to be swampy wetlands. source: Google Earth




Cross-section illustrating the topography of the island of São Vicente (abstracted) source: authors own


location of (abstracted) cross-section
LEGEND
scale: region
Topography
150 - 200 m: Atlantic Forest
100 - 150 m: Atlantic Forest
50 - 100 m: Atlantic Forest
2 - 50 m: Atlantic Forest
0 - 2 m: wetland, sandy soil
water
source: OpenStreetMap
ZUNDT, C. 2006. Baixada Santista: Uso, Expansão e Ocupação
N
0 m
1 km
2 km
3 km
4 km

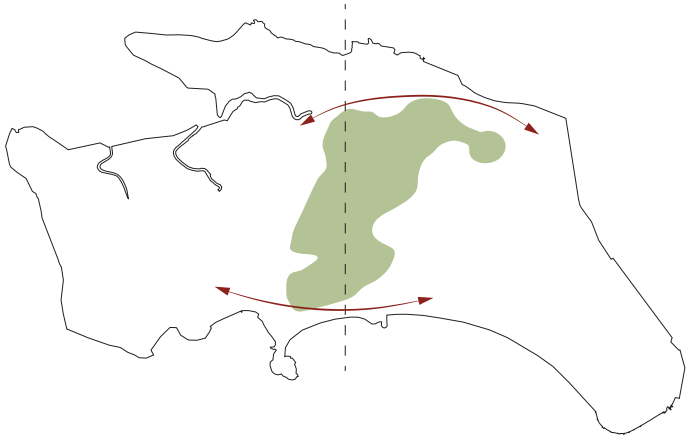
# INFRASTRUCTURE

## Only two main roads are connecting São Vicente with Santos

The road system on the island is divided in two by the Morros de São Vicente, the rock formation in the middle of the island. Due to the topography, there are only two main roads crossing the island from east to west. This causes heavy traffic in the morning as a large share of the employment is situated in Santos.
What also is notable, is the difference in structure between the side of Santos and the side of São Vicente. Where Santos road structure has been well planned, thanks to the urban expansion plan of Saturnino de Brito in the early 20th century, the road structure of São Vicente and the Zona Noroeste of Santos is unstructured. These parts of the island have not been developed with an integral plan but have developed fragmented.
The only bridges on the island are to be found on the western side, linking the island with the large highways towards São Paulo, and with Praia Grande. To reach Guarujá, the city on the east of the island, one should take the ferry.

The cycling infrastructure on the island is not covering both cities. Only the eastern part of Santos is equipped with a network of good quality cycling lanes, however this is not extended towards the other side of the island, in the Zona Noroeste and São Vicente.

Nortern avenue between the east and west of the island
source: Google Streetview



Conclusion: Due to the topography of the island, there are only two connections between the east and the west. Source: authors own


LEGEND
scale: city
Infrastructure
airport
ferry
train
cycling infrastructure
main roads
urbanized area
water
soil
source: OpenStreetMap
N
0 m
1 km
2 km
3 km
4 km

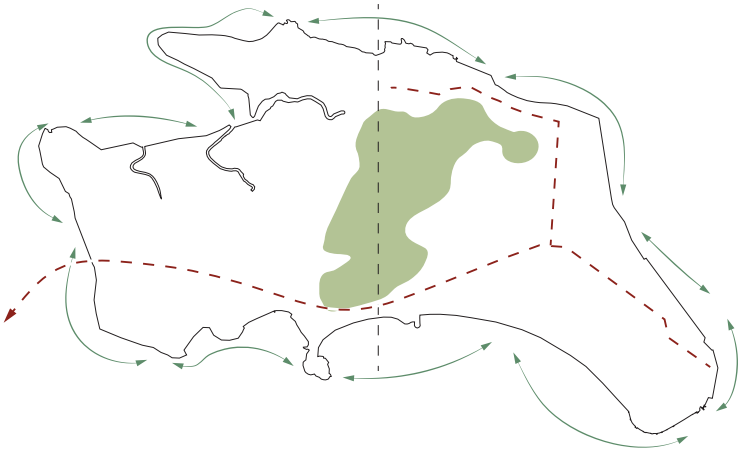
# INFRASTRUC-TURE: EXPECTED PROJECTS

## Investments to relieve the traffic pressure on the island

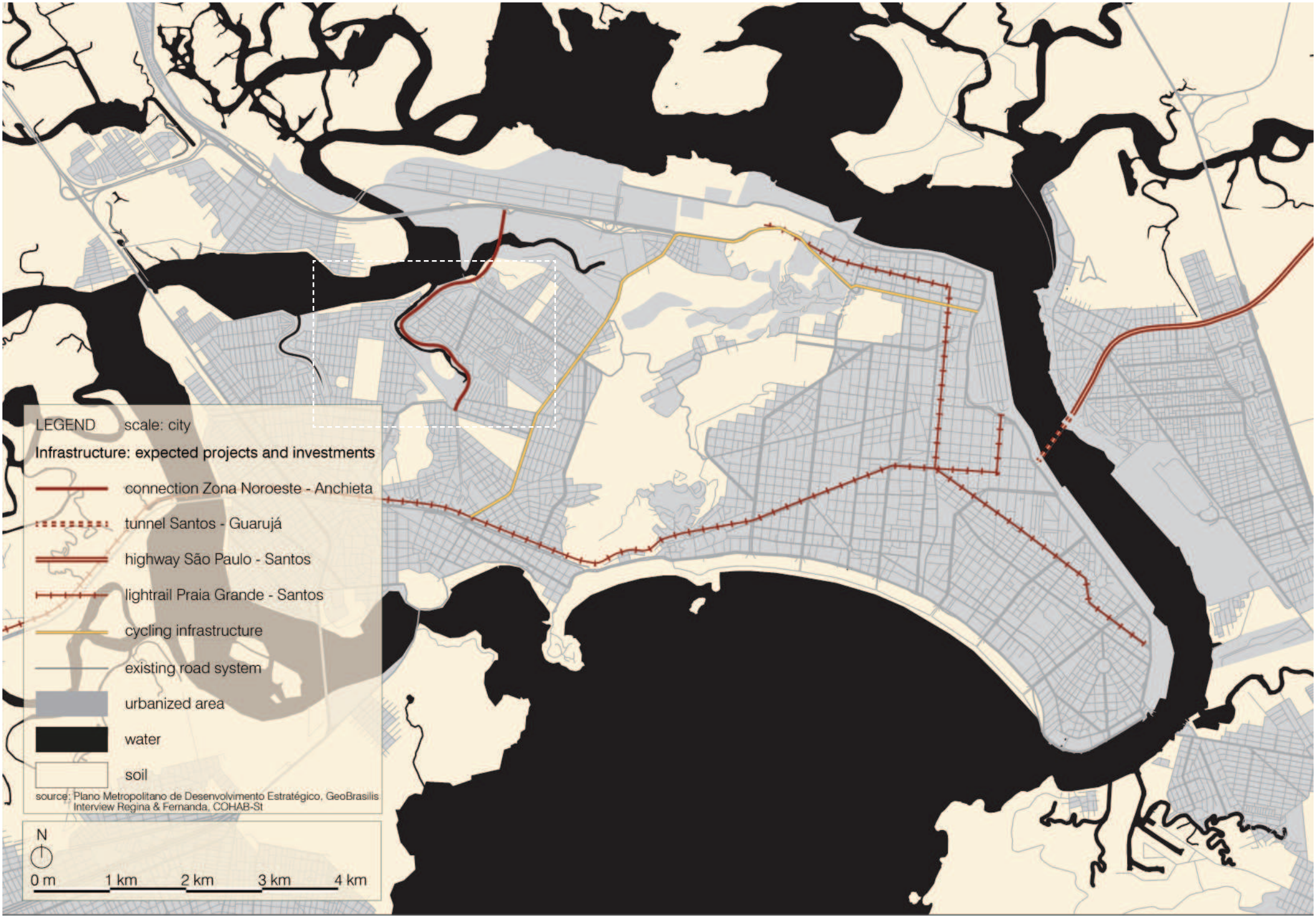
The most important infrastructure project on the island is the light rail which will connect the old city center of Santos in the north with the beaches on the south of the island and, through São Vicente, with Praia Grande. The project is almost completed. The project will relieve the daily traffic from residents of Praia Grande and São Vicente to Santos, were they work. However, the project does not attend the low income habitants of the island, as it only goes through and stops in the high income neighborhoods.
To improve the connectivity to coastal cities on the east as well as São Paulo, a tunnel is proposed. However, this project is currently on hold.
Another important project is the bridge connection the Zona Noroeste and São Vicente, directly with Via Anchieta which is an important route to São Paulo. Through this connection along Dique da Vila Gilda, traffic pressure on the island will be relieved. However, the route along the river will have enormous consequences for the development of an attractive waterfront.
Besides the hard infrastructure projects, the municipality of Santos wants to stimulate water transportation*, which could be a good response to the current traffic congestions.

*information is obtained during an interview with José Carriço, Secr. de Desenvolvimento Urbano

The ferry from Santos to Guarujá. The municipality wants to stimulate water transport.
source: chelocomba. www.flickr.com/



Conclusion: The lightrail will connect the old city centre with the beachside. Besides, the municipality of Santos wants to stimulate public water transportation. Source: authors own

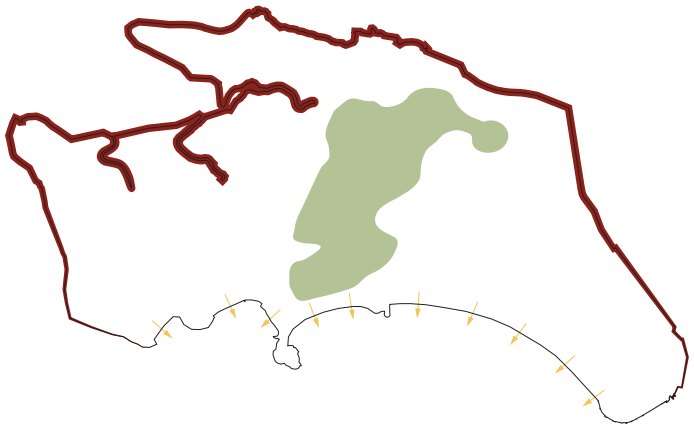

LEGEND scale: city
Infrastructure: expected projects and investments
connection Zona Noroeste - Anchieta
tunnel Santos - Guarujá
highway São Paulo - Santos
lightrail Praia Grande - Santos
cycling infrastructure
existing road system
urbanized area
water
soil
source: Plano Metropolitano de Desenvolvimento Estratégico, GeoBrasilis
Interview Regina & Fernanda, COHAB-St
N
0 m
1 km
2 km
3 km
4 km

# LAND USE

## The port and the favelas along the waterfront block the connection of the island with the water

The spatial configuration of the island can be best described by its waterfronts. The only waterfront which is accessible is the southern waterfront, where the beaches are. This attracts a lot of tourists and high income residents. The real estate speculations in this area have driven up the prices and have made this zone economically the most dynamic of the region. This is characterized by the many high-rises along the beaches.
The other waterfronts are all inaccessible. On the east and north, the waterfront is occupied by large warehouses and port activities. The waterfronts along the Zona Noroeste of Santos and the west of São Vicente are mainly occupied by favelas, also blocking the access to the water.

The port of Santos, stretching along the border of the fully urbanized island
source: Port Strategy. http://www.portstrategy.com/



Conclusion: On many places along the northern side of the island, access to the waterfront is blocked. The beaches on the south provide good acces to the water. Source: authors own


LEGEND
scale: city
Land use
industrial
port
open space
urbanized area
vegetation
water
source: Plano Metropolitano de Desenvolvimento Estratégico, GeoBrasilis
N
0 m
1 km
2 km
3 km
4 km

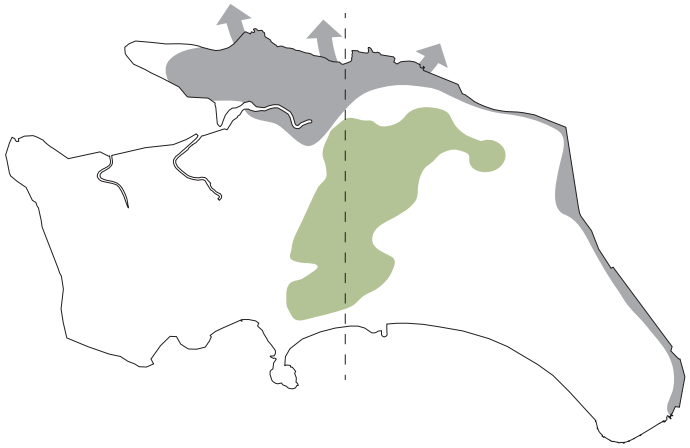
# LAND USE: LEGISLATION

## The port activities are assigned to expand towards the north

To guide further demographic and population growth, the municipalities in Baixada Santista have set legislation for the land use in the region, absorbing the growth and at the same time protecting valuable natural environments. In the case of Santos, which has to cope with the growing port, the most important legislation is the allocation of future port developments, north from the island in an area which is currently occupied by mangrove vegetation.
In the legislation of Santos and São Vicente, the ZEIS* areas are appointed as well. These are zones of special social interest, mainly favelas and relocation areas. The development of these areas is getting special attention and is focused on providing basic infrastructure and cheap housing for the poor.

*ZEIS is a legal and urban policy instrument that outlines the precarious settlements that need to be urbanized or regularized by governments. Municipal government have to use the ZEIS in their masterplans and Land Use Acts (Carvalho, 2014)

One of the port expansion projects, north of Santos in a mangrove area.
source: Paulo Carmona Sanches Neto. http://en.wikipedia.org/wiki/Santos



Conclusion: The port of Santos will expand towards the North.
Source: authors own


LEGEND scale: city
Land use: municipal legislation
commerce and services
tourism
ZEIS I
urban expansion area
industrial
port
urbanized area
environmental conservation
environmental preservation
water
source: Plano Metropolitano de Desenvolvimento Estratégico, GeoBrasilis
N
0 m
1 km
2 km
3 km
4 km

# INCOME PER CAPITA

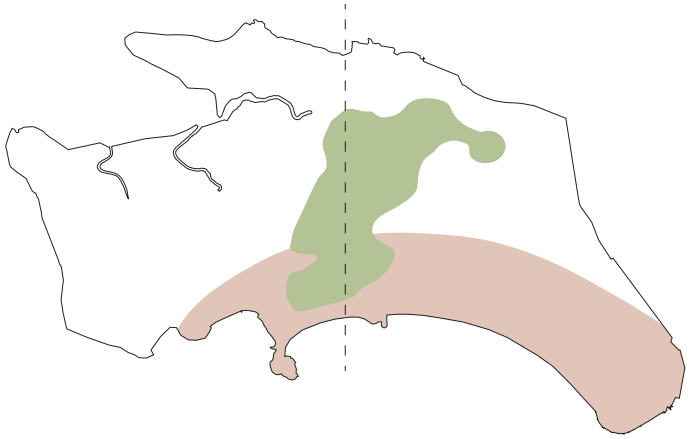
## The highest income groups are living close to the beaches

The distribution of the different income groups over the city of Santos shows a clear correlation with the distribution of functions. The high incomes are situated along the beaches, were the tourist economy has been stimulated over the past decades.
In the city center in the north, the income is low, which seems to be strange, but in Brazilian cities this is normal. Most historic centers in Brazil are have been neglected in urban development in the past decades and are currently deprived and have high rates of criminality. Currently, the municipality is Santos is working on a revitalization plan for the historic center.

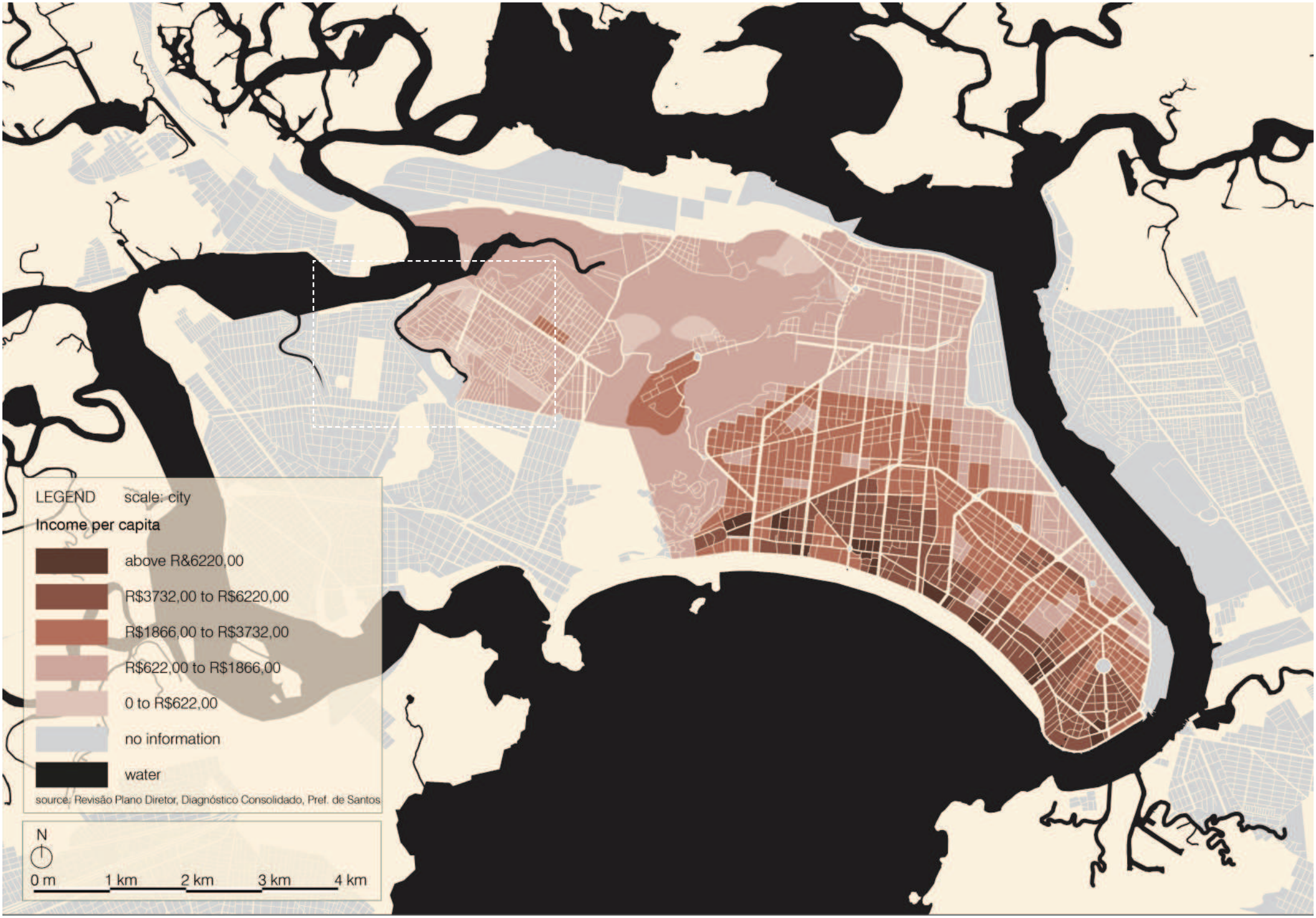
The Zona Noroeste of Santos is the most poor district of the city, many household have an income of only up to three minimum salaries (R$1866.00), while in favela Dique da Vila Gilda the approximate income only goes up to one minimum salary (R$622).*

*the minimum salaries are from the value of the year 2013. The average exchange rate Brazilian Real - Euro in January 2013 was 0,37

note: for São Vicente there was no data about the income per capita available



Conclusion: The group with high incomes live close to the beaches, the lower incomes live closer to the port area and in the areas with high environmental risk. Source: authors own


LEGEND scale: city
Income per capita
above R&6220,00
R$3732,00 to R$6220,00
R$1866,00 to R$3732,00
R$622,00 to R$1866,00
0 to R$622,00
no information
water
source: Revisão Plano Diretor, Diagnóstico Consolidado, Pref. de Santos
N
0 m
1 km
2 km
3 km
4 km

# DENSITY

## The highest densities of the cities are along the beaches and in the favelas

Along the beaches of Santos many high rise buildings have been constructed, resulting in high densities in this area. The area is popular for its beaches and summer tourism, which attracted many investors speculating in real estate. As a result, the quality of the buildings and streetscapes in this area is high. There is a strong green structure, well designed infrastructure and a high density of services.
This, opposed to the Zona Noroeste, which has quite a low density, and a lack of green, low quality infrastructure and a shortage of services, as a result of disinvestment in the urban development of the area.
The only blocks with high densities in this area are the favelas and the social housing blocks which have been developed over in the past decades.

note: for São Vicente there was no data about the density available


An avenue in the east part of Santos: high density, high incomes and high quality.
source: Google Streetview

An avenue in the Zona Noroeste of Santos: low density, low incomes and low quality.
source: Google Streetview


LEGEND
scale: city
Density
above 1500 p/ha
from 1001 to 1500 p/ha
from 401 to 1000 p/ha
from 101 to 400 p/ha
up to 100 p/ha
no information
water
source: Revisão Plano Diretor, Diagnóstico Consolidado, Pref. de Santos
N
0 m
1 km
2 km
3 km
4 km

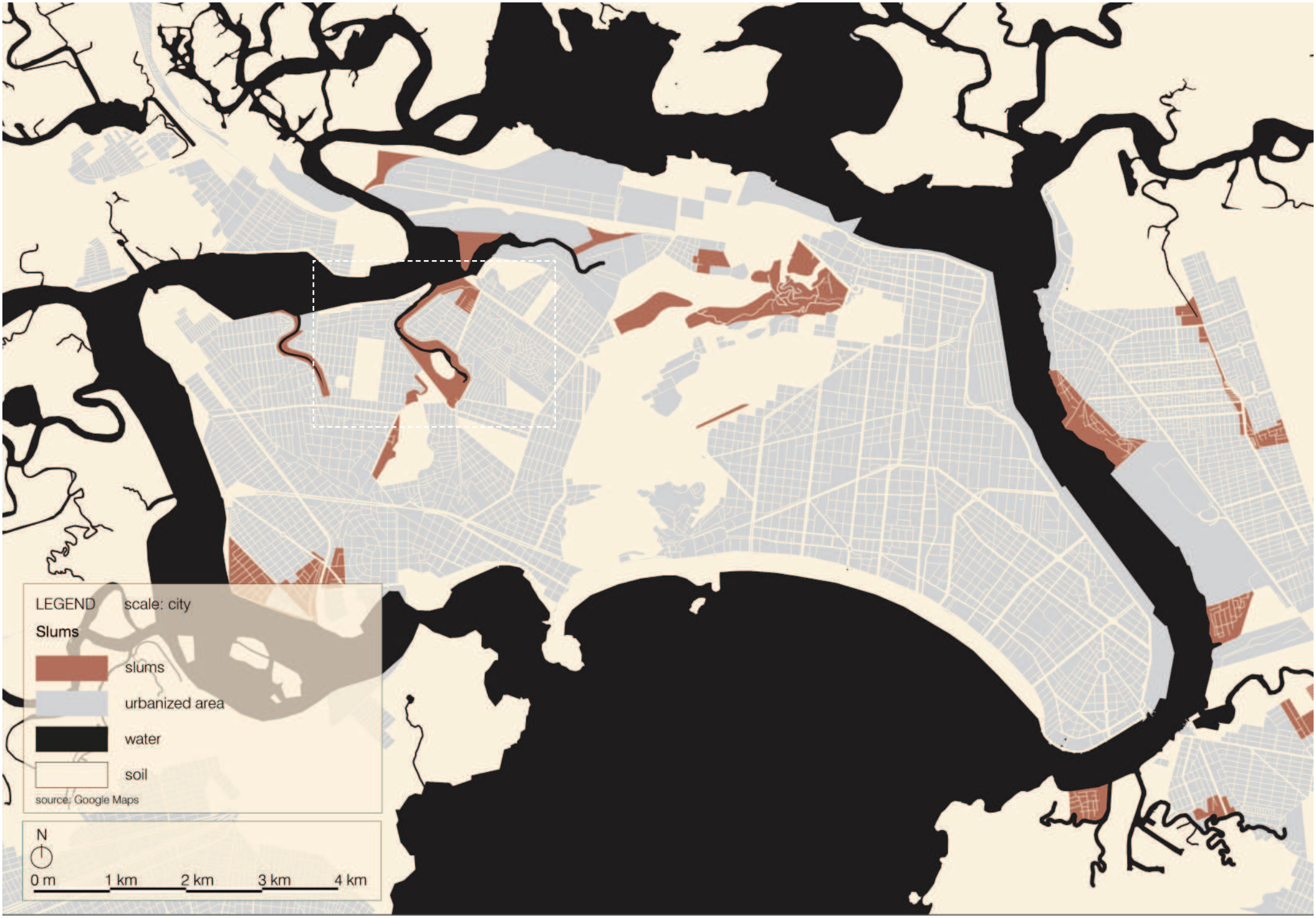
# FAVELAS

## Favelas are often situated in areas with high environmental risk

The favelas on the island are mostly situated on the fringe of urban areas, exposed to landslides and floods, or squatted in between industrial areas. These plots of lands often are not suitable for regular urbanization and therefore provide an opportunity for families with no or a low income to settle. Living and environmental conditions in these illegal settlements are abominable.
The settlements are at risk, but on the other hand, they also have a severe negative impact on the environment. Due to the absence of basic infrastructure, most of the domestic waste is discharged into the environment.
As visible on the map, Dique da Vila Gilda is one of the biggest favelas on the island. About two kilometers to the west, a similar type of favela has been formed. Also stretching along a river and presenting the same type of problems as Vila Gilda.
Also some other favelas in the region are built on stilts and have the same spatial structure.

**“In most cases, the poorer residents [ ... ] bear the human costs of the most debilitating impacts of environmental degradation. In many megacities, environmental pollution affects the poor more severely in part because many of them live at the periphery.”**

Ellen M. Brennan (1999) about the importance to address the issue of environmenal impacts on vulnerable population groups

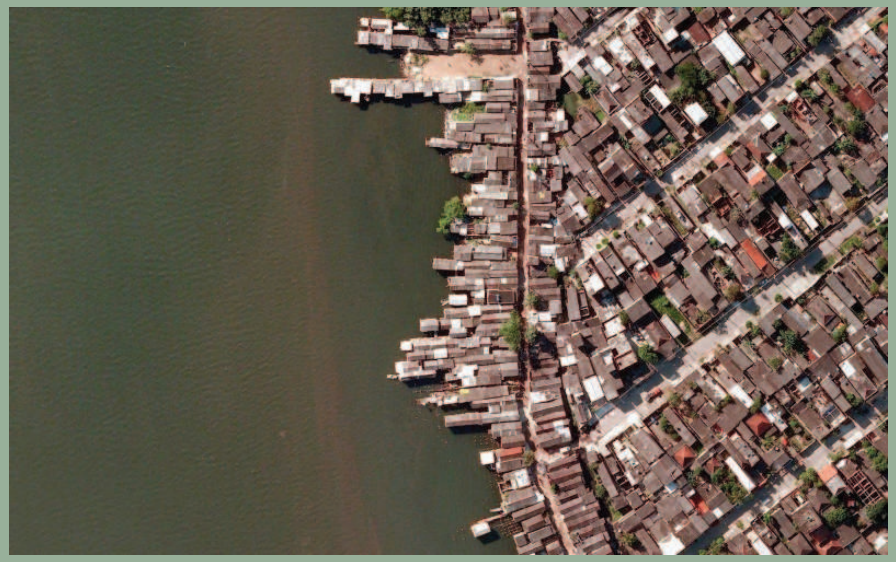

LEGEND
scale: city
Slums
slums
urbanized area
water
soil
source: Google Maps
N
0 m
1 km
2 km
3 km
4 km

# ZOOM
## THE STRUCTURE OF THE WATERFRONT FAVELAS

Looking through the lens of Google Earth,  the favelas along the waterfronts of Ilha de São Vicente have a fascinating structure.

From this structure, perpendicular to the waterfront, the historical growth and social structure can be read. Also, it shows a spatial translation of how the vulnerable population groups have been pushed towards the periphery of the urban area. They literally are living on the edge, on locations with high environmental risks.

source: Google Earth



# GREEN SPACES

## Morros de São Vicente and the beach of Santos are the most important green spaces on the island

Topographically, the rock formation on the middle of the island, the Morros de São Vicente, are of high importance for the living quality on the island. They can be seen from almost everywhere and provide some space, green and air on the for the rest fully urbanized island.
In the urban structure, some more green voids are appearing on the city of São Vicente and in the Zona Noroeste of Santos, because the pressure on space and the real estate speculation is lower there, then on the other side of the island in Santos. There, green is provided by trees along the canals which are securely integrated in the urban structure. But, most importantly, along the beach of Santos is the most important green and leisure area of the island, a park designed by Burle Marx. This park stretches along the beach and is one of the top spots for the inhabitants of the island to relax, sport, drink, eat and chat.

The park along the beach of Santos is the most important leisure space of the island.
source: Tudo Encontra. http://tudoencontra.com/

Santos seen from the rockformation in the middle of the island, Morro de São Vicente.
source: Paragliding Map. http://www.paraglidingmap.com/


LEGEND
scale: city
Green areas
mangrove
dense vegetation
park/public space
beach
sports
urbanized area
water
source: OpenStreetMaps/Google Maps
Departamento de Geoprocessamento, Municipality of São Vicente
N
0 m
1 km
2 km
3 km
4 km

# CANAL SYSTEM

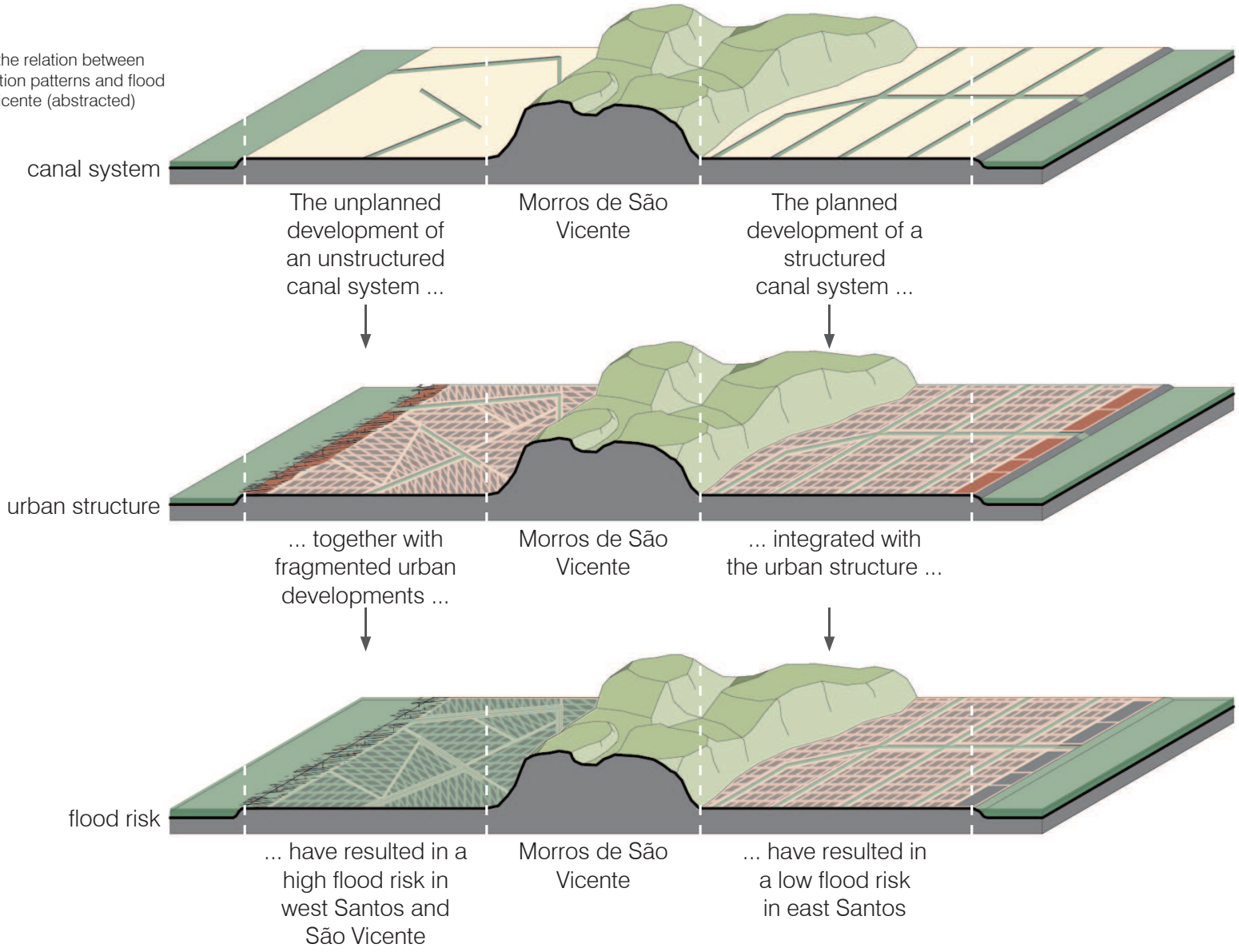
## The canal system as a reflection of the planned and the unplanned city

On the island of São Vicente, a clear distinction between the western and the eastern part becomes clear when looking at the canal system. The city of São Vicente and the Zona Noroeste of Santos have never been developed according a urban plan. The different neighborhoods in this area have been developed privately, without having a general urban structure to confirm to. This led to a fragmented development which is reflected in the unstructured canal system.
On the other side of the Morros de São Vicente, in the rest of Santos, a clear structure becomes visible when studying the canal system. This part of the city has been developed since the early 20th century according to a structure laid out in the urban expansion plan of sanitation engineer Saturnino de Brito. Also when looking at the canals from eye level, the canals on the side of Santos have much more than those in São Vicente and the Zona Noroeste, as they are integrated with the urban green structure.
On the page on the right the development of the canal system and urbanization patterns on both sides of the island is illustrated with abstract cross-sections of the island.
On page .. a detailed map of the canal system and areas with a high flood risk is presented, in order to have an accurate view on the risk areas.

A canal in the east part of Santos, integrated with the green structure of the area.
source: Google Streetview

A canal in the Zona Noroeste of Santos, with a lack of green.
source: Google Streetview

Cross-sections illustrating the relation between the canal system, urbanization patterns and flood risk on the island of São Vicente (abstracted)
source: authors own

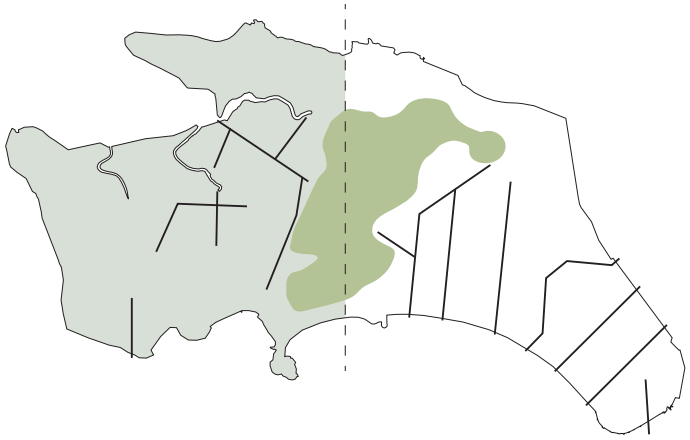


# CANAL SYSTEM AND FLOOD RISK AREAS

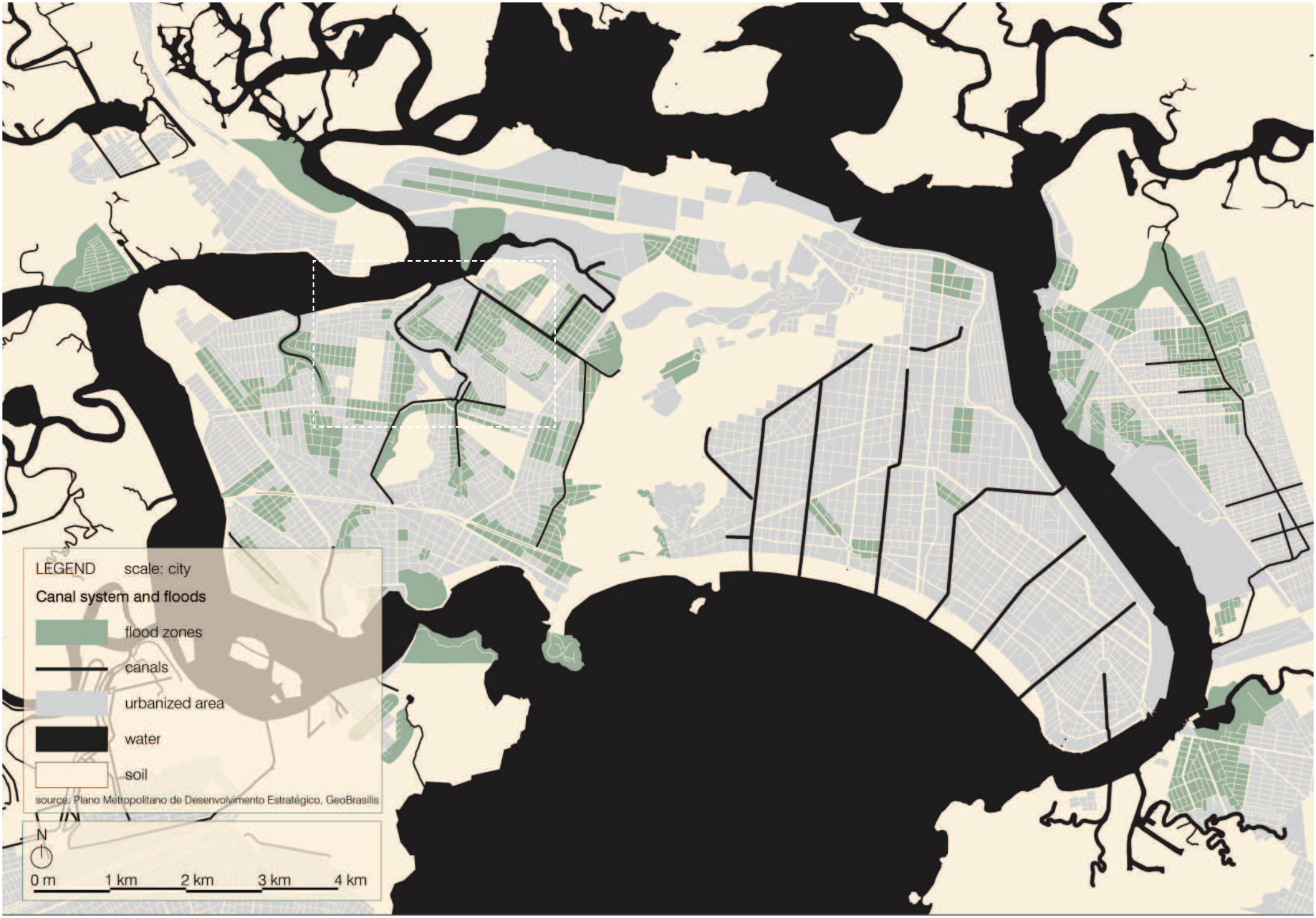
## Unplanned urban development on the west side of the island has resulted in a higher flood risk

As the island of São Vicente used to consist, apart from the rock formation in the middle, of plain wetlands, occupation on the island always have been at risk of floods. Some parts already used to flood with high tide, even without rain. The areas indicated on the map on the right are the flood areas when there is heavy rain during high tide, so this is the most extreme scenario, but it happens quite frequently. A large share of the blocks and streets which are flooding frequently are situated in the Zona Noroeste of Santos and in São Vicente. This is the area which has had an unplanned, fragmented development, of which the unstructured canal system is a the result. Currently, the system does not have the capacity to absorb the amount of water in situation of heavy rain (and high tide). (Bloch and Papachristodoulou, 2012) On the other side of the Morros de São Vicente, the flood risk is much less, thanks to the excellent canal system planned in the beginning of the 20th century by sanitation engineer and urbanist Saturnino de Brito.

A road in São Vicente is flooded due to high tide and heavy rain.
source: Diario da Zona Noroeste. http://www.diariodazonanoroeste.com.br/



Conclusion: Studying the canal system, a clear distinction between de planned and unplanned sides of the island becomes visible. São Vicente and Zona Noroeste of Santos have to cope with a higher flood risk.


LEGEND
scale: city
Canal system and floods
flood zones
canals
urbanized area
water
soil
source: Plano Metropolitano de Desenvolvimento Estratégico, GeoBrasilis
N
0 m
1 km
2 km
3 km
4 km

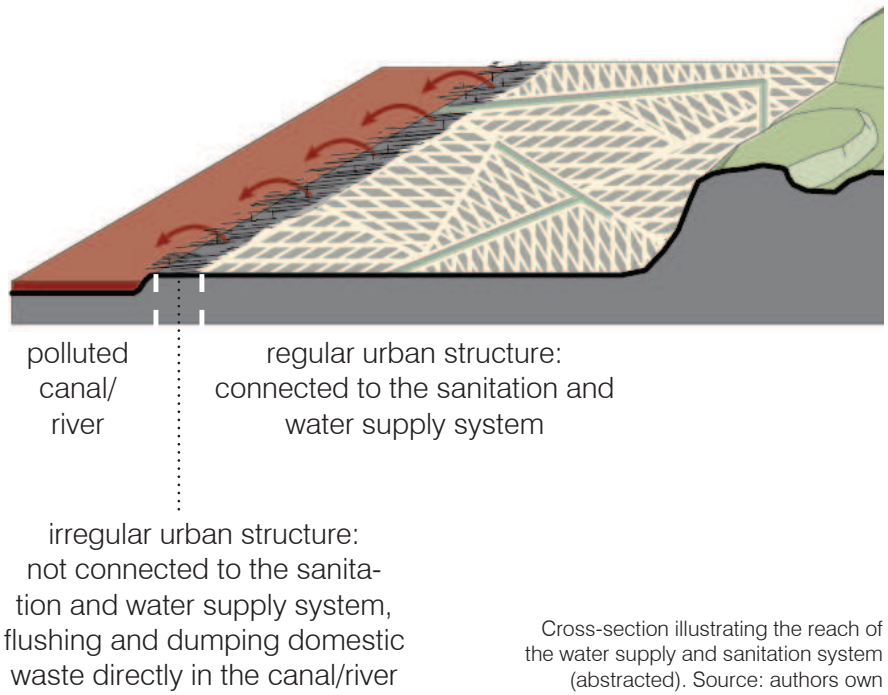
# SANITATION SYSTEMS AND WASTE COLLECTION

## Most favelas do not have basic sanitation infrastructure

Apart from the favelas, the whole island is connected to the water supply and sanitation system of SABESP (Companhia de Saneamento Básico do Estado de São Paulo), which is the organization responsible for the water supply and sanitation in the state of São Paulo. *

As the favelas are illegal settlements, they are not connected to the system. This has severe consequences for the quality of the environment and the living conditions within the slum areas. The waste collection in slum is better organized, but still a lot of domestic waste gets dumped in to rivers or on the slopes of the hills. (Prefeitura Municipal de Santos)

*information is obtained during an interview with Regina del Cistia, COHAB-St.



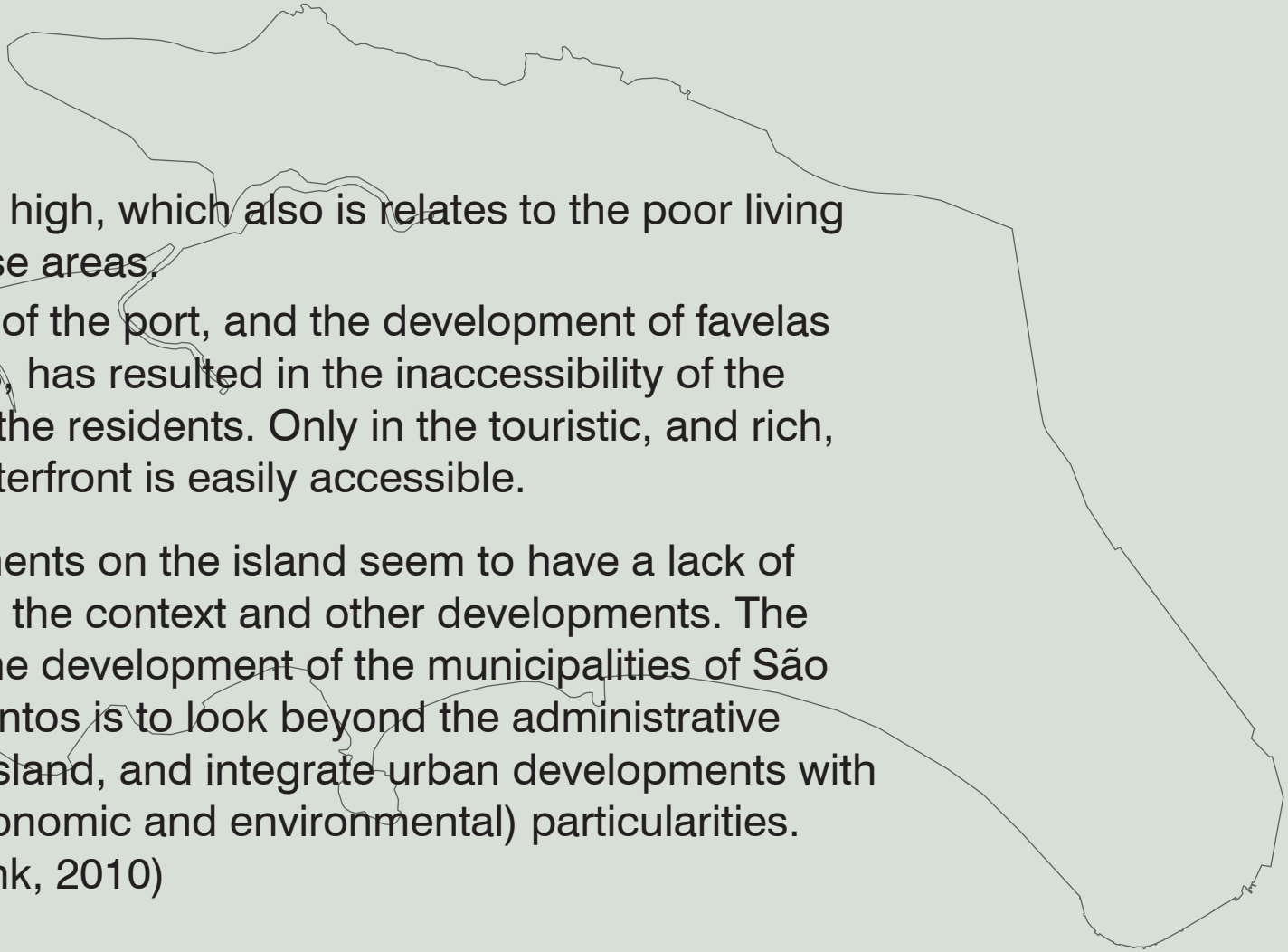

Cross-section illustrating the reach of the water supply and sanitation system (abstracted). Source: authors own

# CONCLUSIONS
## CITY SCALE

Ilha de São Vicente is an island with two faces, which is expressed in the socio-spatial structure. It consists of one more wealthy and structured side (east) and a poorer and unstructured side (west) separated through its topography, by the Morros de São Vicente.

The strong imbalance on the island has been generated by the municipalities which have invested money in the port and tourist sectors, while neglecting the development of resedential areas in less profitable districts. This has led to weak social and economic development opportunities in these areas.

The socio-economic imbalance is also reflected in the flood control capacity. Investments in the east sice of Santos have resulted in an excellent flood control system on this side of the island. While on the west side of Santos and in São Vicente,



the flood risk is high, which also is relates to the poor living qualities in these areas.
The expansion of the port, and the development of favelas along the rivers, has resulted in the inaccessibility of the waterfronts for the residents. Only in the touristic, and rich, districts the waterfront is easily accessible.

Most developments on the island seem to have a lack of integration with the context and other developments. The challenge for the development of the municipalities of São Vicente and Santos is to look beyond the administrative border on the island, and integrate urban developments with local (socio-economic and environmental) particularities. (Rolnik and Klink, 2010)

# Part 03.3 / SOCIO-SPATIAL ANALYSIS
## LOCAL SCALE

As found through analysis on the city scale, Dique da Vila Gilda is situated in an area with a fragmented urban structure, low income population, and a high flood risk.

More detailed socio-spatial analysis of the neighborhood has been done in order to exactly recognize the hierarchy and permeability of the urban structure, the diverse socio-economic clusters and the environmental risk and potential areas.

In a city where the development of these different systems mostly results in conflicts, it is important to understand how they work to be able to propose a framework for better integration between them.

Also, the acquired knowledge has been used to evaluate the current plans of the various active stakeholders in the neighborhood.

# CONTENT

History of Vila Gilda
Urban structure and Dique da Vila Gilda
Urban typologies in the neighborhood
Characteristics of the urban typologies
Zoom. segregation between different urban structure
The relation betwen the favela and its surroundings
Infrastructure
Socio-economic centers
Streetview. The spatial appearance of socio-economic neighborhood centers
Mapping of a sample of favela Dique da Vila Gilda
Streetview. The spatial appearance of Vila Gildas mainstreet
Green spaces
Canal system and flood risk areas
Environmental impact of Vila Gilda
Photo series. Illustrating the environmental impact of favela Vila Gilda
Conclusions

# HISTORY OF VILA GILDA

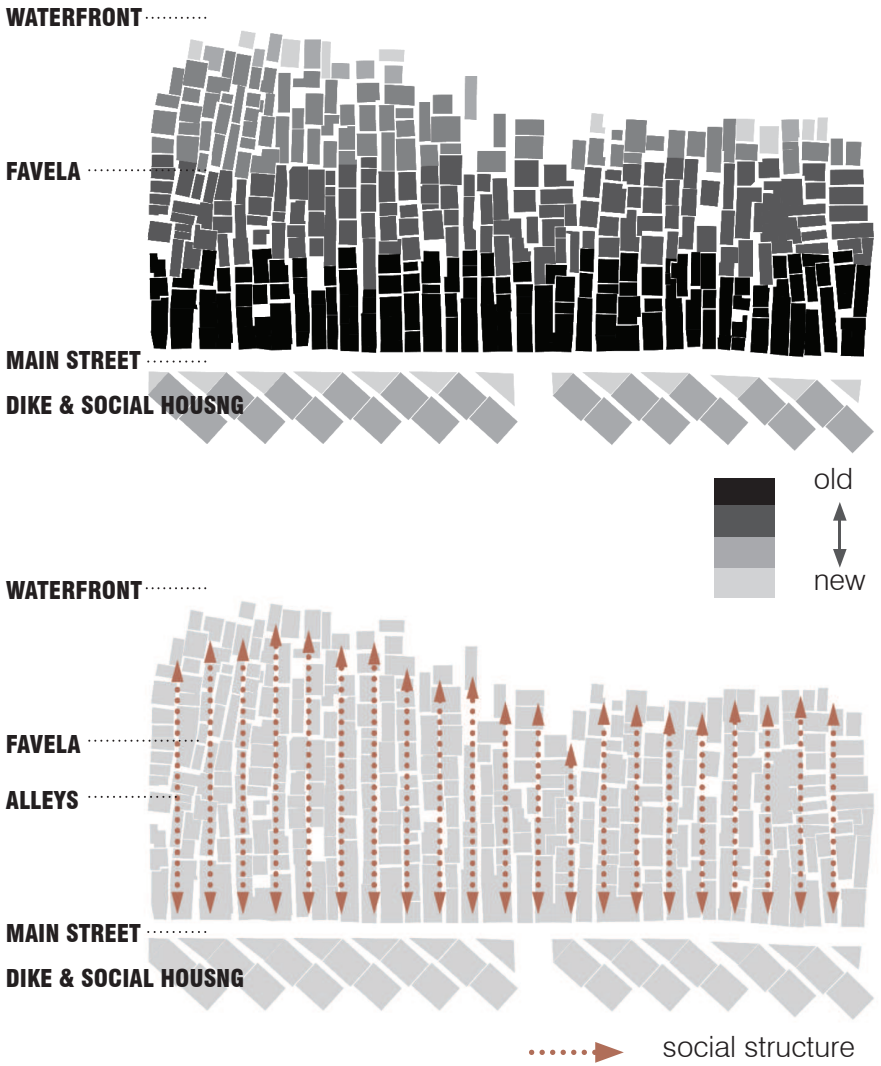
## Social structures in favela Vila Gilda have been defined along historical spatial structure.

The dike along which Dique da Vila Gilda has developed used to have a canal running through it and has been constructed to drain the surrounding area for agricultural purposes. On the fringe of the legislated plots of lands an undeveloped stretch of land remained, along the waterfront of the river Rio dos Bugres. During the time of the dictatorial government in Brazil, from 1964 to 1985 many immigrant were attracted to the region as huge investments in port and industrial developments were made. Due to a lack of affordable housing, these people started to live in informal settlements, one of which was the Dique da Vila Gilda.*

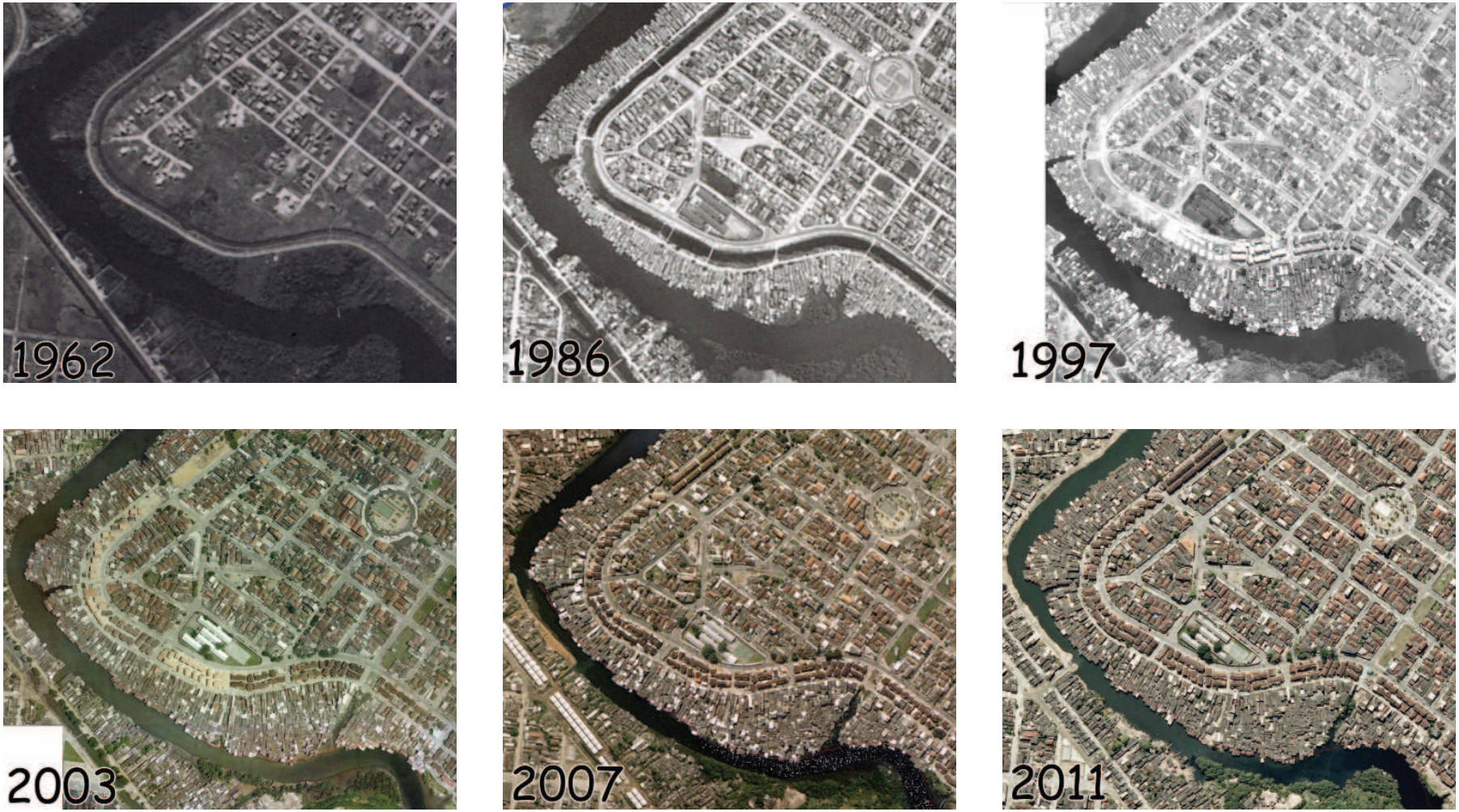
After the settlement occupied the whole stretch of land along the dike, it started expanding over the river. This structure in the development of the favela, defined the current social structure, which is aligned strongly along the alleys from the street to the waterfront.
The dike and the canal have been replaced in the 1990s by the construction of social housing, these social housing blocks are now part of the favela.**

*information obtained during an interview with José Carriço, Secr. de Desenvolvimento Urbano

**information obtained during an interview with Regina del Cistia, COHAB-St




Schematic illustrations of the historical growth of Vila Gilda (top) and the related social and urban structure (bottom). Source: authors own




Satellite images of the historical growth of Vila Gilda and the surrounding neighborhood.
Source: Google Earth

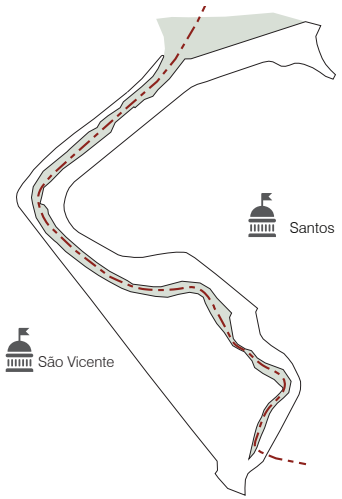
# URBAN STRUCTURE AND DIQUE DA VILA GILDA

## Segregated settlement along the borders of a monotonous neighborhood

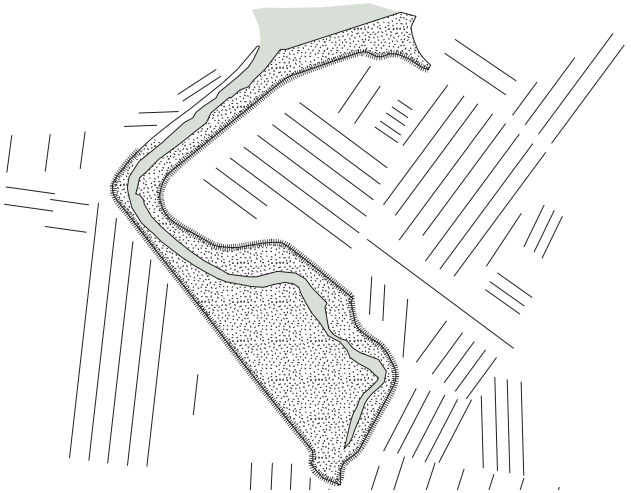
Favela Dique da Vila Gilda has been formed along both sides of the river Rio do Bugres, which is on the administrative border of the municipalities São Vicente and Santos. The stretch of land was not used for legal municipal urbanization, and therefore it provided the opportunity for people (mainly immigrants) with no or a low income to construct their shelter.* As the population kept growing, the favela expanded on stilts over the river. Nowadays the favela is home to about 7,000 families(COHAB-St, 2009) who are living in extremely poor environmental and living conditions.

Up to the 1960s the neighborhood around the favela used to be agricultural area. In the 1960s, the municipality of Santos sold the land in the Zona Noroeste to various landlords who developed their own plot of land, speculating on the population growth. These developments were unregulated and as a result, the neighborhood is monofunctional and has a fragmented urban structure.* Vila Gilda is highly disconnected from this neighborhood due to its closed structure, which is limiting the integration of the favela with this neighborhood, as well as the accessibility of the waterfront.

*information is obtained during an interview with José Carriço, Secr. de Desenvolvimento Urbano




Dique da Vila Gilda is situated along the Rio dos Bugres river, on the border between São Vicente and Santos. Source: authors own



The neighborhood has been developing without a general urban plan, which has resulted in a fragmented urban structure. Dique da Vila Gilda is physically separated from the rest of the neighborhood. Source: authors own


LEGEND scale: neighborhood
Accessibility of waterfront
waterfront not accessible
waterfront accessible
buildings
water
source: authors own
N
0 m
200 m
400 m
600 m

# URBAN TYPOLOGIES IN THE NEIGHBORHOOD

## A large share of the neighborhood is occupied by regular housing blocks

The neighborhood started develeping in the 1960s, during a time of strong growth of the port activites leading to rapid population growth. The plots, owned by different landlords, were build with what is described in this paper as regular housing blocks. These nowadays dominate the appearence of the neighborhood. It is mainly resedential, has a low density and wide streets, having the feeling of a city in the interior of Brazil, in contrary to the east of Santos which is more urban.

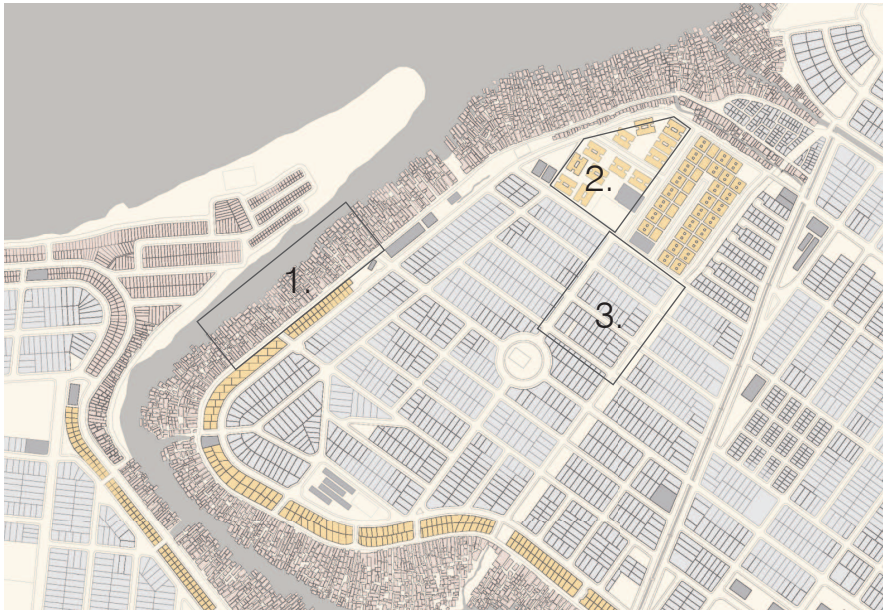
On the edge of the land owned by the various landlords, along the waterfronts, was a strip of land owned by the Union. However, as they did not occupy or control this stretch of land, this gave the opportunity for the poorest migrants to settle illegally on this stretch of land, the dike along the waterfront. From here, favela Dique da Vila Gilda developed.
Along this dike, social housing blocks have been construced in the 1990s, which have nowadays became part of the favela system.
More recent social housing blocks, have a larger scale and are morphologically more segrated from the rest of the neighborhood, due to their completely differnt scale and compostiion.

On the next pages some characteristics of the most important typologies in the neighborhood (favela, social housing, regular block) are presented.


LEGEND scale: neighborhood
Building typologies
favela
social housing
high rise
regular housing
other
water
source: authors own
N
0 m
200 m
400 m
600 m

# CHARACHTERISTICS OF THE URBAN TYPLOGIES

The three main housing typologies as presented on the previous pages have different spatial characteristics, defining the diverse living environments. Striking is the strong contradiction between the favela and the social housing blocks to which many favela inhabitant are being relocated.




Source: authors own

## 1. Favela Dique da Vila Gilda

density: 225 houses/ha

small scale
alleys
strong relation between public and private
low permeability of urban structure
lack of green and permeable pavement

## 2. Social housing blocks Vila Pelé II

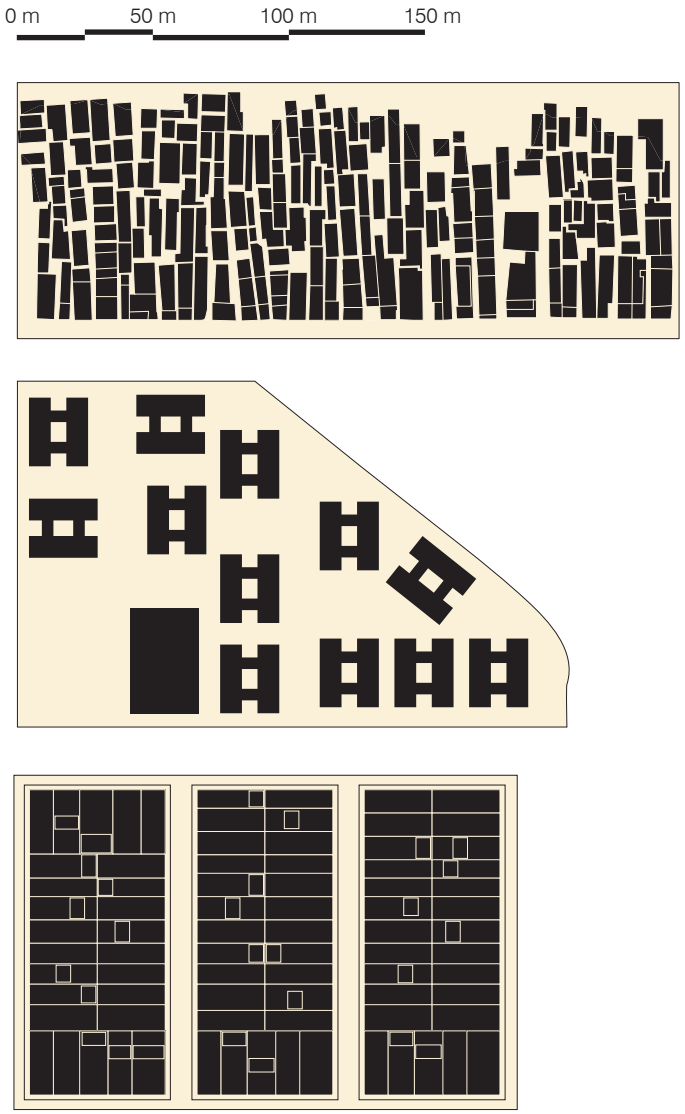
density: 220 houses/ha

large scale
streets
no relation between public and private
high permeability of urban structure
lack of green and permeable pavement

## 3. Typical housing block Zona Noroeste

density: 26 houses/ha

medium scale
streets
mediam relation between public and private
normal permeabilityof urban structure
lack of green and permeable pavement




Source: authors own

Source: Google Streetview

# ZOOM
## SEGREGATION BETWEEN DIFFERENT URBAN STRUCTURES

Looking from above, the different urban structures of favela Vila Gilda and the regular housing blocks become clearly visible, illustrating the spatial segregation between the two and the disconnection with the waterfront.

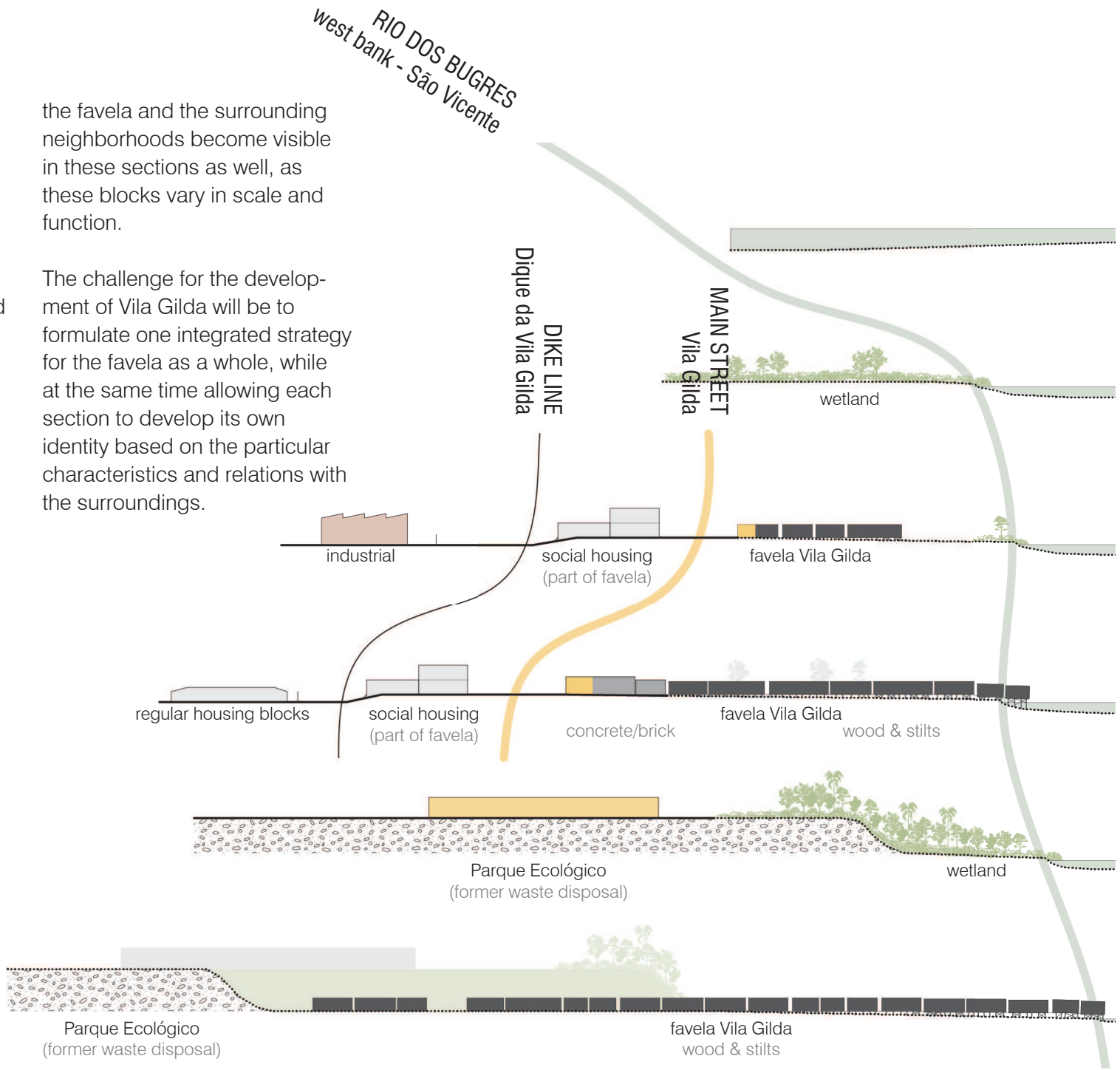
The top left image shows the most recent social housing developments, which appear as an island in the structure, not responding to the morphogical challenge of developing an integrated urban structure.

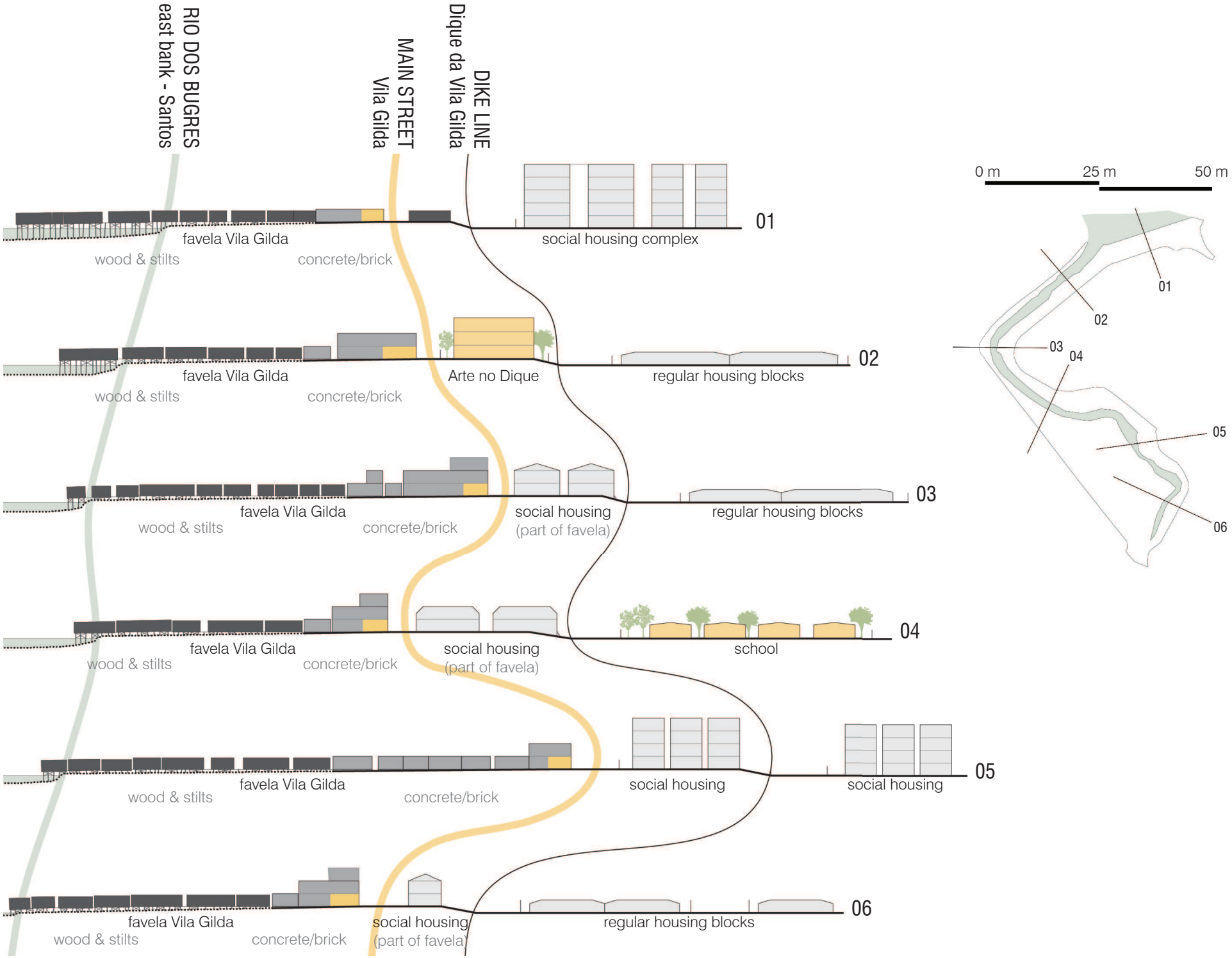
source: Google Earth

# THE RELATION BETWEEN THE FAVELA AND ITS SURROUNDINGS

Cross-sections of the favela and the adjecent neighborhoods provide interesting views on the different relations between the two, as well as the structure of Vila Gilda itself.
The favela expanded over the river starting from the dike, meaning that the oldest construction are build on this dike. These are the houses which gradually have been upgraded from wood to concrete or brick constructions.
The favela is enclosed by the main street, where most of the public life takes place. The waterfront is not publicly accessible, as all the space along the river have been occupied by the stilt-houses or consist of wetlands with dense vegetation
The different relations between the favela and the surrounding neighborhoods become visible in these sections as well, as these blocks vary in scale and function.

The challenge for the development of Vila Gilda will be to formulate one integrated strategy for the favela as a whole, while at the same time allowing each section to develop its own identity based on the particular characteristics and relations with the surroundings.



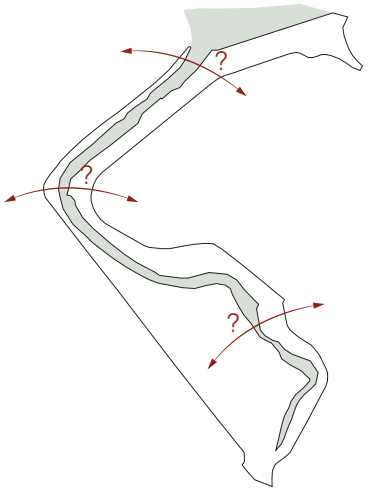

RIO DOS BUGRES
east bank - Santos
MAIN STREET
Vila Gilda
DIKE LINE
Dique da Vila Gilda
01
favela Vila Gilda
wood & stilts
concrete/brick
social housing complex
02
favela Vila Gilda
wood & stilts
concrete/brick
Arte no Dique
regular housing blocks
03
favela Vila Gilda
wood & stilts
concrete/brick
social housing
(part of favela)
regular housing blocks
04
favela Vila Gilda
wood & stilts
concrete/brick
social housing
(part of favela)
school
05
favela Vila Gilda
wood & stilts
concrete/brick
social housing
social housing
06
favela Vila Gilda
wood & stilts
concrete/brick
social housing
(part of favela)
regular housing blocks
0 m
25 m
50 m
01
02
03
04
05
06

# INFRASTRUCTURE

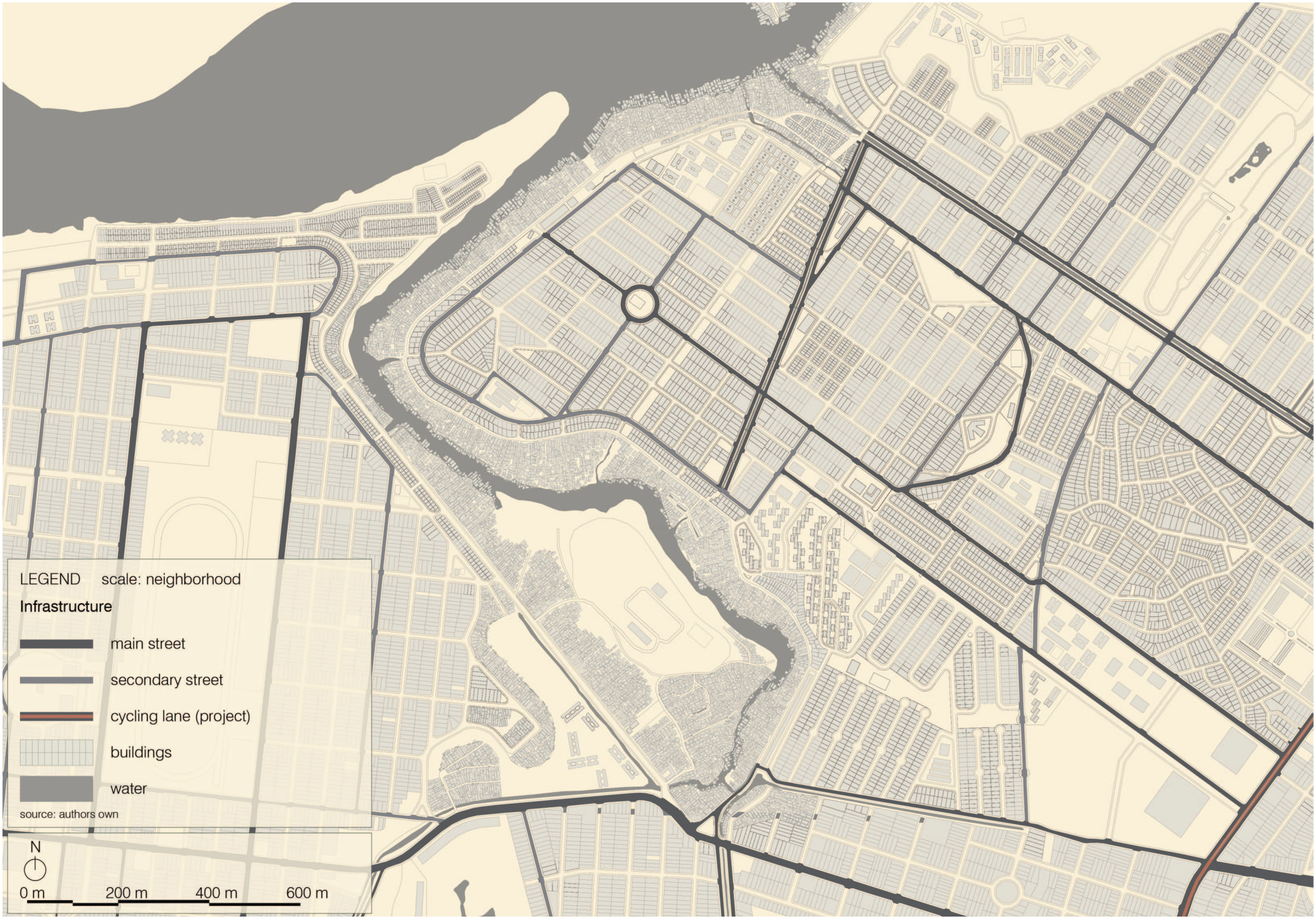
## The infrastructure is car-oriented, while cycling is a common mean of travelling

The infrastructure in the region is car-oriented. There are no cycling lanes, while the use of bikes in the area is high as this is a good and cheap way to get around. The main roads are situated along the canals, and these are linked to each other by secondary roads. The main and secondary roads are also part of the bus routes through the area. Favela Vila Gilda is connected by one road which runs along the former dike. From this road, one can enter in the alleys. Those are only accessible by foot or bike. There are no connection across the river Rio dos Bugres, from São Vicente to Santos. Recently a project to improve the bicycle connection of the Zona Noroeste with the East of Santos has ben proposed. This project consists of some cycling lanes along the main routes towards the west. One of those, is visible on the bottom right side of the map on the next page.

Av. Capitão Luiz Hourneaux, one of the main roads in São Vicente, which goes along Vila Gilda.
source: Google Streetview




There is no connection between São Vicente and Santos, crossing the Rio do Bugres river.
Source: authors own


LEGEND scale: neighborhood
Infrastructure
main street
secondary street
cycling lane (project)
buildings
water
source: authors own
N
0 m
200 m
400 m
600 m

# SOCIO-ECONOMIC CENTERS

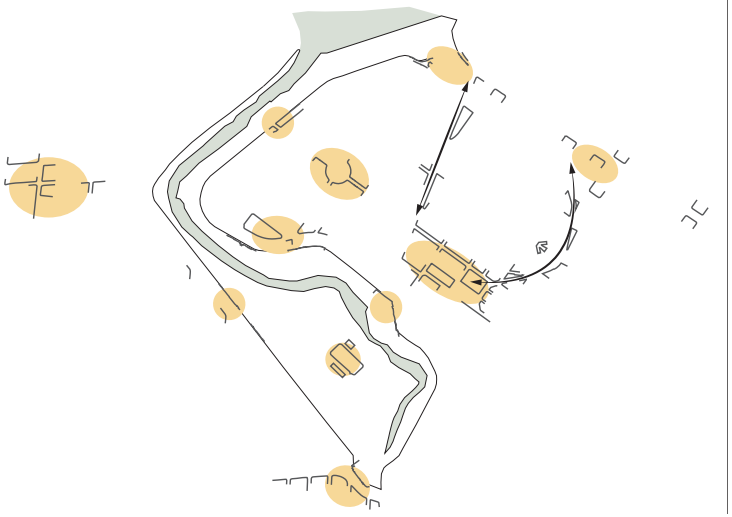
## Functions in the neighborhood are mainly local and do not have city-wide attractiveness

Because the area is of a low density, the neighborhood has few streets with shops and services. However, there are some clusters with a higher activity where different commercial, institutional and cultural functions are close together. These clusters are mainly used by local residents, as the functions do not have a city-wide atractiveness. Also, there seems to be a lack of connections between the clusters, they are not integrated in a socio-economic network.
The clusters of activity in Santos are mainly commercial, while in São Vicente the clusters are more industrial.
The whole area has many plots which are not used, wastelands.

In favela Vila Gilda itself, the socio-economic activity is focussed along the street located on top of the former dike. These are mainly bars, but also construction and manufacturing stores, barbers, little markets, cleaning and clothing services and furniture shops. Mostly these shops are used by the favela inhabitants themselves, and attract only few people from around. *

* Information obtained during interview with Regina del Cistia, COHAB-St

Av. Ver Álvaro Guimarães, the main commercial street in the proximity of Vila Gilda.
source: Google Streetview


The centers of activity are spread out over the neighborhood, not integrated in a network.
Source: authors own


LEGEND scale: neighborhood
Functions
commercial/service
cultural/institutional/public accessible
sports
park
industrial
wasteland
housing
water
source: authors own
N
0 m
200 m
400 m
600 m

# STREETVIEW

## THE SPATIAL APPEARANCE OF SOCIO-ECONOMIC NEIGHBORHOOD CENTERS

Looking through the lens of Google Streetview, the spatial form of the clusters of commercial and cultural activity in the neighborhood can be seen.

They are characterized by low buildings, wide roads, a lack of green, mainly impermeable pavements, a lack of seating space and a lack of shadow. Many shops have been implemented in resedential building blocks.

The centers are mainly used by locals, and do not attract residents from other parts of the city.

source: Google Streetview



C's CALÇADOS


SUPERMERCADO


A.P. AUTO CENTER
ALINHAMENTO
BALANCEAMENTO
SUSPENSÃO | FREIO
DIA

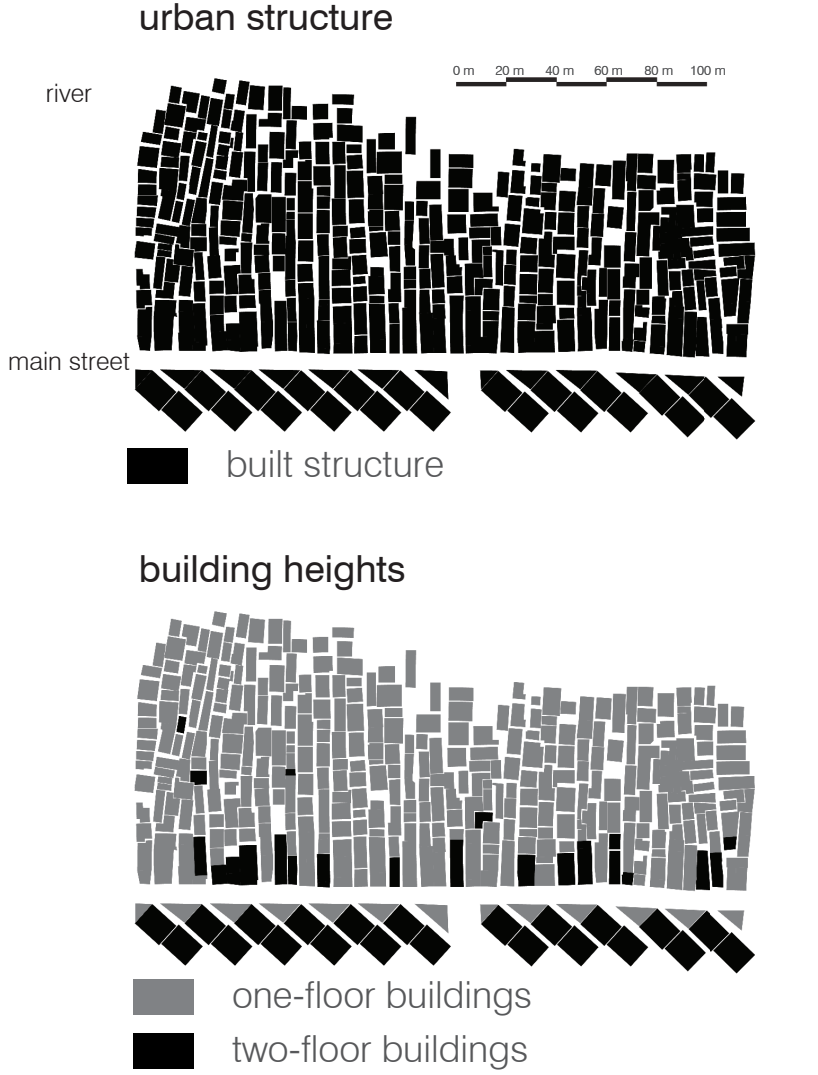
# MAPPING OF A SAMPLE OF FAVELA DIQUE DA VILA GILDA

## Study of a typical sample of Dique da Vila Gilda illustrating the basic urban structure in relation to the socio-economic system

This study aims to show the general structure of the favela. However, this is a simplified illustration of the favela and as illustrated in the sections earlier in this chapter, each part of the favela has different characteristics. Therefore, when proposing an intervention in a certain cluster, its particular characteristics need to be studied carefully.

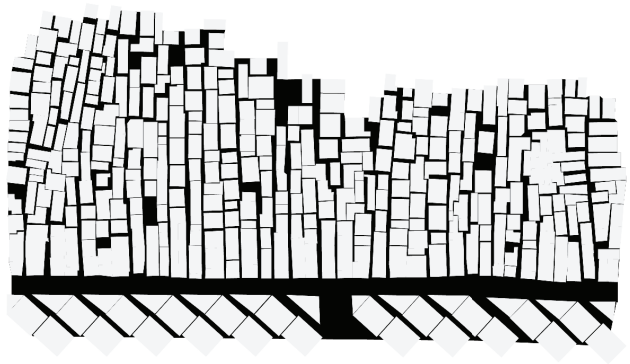
As illustrated earlier in this chapter, Vila Gilda started growing over the river from the dike, which now is the main street. This main street currently is the place where public life in the favela takes which, which also has been concluded by mapping the socio-economic centers of the neighborhood. The rest of the favela does not have the space, due to the density of construction, to facilitate publc life. This is visualized in the open space and routing diagrams on the next page.

To improve the accessibility, the hierarchy and the interaction with the neighborhood, the challenge will be to reorganize the favela and open it up at some places so that public space can be created..




Schematic maps illustrating the urban structure of Vila Gilda.
Source: authors own

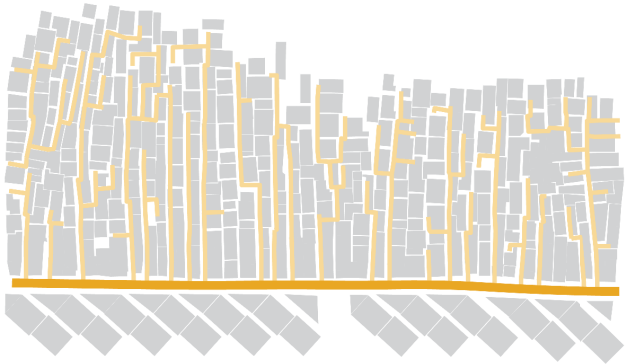
## open space



built structure

open space

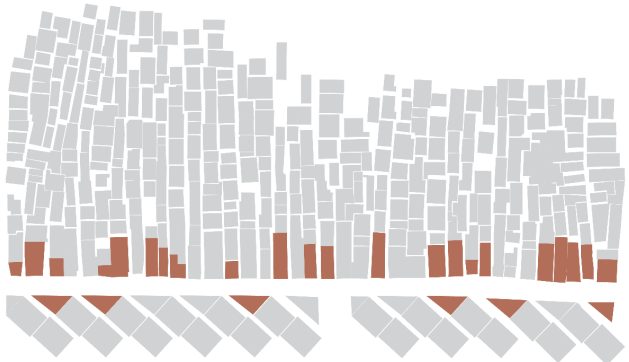
## routing



public

private

## functions



resedential

commercial

0 m 20 m 40 m 60 m 80 m 100 m

Schematic maps illustrating the urban structure of Vila Gilda.
Source: authors own

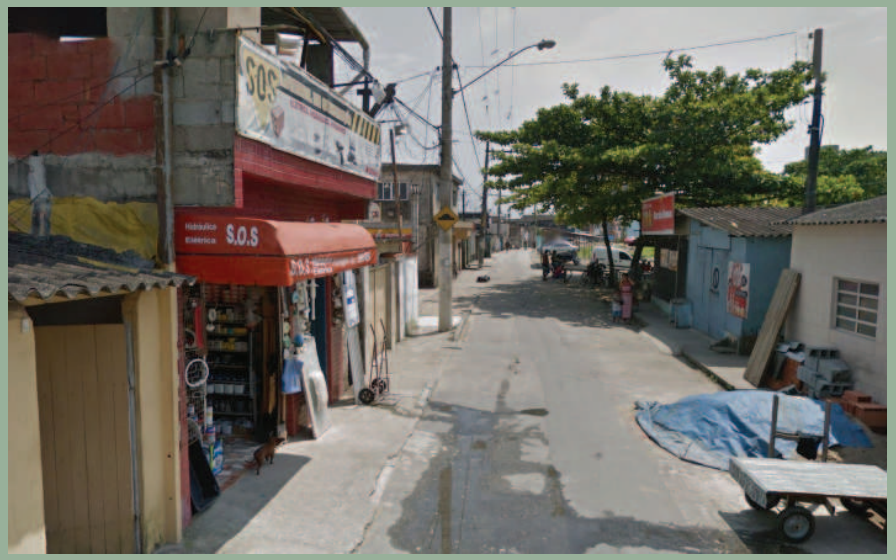
# STREETVIEW

## THE SPATIAL APPEARANCE OF VILA GILDAS MAIN STREET

The main street, “Cristo do Dique”(top of the dike) as it is called, is where most of the local bars, shops and services are located. This is the street were people meet, as it is the only street connecting the whole favela. From here, the small, uninviting, alleys towards the houses on stilts can be accesses.

Through the years, most of the houses along the Cristo do Dique have been upgraded from wooden to concrete or brick construction. Space for commerce or production is provided on the ground floor.

source: Google Streetview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S.O.S


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267

# GREEN SPACES

## Open green spaces in the neighborhood are not actively used

Because all the pavement in the streets of São Vicente and Santos the open green spaces on the island are important for the use of water absorption and/or retention. Close to Dique da Vila Gilda there are some unused plots of lands, that can be used for this, eventually in combination with recreation.
On the end of the Rio do Bugres still is some mangrove vegetation left, one of the last bits of the island, therefore it should be protected carefully.
There are two parks in the neighborhood of which one is on top of the former waste disposal of São Vicente. The other is a Botanical Garden, in Santos.
The area consists mostly of impermeable pavements. All the roads. sidewalk and building plots are largely concrete. Especially the social housing complexes are built on large plots of concrete, without any green or impermeable surface. This reduces the flood control capacity of the area, as will be explained in the next chapter.
The most large areas of green and permeable surfaces, besides a few parks, are wastelands which are not actively used in the public space network or water retention.

Social housing complexes are built on large plots of impermeable surface.
source: Google Streetview

This wasteland is one of the few open green and impermeable plots in the neighbordhood.
source: Google Streetview

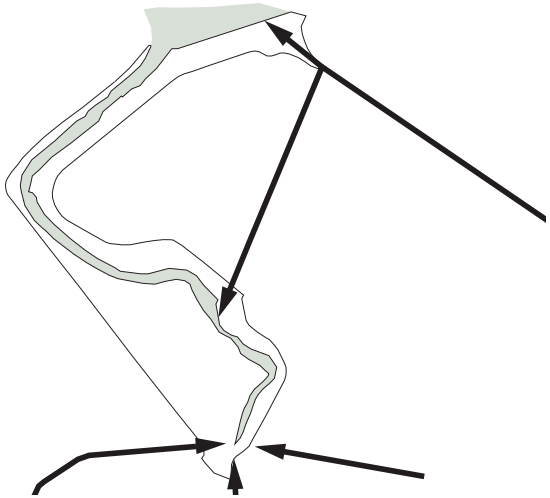

LEGEND scale: neighborhood
Green structure
canal
mangrove vegetation
low vegetation
high vegetation
large impermeable plot
buildings
water
source: authors own
N
0 m
200 m
400 m
600 m

# CANALSYSTEM AND FLOOD RISK AREAS

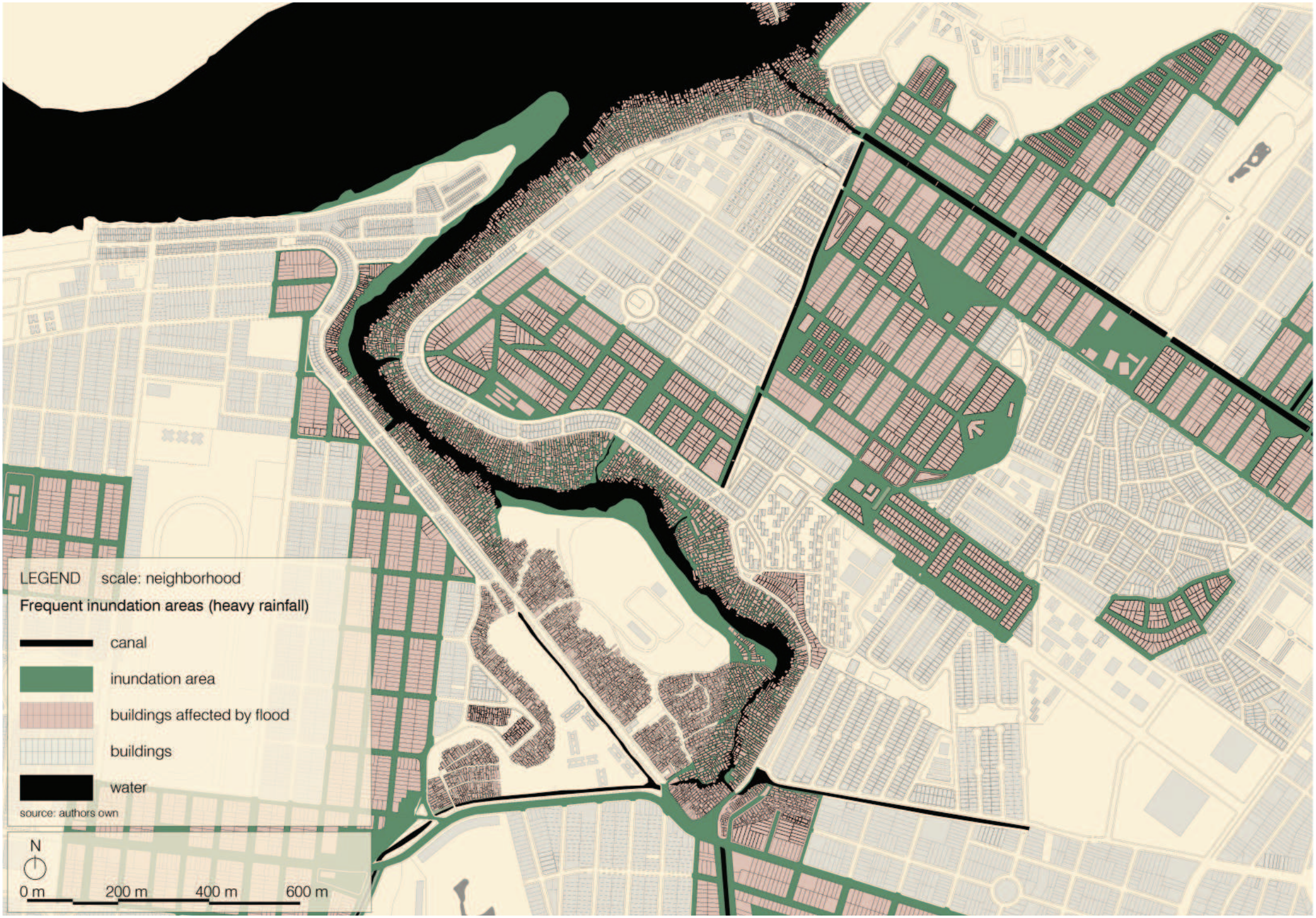
## Canal system does not have the capacity to absorb heavy rainfall

The regular floods in the area have three major causes: (1) There is a lack of permeable pavement in the area. Almost everything is concrete. (2) The main roads along the port just north of the area have been altered to prevent floods, however, this has created a basin in which the water gets trapped in the Zona Noroeste. (3) The canal system does not have the capacity to absorb affluent rainwater. (Bloch and Papachristodoulou, 2012)
So, the canal system in this part of the city does not have the quality as the system on the western side of the island, in Santos. Here in São Vicente and the Zona Noroeste of Santos, the canal system is less structured, and less maintained. This causes the area to flood regularly.
Because Vila Gilda is situated along the river, several canals are connected to the favela to discharge their water flow.
The area has a separated sewage system, so these canals are mainly carrying rainwater and are relatively clean.

A canal on Av. Hugo Maia  close to Vila Gilda. Due to a lack of capacity, it frequently floods.
source:  Google Streetview



Canals which are connected to Vila Gilda can be used in the urban design, in order to improve the connection with the neighborhood.


LEGEND scale: neighborhood
Frequent inundation areas (heavy rainfall)
canal
inundation area
buildings affected by flood
buildings
water
source: authors own
N
0 m
200 m
400 m
600 m

# ENVIRONMENTAL IMPACT OF VILA GILDA

## Dique da Vila Gilda has a severe impact the natural environment

Since the construction of the dike Dique da Vila Gilda, several impacts have severely affected the natural environments of which the first was the actual construction of the dike and the draining canals in the 1950s. This destroyed a large part of the natural mangrove vegetation along the waterfront of river Rio dos Bugres

The second environmental impact was when the informal settlement started to expand on stilts over the river. This destroyed the rest of the native vegetation along the waterfront and it is still affecting the water quality because the a large share of the settlement is not connected to the sewage system.

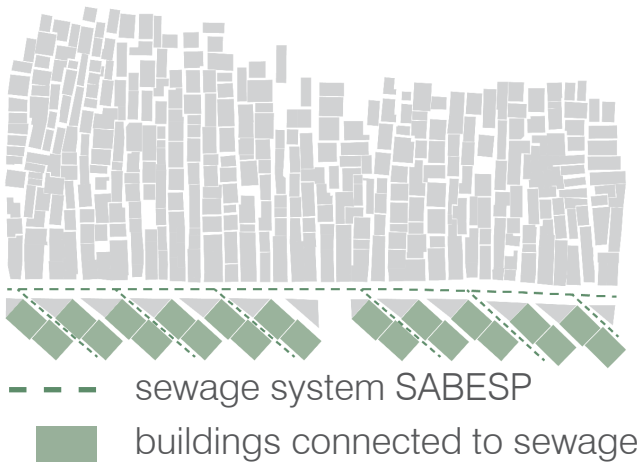
The third environmental impact was caused by the installation of the waste disposal (visible in the sections earlier in this chapter) of the city of São Vicente right next to the river Rio do Bugres. From this mountain of waste, many liquid residues and solid waste were spilled in to the river.*

On the right, statistics based on a municipal survey in Vila Gilda are presented, clarifying the large amount of pollution in Rio do Bugres. The key challenge for the slum upgrading of Vila Gilda will be to provide basic sanitation infrastructure, and educate the residents about waste disposal.

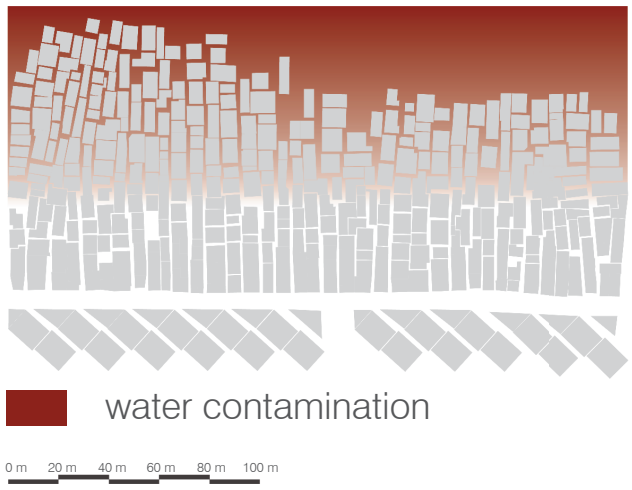
*information obtained during an interview with André Neumann, Instituto do Mar, Santos


Statistics about Vila Gilda based on a municipal survey.
Source: Pereira, 2008

## sewage network




## water pollution




## waste collection


Schematic maps illustrating the sewage network, water pollution and waste collection in Vila Gilda. Source: authors own

# PHOTO SERIES
## ILLUSTRATING THE ENVIRONMENTAL IMPACT OF FAVELA VILA GILDA

The lack of basic sanitation infrastructure and the regular disposal of waste in the river Rio do Bugres, is affecting the environmental quality. The pollution is a source of diseases, and is threatening the natural ecosystem.

These photos illustrate real conditions in which the people in Vila Gilda are living, in dangerous wooden constructions and a severely polluted environment, in contrary to the more abstract, but fascinating, beauty it has when seen from above in the earlier ‘zoom’ into the favela.

source: Instituto Eco Faxina. http://www.institutoecofaxina.org.br/

source: Instituto Eco Faxina. http://www.institutoecofaxina.org.br/

source: Dona Helena Veradora Blogspot. http://donahelenavereadora.blogspot.nl/

source: Dona Helena Veradora Blogspot. http://donahelenavereadora.blogspot.nl/

source: Google Streetview

source: Instituto Eco Faxina. http://www.institutoecofaxina.org.br/

# CONCLUSIONS
## LOCAL SCALE

As a consequence of its unregulated development the neighborhood around Dique da Vila Gilda has a fragmented and monotonous urban structure, in which the favela and the waterfront are not included.This fragmented urban structure is reflected in the socio-economic and environmental systems of the neighborhood.
The socio-economic system of the area consists of a few (local) centers of commercial, cultural and institutional activity. However, these are not connected in a network of corridors and centers. Favela Vila Gilda functions as an independent socio-economic system, segregated from the rest of the neighbordhood. The new social housing complexes do not have any socio-economic activity.
The area has a lack of (natural) vegetation, has to cope with frequent floods and the water is highly polluted. This is due to the unregulated urbanization, the (fragmented) canal

system with a lack of capacity, the large areas of impermeable pavements. the lack of connection between green areas and the lack of basic infrastructure in favela Vila Gilda.
Thus, the morphological structure and the socio-economic and environmental systems do not function as strong networks. Besides this they are not integrated with each other. Also in the development strategies of the diverse stakeholders in the area, these systems seem to be conflicting, which will be further elaborated in the institutional analysis.

The integration of the development of the different systems including Vila Gilda will be the key challenge. In order to do so, the diverse stakeholder goals related to these particular systems need to be integrated in a strategic framework for development, in which the development opportunities through overlapping the systems, can be expanded.

# Part 04.1 / URBAN PLANNING FRAMEWORK ANALYSIS
## STAKEHOLDERS

This analysis of the urban planning framework aims to recognize which stakeholders are currently involved in the development of the systems analysed in the socio-spatial analsys and how they are related to each other.

Key stakeholders have been defined and their goals and capacities have been studied, in order to explore their influence on the region. The key stakeholders are currently developing projects which have been evaluated based on the gained knowledge through socio-spatial and literature studies.

Also, an overview of potential stakeholders who could be involved in the development of the area is presented. By studying the possible conflicts and cooperations between these stakeholders, the opportunity to integrate their objectives in an integrated strategic framework can be explored. A key challenge for the formulation of the integrated framework will be the involvement of the local community, which currently is ignored in all of the urban developments in the region.

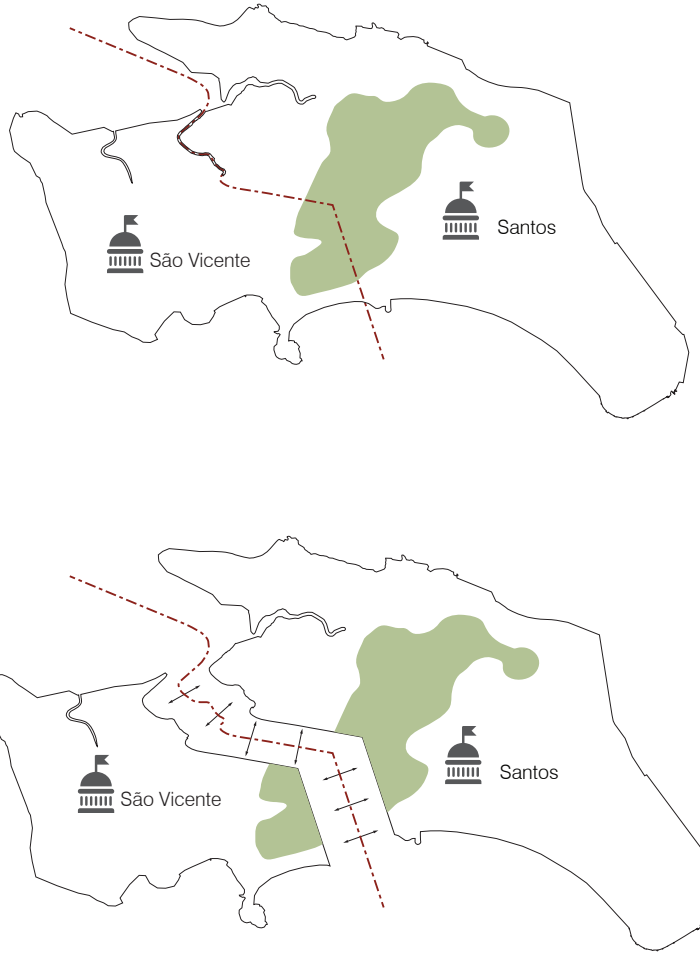
CONTENT

Muncipal governance
Santos Novos Tempos
COHAB - resettlement program Dique da Vila Gilda
COHAB - social housing complex Tancredo Neves
Streetview. Illustrating the spatial appearance of social housing projects
Stakeholder overview
Key stakeholders objectives and capacities
Local development example
Conclusions

# MUNICIPAL GOVERNANCE

## Municipalities of São Vicente and Santos do not cooperate in their urban and spatial planning

The municipalities of São Vicente and Santos are sharing the island of São Vicente. As the island has the same topographical conditions on both sides, the problems occurring due to the intense urbanization are the same for both municipalities. For example, both have severe problems with floods and landslides. Also, both have to fight problems of traffic congestions, but they are dependent on each other's infrastructures as well. Striking though, is that the municipalities barely cooperate in their urban and spatial planning. Both municipalities are making their own plans, while it would be more efficient to cooperate and challenge the problems by working together. On the right pages an example of the lack of cooperation is illustrated by the recurrent theme of flood problems on the island.

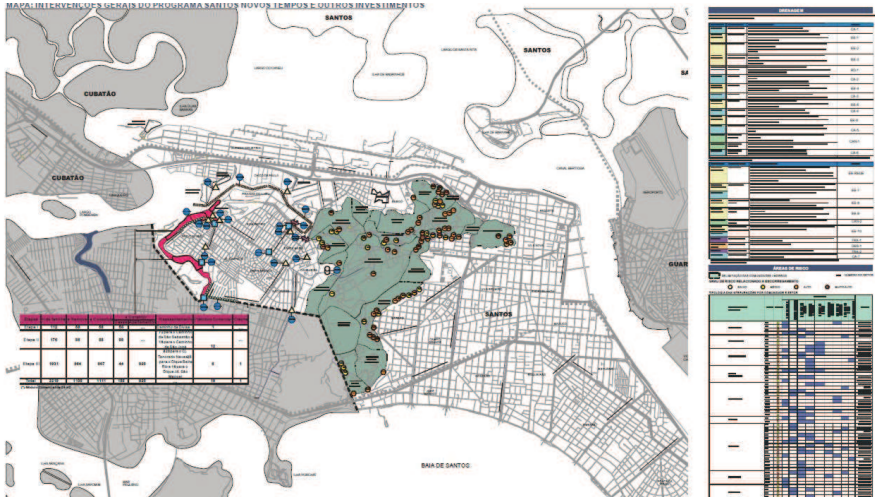



Conclusion: The two municipalities of São Vicente and Santos are sharing the same island, but do not work togerther in their urban planning. Source: authors own

The flood problems in both cities provide a good example of the segregated urban and spatial planning governance of the municipalites on the island.

The illustration on the top right is a map of projected interventions within the Santos Novos Tempos Project, A project which was already initiated in 2007 and is only attending Zona Noroeste of Santos. On the map, São Vicente is igored, while some of their canals are even connected to watercourses in Santos.

At the bottom left, a news item from February 2015 stating that the municipality of São Vicente wants to stop the recurrent floods and is applying for fundings to start a macrodrainage project. Santos, or the Santos Novos Tempos project is not mentioned.




The Santos Novos Tempos program, a draining project for Santos only. source: Relatório de Avaliação Ambiental dos Componentes do Programa, Prefeitura Municipal de Santos

SÃO VICENTE BUSCA VERBA PARA ACABAR COM ENCHENTES

administrador 10 de fevereiro de 2015 Cidades, Notícias Deixe um Comentário 130 Views

Like 0 Tweet 0 +1 0 Share Pin it

Com o objetivo de sanar os problemas de enchentes em São Vicente, o prefeito Luís Cláudio Bili se reuniu na tarde de ontem, em São Paulo, com o ministro das Cidades, Gilberto Kassab, para obter recursos e colocar em prática projeto de macrodrenagem no município. Kassab se prontificou em ajudar a cidade a resolver os problemas na Bacia do Catiapoã (canais das avenidas Alcides de Araújo e Lourival Moreira do Amaral), Linha Azul e macrodrenagem da ilha e Área Continental. O ministro das Cidades afirmou que após o Carnaval marcará reunião com os secretários estaduais de Logística e Transportes, Duarte Nogueira, e de Saneamento e Recursos Hídricos, Benedito Braga, para discutir o assunto.

A news item about a draining project in São Vicente in the Diario da Zona Noroeste. source: http://www.diariodazonanoroeste.com.br/

# SANTOS NOVOS TEMPOS

## Single-purpose draining project reducing the flood risk in Zona Noroeste

To fight the recurrent floods in the Zona Noroeste in Santos, the municipality has launched the project Santos Novos Tempos, which is supported by the Worldbank. It is an infrastructural project, constructing new pumping stations and increasing the water capacity of the existing canals. Also, the project is linked to the social housing project of Dique da Vila Gilda, because space in Vila Gilda is needed for infrastructure such as lift gates and pumping stations. (Bloch and Papachristodoulou, 2012) Notable is that the project only addresses the Zona Noroeste of Santos, and not the neighboring municipality São Vicente which is coping with the same flood problems. An integral approach might have been more efficient, knowing the São Vicente as well will develop a macro-drainage project.
The project only considers the water carrying capacity of the current canal system and the belonging infrastructure. It does not seek for alternative water retention methods such as the implementation of more permeable surfaces, improving the green structure and developing water retention areas.

DIÁRIO OFICIAL DE SANTOS

PREFEITURA DE SANTOS

www.santos.sp.gov.br • Ano XXII • Sexta-feira, 11 de junho de 2010 • nº 5180

**Novas obras vão impulsionar o 'Santos Novos Tempos'**

**Principal intervenção em desenvolvimento urbano, social e ambiental, programa inicia na próxima semana a drenagem no Dique da Vila Gilda e no conjunto Caneleira 4** Páginas 4 e 5

*Ilustração do projeto da prefeitura, que conta com financiamento do Banco Mundial, mostra como ficará o Dique da Vilda Gilda, na Zona Noroeste*

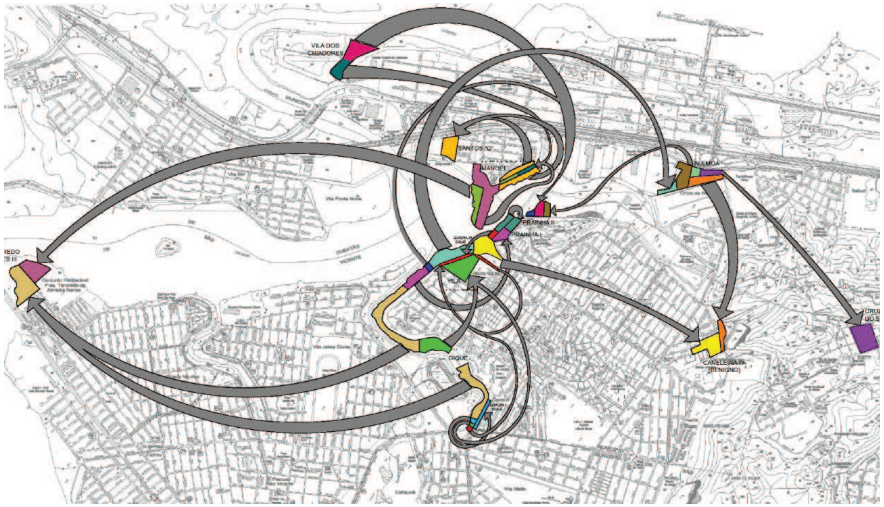
Visualization of the Santos Novos Tempos draining program in the 'Jornal of Santos' source: Diário Oficial de Santos, 5180, 4, June 2010


Map of the Santos Novos Tempos draining program .
source: Climate Change Adaption Planning for Santos, Brazil. ICF GHK

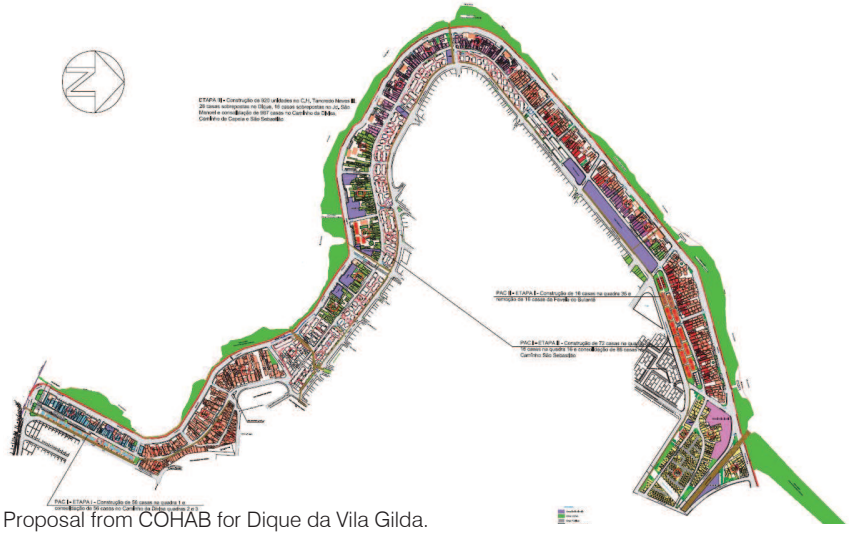
# COHAB - RESETTLEMENT PROGRAM DIQUE DA VILA GILDA

## Resettlement of 2,000 families to social housing compounds around the city

The slum upgrading program for Dique da Vila Gilda is led by COHAB-St, a housing company in the State of São Paulo. Within the slum upgrading, a resettlement plan is incorporated, as about half of the population has to be removed from the site in order to make space for the needed infrastructure for the Santos Novos Tempos draining project, as well as a new road along the river Rio do Bugres. The road is one of the key aspects of the design, as (besides its function in the road system) will prevent further illegal occupation along the waterfront.
Negatives:
-The road destroys the opportunity to reconnect the neighborhoods with the waterfront.
-The social structure, found in the analysis, perpendicular to the river is being torn apart.
-Some clusters of inhabitants are being resettled to social housing compounds about 5 kilometers away.
-There will be space for reforestation along the waterfront, but it is not well integrated in the project.
-The relation with the surrounding neighborhood is not being improved.
-The design is not integrated with a design for São Vicente.



Map of the projected resettlements from Vila Gilda to social housing compounds around the city.
source: Plano de Reassentamento Involuntário, Prefeitura Municipal de Santos



Proposal from COHAB for Dique da Vila Gilda.
source: Plano de Reassentamento Involuntário, Prefeitura Municipal de Santos

One of the housing complexes which is being developed, Tancredo Neves, will be described on the next pages. This will be a typical Brazilian social housing compound as presented in the essay which is included in this booklet. More of these types of projects have already been developed by COHAB.
During an interview, Regina del Cistia from COHAB-St explained that many of these compounds after a few years are transform into a favela again. When the projects are delivered, the residents are happy that they have the opportunity to live in a decent housing block and a clean living environment. However, as times passes, they seem to fall back in the same 'favela-routine' again. As Regina puts it: "We took them from the favela, but we did not take the favela out of them."

This illustrates the main problem of the standardized housing blocks, which do not respond to the actual problem of the favelas; the spatial segregation and the lack of accessibility to city services. So, as also has been described in the essay, the housing complexes do not provide a durable, long term solution, it only is a short term response onthe enormous housing demand.

**"Tiramos eles da favela, mas não tiramos a favela dentro deles."**

**"We took them from the favela, but we did not take the favela out of them."**

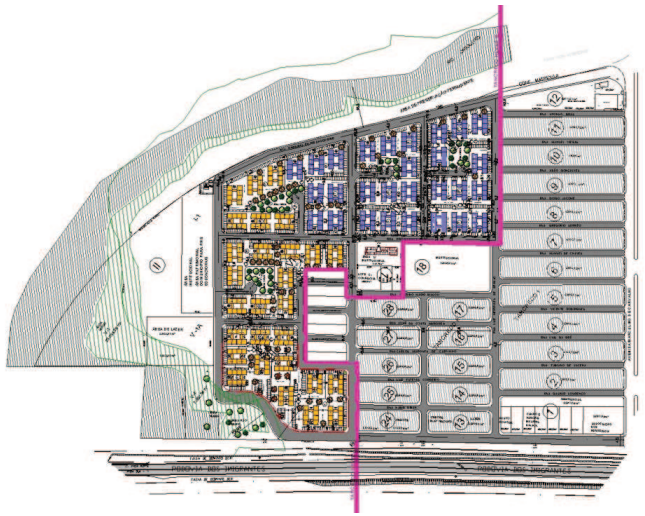
Regina del Cistia, COHAB-St
interview during fieldtrip 2014

# COHAB - SOCIAL HOUSING COMPLEX TANCREDO NEVES

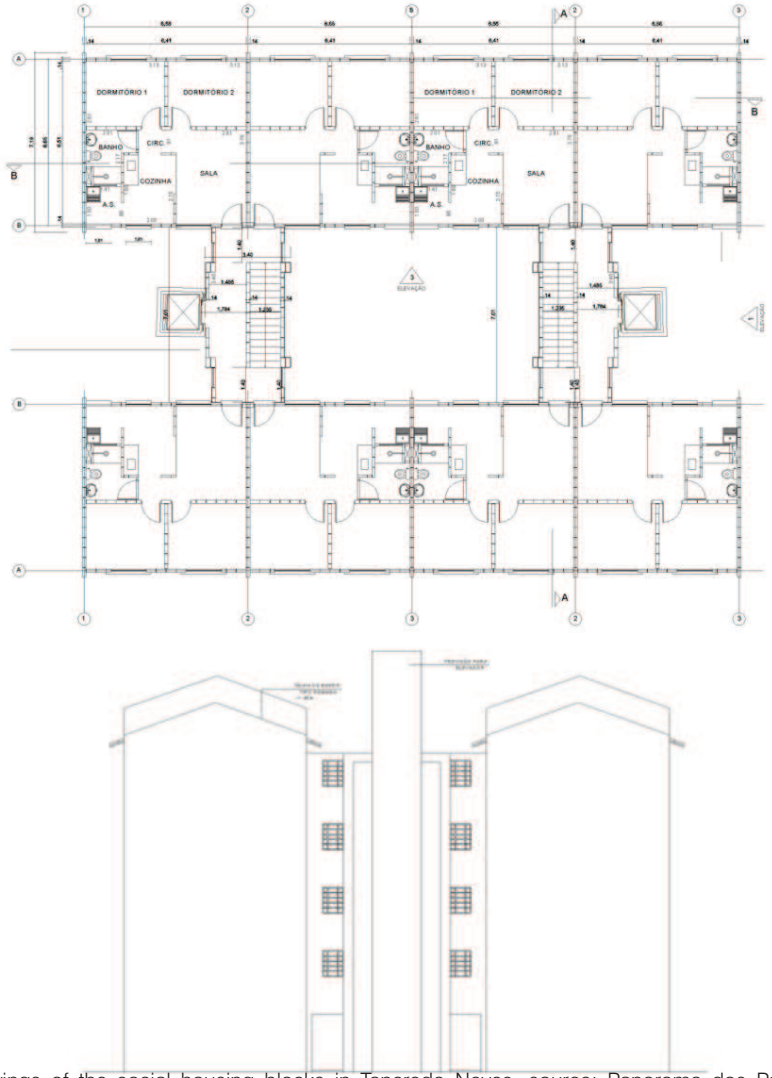
## Social housing complex not integrated with social, urban and environmental system.

The social housing complex Tancredo Neves, on the most northwest tip of the island of São Vicente, is the resettlement location for approximately 900 families from Dique da Vila Gilda. The site of Tancredo Neves is one of the last places in the island were mangroves vegetation is still growing. This will be heavily impacted by the development of the social housing blocks.
As Tancredo Neves is about 5 kilometers away from Dique da Vila Gilda, and has a bad connectivity with the rest of the city, the families who will have to live in these blocks will have difficulties maintaining their social network, as well as difficulties in reaching basic services, facilities and institutions. The access to the city from this location is poor. On the smaller scale, the architectural and urban elaboration of the blocks is of a low quality. There is no connection between public and private, little green space and a lack of permeable space. Also, the blocks don't have any flexibility in use, do not provide space for commerce and production, and are designed with only one type of apartment. The apartments have only two sleeping rooms so for bigger households it will be difficult to accommodate here.


Map of social housing compound Tancredo Neves. source: Panorama dos Projetos Habitacionais em Desenvolvimento no Município, COHAB-St & Prefeitura Municipal de Santos



Map of social housing compound Tancredo Neves. source: Panorama dos Projetos Habitacionais em Desenvolvimento no Município, COHAB-St & Prefeitura Municipal de Santos









Drawings of the social housing blocks in Tancredo Neves. source: Panorama dos Projetos Habitacionais em Desenvolvimento no Município, COHAB-St & Prefeitura Municipal de Santos

# STREETVIEW

## ILLUSTRATING THE SPATIAL APPEARANCE OF SOCIAL HOUSING PROJECTS

On the island of São Vicente, several social housing projects similar to those in the Dique da Vila Gilda resettlement program have been develop over the past decades.

Some have been abandoned, but most have been evolved through a process of gradually adjustments according to the needs of the residents.

source: Google Streetview

# STAKEHOLDER OVERVIEW

## Multiple stakeholders could be involved in the development of an integrated strategic development framework.

The table on the right is an overview of the most important stakeholders that could be involved in a future project. They are organized according to the scale and sector in which they act. The key stakeholders are the municipalities of Santos and São Vicente, the Santos Novos Tempos Project, COHAB (Housing company) and the local communities, which are currently not being involved. Each of the stakeholders has its own objectives and tries to meet these in their projects. Currently, it seems, that stakeholders are cooperating poorly while, there project could be enhancing each other. An example of this was given earlier, illustrated by the draining projects in the municipalities of São Vicente and Santos.
Due to the lack of coorporation and integration, the full potential of the region, the island and the neighborhoods is unexploited. In order to do so, the key challenge will be to combine the diverse stakeholder goals and programs in a strategic framework for urban development.

*urban structure*

## POTENTIAL STAKEHOLDERS

| | |
|---|---|
| *key stakeholder* | Municipalities |
| *federal* | Ministério do Planejamento |
| *regional/state* | Secretaria Estadual de Logística e Transporte<br>RMBS - Região Metrolitana da Baixada Santista |
| *city* | Santos: Secretaria de Desenvolvimento Urbano<br>Santos: Secretaria de Infraestrutura e Edificações<br>São Vicente: Secretaria de Desenvolvimento e Mobilidade Urbana |
| *local* | Local community |

## POTENTIAL PROGRAMS/FUNDINGS

| | |
|---|---|
| *federal* | Plano Nacional de Habitação<br>Urbanização de Favelas<br>MCMV - Minha Casa Minha Vida<br>FNHIS - Fundo Nacional de Habitação de Interesse Social |
| *regional/state* | |

| *socio-economic system* | *environmental system* |
| --- | --- |
| **COHAB & Local community** | **Santos Novos Tempos** |
| Ministério das Cidades | Ministério do Meio Ambiente<br>IBAMA - Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais |
| Secretaria Estadual de Desenvolvimento Social<br>COHAB<br>CDHU<br>Ambienta | Secretaria Estadual de Meio Ambiente<br>Secretaria Estadual de Saneamento e Recursos Hídricos<br>CETESB - Companhia de Tecnologia de Saneamento Ambiental<br>SABESP - Companhia de Saneamento Básico do Estado de São Paulo |
| Santos: Secretaria de Assitência Social<br>São Vicente: Secretaria de Assitência Social | Santos: Secretaria de Meio Ambiente<br>São Vicente: Secretaria de Obras e Meio Ambiente<br>Santos Novos Tempos - Worldbank<br>Instituto Eco Faxina |
| Local community<br>Arte no Dique | Local community<br>Parque Ecológico |
| Programa Especial de Melhorias<br>PAC - Programa de Aceleração do Crescimento<br>Urbanização, Regularização e Integração de Assentamentos Precários<br>Melhorias das Condições de Habitibilidade | Plano Nacional sobre Mundança do Clima<br>Fundo Nacional sobre Mundança do Clima<br>Prevenção e Erradicação de Riscos em Assentamentos Precários |
| Casa Paulista | Fundo Estadual de Recursos Hídricos / Onda Limpa |

# KEY STAKEHOLDERS OBJECTIVES AND CAPACITIES

## Their objectives and capacities should be incorporated in the integrated strategic framework

Four key stakeholders which are or should be involved in the urban developments in and around Dique da Vila Gilda, have been defined:

- both Municipalites of São Vicente and Santos
- Santos Novos Tempos draining program
- COHAB, social housing corporation
- the local community (currently not involved)

In the table on the right the objectives and capacities of the key stakeholders, that have been found through documentory analysis (COHAB-St, 2009; Bloch and Papachristodoulou, 2012; Prefeitura de Santos, 2008; Prefeitura de Santos, 2013), are presented.

The municipalities, Santos Novos Tempos and COHAB are currently already involved in the development of Dique da Vila Gilda and its surroundings. Therefore, it is essential to involve these stakeholders in the development of the integrated strategic framework and incorporate their objectives in the program.

Important tough is, to study their initial objectives for the area, and not what currently is being developed. For example, the initial goals of the Santos Novos Tempos program state that it should improve the living conditions of the low-income communities, by providing access to urban services and housing. However, studying the current project, the acces to urban services is not being improved as the project only focusses on primary infrastructure.

An integrated strategic framework could help achieve these initial goals, by joining forces of key stakeholders and potential stakeholder (previous pages). By integrating the diverse stakeholders goals, the opportunities for development will be expanded.

Of key importance is to involve the local communities, who currently are not involved in any of the urban development plans. Especially in the development of housnig and the improvement of living conditions, they can provide essential local knowledge and projects could be based on existing social structures of the communities.

| | OBJECTIVES | CAPACITIES |
|---|---|---|
| *Municipality of Santos & São Vicente* | poverty alleviation<br>reduce flood risk<br>restore natural environments<br>maintain economic growth<br>relieve traffic pressure | land regulation<br>plano diretor (ZEIS)<br>urban planning<br>coordination<br>mobilization of resources<br>subsidize services and institutions |
| *Santos Novos Tempos* | improve the cities critical infrastructure (sanitation, flood protection, macro-drainage)<br>improve the living conditions of the low-income communities (access to urban services and housing)<br>facilitate economic development in the city | Worldbank resources<br>flood risk assessment<br>existing SNT program |
| *COHAB* | create and improve the conditions for the promotion of Municipal Housing Policy<br>meet the housing demand in Santos (and São Vicente)<br>promote access to the city, public services, social facilities and urban infrastructure | develop affordable housing units<br>social support<br>municipal housing plan |
| *local community* | decent housing<br>means of production<br>access to urban services | community building<br>existing social structure<br>local knowledge |

# LOCAL DEVELOPMENT EXAMPLE

## Lack of integration between housing and environmental developments

On the island of São Vicente, there is a scarcity of space for housing developments. However, the green-blue spaces which are still left at the island are valuable in order to absorb the affluent water during times of flood. Also, green and water improve the streetscapes and living environments in the neighborhood.

The image on the top shows a satellite photo from 2008, with a small river right in between the south part of favela Vila Gilda and the surrounding neighborhood. The image on the bottom is a photo from the same location, but then in 2009, showing that the stretch of water and green has been destroyed in favor of a row of social housing blocks.

This development is typical for many of the projects on the island (also the Tancredo Neves housing complex, described earlier), and stretches the need for a more integrated approach in which urban and environmental developments would not be conflicting, but enhancing each other. By combining forces in a smart way, through the development within an integrated strategic framework, a more durable response to the housing demands and flood problems could be achieved.


Top: aerial photo from 2009, showing a small river through the neighborhood.
Bottom: aerial photo from the same location, illustrating the housing units built on top of the former river. Source: Google Earth

# CONCLUSIONS
## STAKEHOLDERS

They key stakeholders which have been recognized through the analysis of the current urban planning framework in Dique da Vila Gilda are the Municipalities of São Vicente and Santos, the Santos Novos Tempos draining program and COHAB housing corporation. There is a lack of cooperation between either of these stakeholders, which is expressed in their projects which are currently executed in the city. These are all single-purpose projects, which are not integrated with the urban, socio-economic and environmental systems that have been defined through socio-spatial analysis, and therefore these projects are not exploiting the full potential of the area.

The challenge will be to involve the diverse stakeholders goals, inclucing those of the local community, in an integrated strategic framework, in order to expand the opportunites for development

# Part 04.2 / URBAN PLANNING FRAMEWORK
## ALTERNATIVE SLUM UPRGADING APPROACHES

The exhaustive repetition of standardized social housing blocks as a response towards the housing demand do not provide a durable and adequate solution for Brazilian cities, as concluded through literature and analytical research presented in this book. There is a need for alternative approaches, which are better integrated with the diverse and complex systems of the cities, and actively involve residents in the design process.

During the fieldtrip in March 2014, various experts about slum upgrading have been interviewed, presenting some of their projects and explaining how these alternatives for mainstream social housing are being developed and implemented.

CONTENT

Companhia de Decenvolvimento Habitacional e Urbano
Ambienta - Assessorio e Desenvolvimento Local
Boldarini Arquitetos Associados
MMBB ARquitetos
Conclusions

# COMPANHIA DE DESENVOLVIMENTO HABITACIONAL E URBANO

## Facilitating space for commerce and production in social housing compounds

CDHU is the company of habitation and urban developments of the State of São Paulo, linked to the Secretary of Habitation and the largest promotor of popular housing in Brazil.
In contrary to COHAB, the not only provide housing, but also try to intervene in the urban developments of cities and include commercial and production space in the housing blocks.

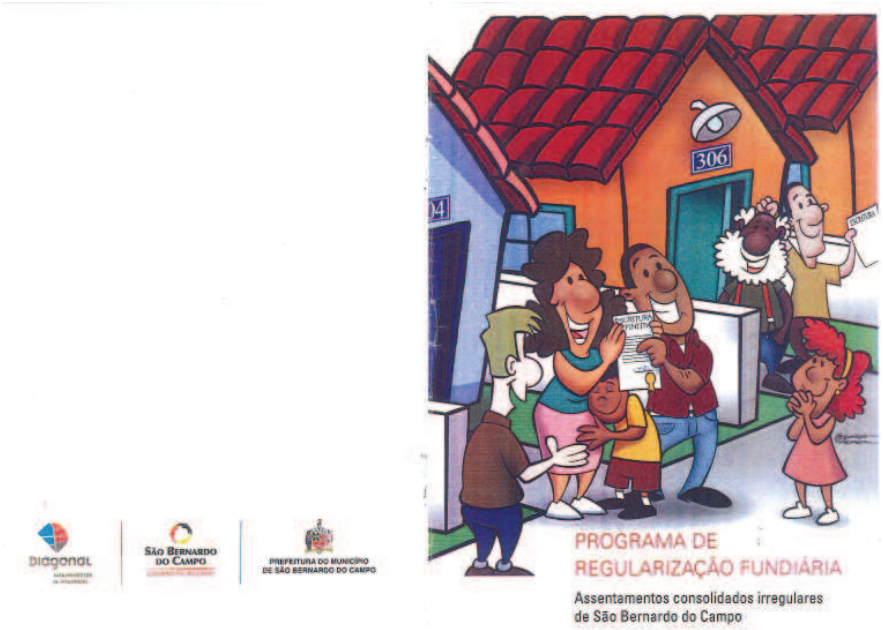
For the urbanization of informal settlements, they use the following approach:

(1) Diagnosis: a urban, social and environmental diagnosis of the area of intervention, quantifying and qualifying among others the households, constructions, basic infrastructure, legislations and social indicators.
(2) Guidelines: guidelines to structure the project, based on references, relevant municipal regulations, and an agreement with the population
(3) Preliminary study: based on the guidelines
(4) Basic project: strategy of interventions accompanied by a chronogram of actions and sequence of phases, including existing Municipal and State projects, and in agreement with the population.
(5) Budget
(6) Executive project
(7) Approval project
(8) Cadastral survey
(9) Regularization project

In relation to the provision of commercial and production space in the housing blocks, they apply the principle that housing should be prioritized and if there is funding left, commercial and production space could be incorporated in the project. In step (1) of their approach and in agreement with the population, CDHU will determine where and how this will be facilitated.

*Communication*
In order to communicate with the local population, CDHU provides booklets with information about the different steps of development and how they could apply for taking part in the housing program. An example of such a booklet is given on the right page.

The information has been provided by Renato Guimarães Pereira, CDHU - Gerência de Produção de Projetos, through an interview via e-mail




Example of booklet informing the local population about the housing program.
source: Prefeitura do Município de São Bernardo do Campo

# AMBIENTA - ASSESSORIA E DESENVOLVIMENTO LOCAL

## Supporting self-management of local community in the development of social housing

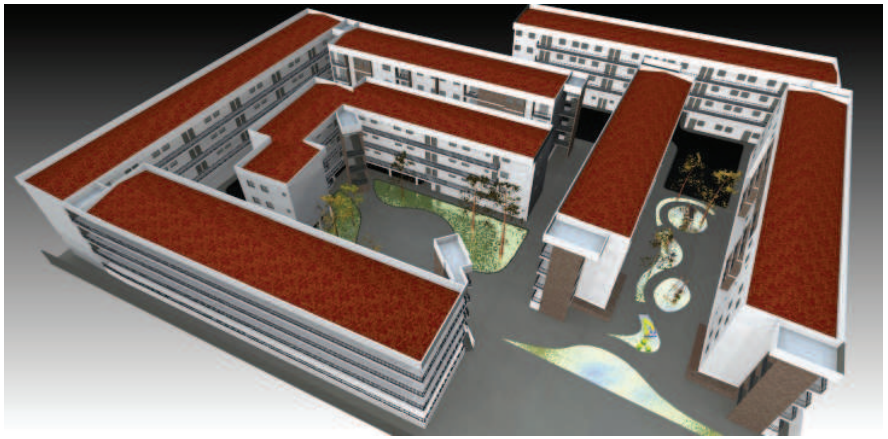
**“Na luta pela nosso moradia digna.”**

**“Fighting for decent housing.”**

Inhabitants of Vila Sapo, Santos

Ambienta is a non-governmental organization of architects who are supporting communities in their fight for decent housing. During the fieldtrip in 2014, two of their projects have been visited and discussed: Vila Sapo and VanGuarda.
Because the application for social housing within the regular program in Brazil is a long process, the inhabitants of both of these communities decided to develop social housing themselves. In order to do so they started a community organization, supported by the architects of Ambienta who taught them about the relevant legislations and helped acquiring a construction plot and setting up the financial administration of the project. A demand of the community was that the construction plot was situated in the same neighborhood, therefore they applied for the assignment in the zoning law of a ZEIS-location to one of the wastelands in the neighborhood. This opened up the possibility to construct social housing on this particular plot.  The legislation E*statuto da Cidade* provided the instruments for this application. Then, the community organization needed to be registered at the Ministry of Cities, in order to apply for governmental funding, within the condition that the organization itself is responsible for the financial administration. As the buildings have been designed by Ambienta, in constant consultation with the community, different types of apartments have been developed, adapting to the different household sizes. Also, commercial and production spaces have been incorporated in the project, through which the community could generate income.
Adviced by Ambienta, the community also applied environmental adaptation measures in the buildings, such as a grey water circuit and the building with recycled material. (Huijding, 2013)

Contacts fieldtrip 2014:
Rafael Ambrosio, Ambienta
Fabiola, Vila Sapo
Samara, VanGuarda



Participatory social housing project VanGuarda, Santos
source: Ambienta


Community center Vila Sapo, Santos
source: Ambienta

# BOLDARINI ARQUITETOS ASSOCIADOS

## Local community participation and using public space improvements as a tool for slum upgrading

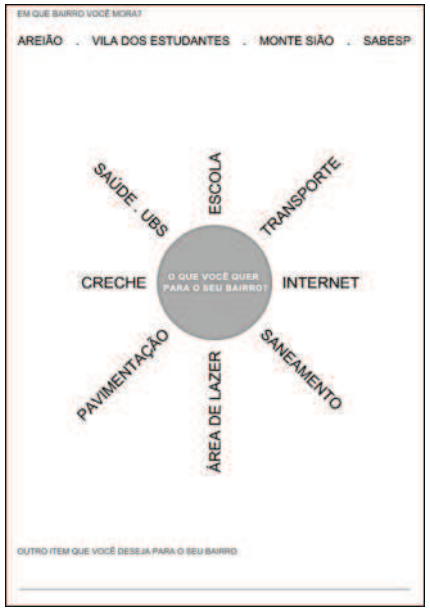
Boldarini Arquitetos is a São Paulo-based office, developing urban, architectural and landscape projects, focusing on social habitation and the urbanization of precarious settlements. In their design they try to incorporate the complexity of the irregular settlements, responding to the diverse social, morphological and infrastructural challenges.

Their approach towards the development of a urban plan for a favela is threefold, based on a technical analysis, an analysis of the community and the conceptual approach. The technical analysis is done through mapping the different systems and structures of the settlement. The analysis of the community is done through workshops with the local population, in which they get informed and involved in the project. One of the tools used by Boldarini is the Sun of Functions, illustrated on the right. Using this, the community can indicate what kind of functions they think are important to incorporate in the design.

On the right page, images of project Cantinho do Céu are presented, a participatory project with the community of the favela, activating the waterfront through the improvement of public space. By actively involving the community they developed a sense of responsibility for the maintenance of the space.

Contact fieldtrip 2014:
Marcos Boldarini, Boldarini Arq.


Threefold approach for development of urban plan: technical analysis, community analysis, concept. Source: Boldarini Arquitetos




Sun of Functions. Tool for communication during community participation workshops. Source: Boldarini Arquitetos


Images of project Cantinho do Céu, the development of a public waterfront through local community participation. Source: Boldarini Arquitetos

# MMBB ARQUITETOS

## Environmental adaptation infrastructure as a backbone for urban development and facilitator of socio-economic activity

MMBB is an São Paulo based office, which has developed a wide range of architectural as well as urban projects.
Urban project Córrego do Antonico in favela Paraisópolis has been developed within the program Urbanização de Favelas, promoted by the Municipal Secrectary of Habitation of São Paulo. This program stimulating different projects on the basic infrastructure, social equipment and new habitation in the favela. Especially the provision of a sanitation and draining system are essential elements in the improvement of the living conditions of the favela.
The Córrego do Antonico, which is a brook running through the favela, will be the backbone of the developments. The removal of houses on this brook, results in the principal draining and urban structure and become the articulator of public spaces. The main issue in this project is about the future maintenance of open spaces, preventing further illegal occupation. The strategy to avoid this is to well define the infrastructural space and invite the community to activate the space.

So, the Córrego do Antonico is not a project on itself, but it is very much integrated with the housing program Urbanização de Favelas. It should become the structure and activator of the improvement of living conditions in the whole favela, and sets an example by integrating the urban structure, the environmental system, as well as the socio-economic system in one project.

Vitruvius. http://www.vitruvius.com.br/revistas/read/projetos/12.134/4239


Images of project Córrego do Antonico, integrating urban structure, draining system and public space within the municipal housing program for favela Paraisópolis , São Paulo.
Source: Vitruvius. http://www.vitruvius.com.br/revistas/read/projetos/12.134/4239

# CONCLUSIONS

## ALTERNATIVE SLUM UPGRADING APPROACHES

The different alternatives for slum upgrading approaches provide valuable knowledge for the formulation of an integrated strategic framework of the urban development of Vila Gilda, in particular for the operability of the development of social housing and integration of different systems.

Important strategies within the presented alternatives is the step-by-step approach from diagnosis to regulation of housing from CDHU, the local community self-management support of Ambienta, the involvement of the local community in the development of public space by Boldarini, and the integration of different systems within the Muncipal Urbanization program by MMBB.

Studying the approaches of these projects, the conditions for slum upgrading within the integrated strategic framework have been established.

# Part 05.1 / INTEGRATED STRATEGIC FRAMEWORK
## STRATEGIC VISION AND ACTIONS

Integrating the diverse stakeholder goals and challenges found through socio-spatial analysis, and translate this in an integrated strategic framework for the development and promotion of common assets is the objective of this graduation project.

This chapter will illustrate the set up integrated strategic framework, by presenting the different layers with which the integrated vision is built up (environmental adaptation network, socio-economic network and urban structure).

Then, the guidelines for the actual slum upgrading within the framework are elaborated, concluding with a demonstration project, bringing the various steps that have to be taken in practice.

# CONTENT


Integrated strategic framework
Integrated strategic vision - synthesis of layers
Implementation of interventions
Environmental adaptation network

- Clarification
- Approach
- Operability
- Demonstration project: connector street
- Demonstration project: actively use wasteland in environmental adaptation network

Socio-economic network

- Clarification
- Approach
- Operability
- Demonstration project: local food production as catalyst for public space improvement
- Demonstration project: strengtening socio-economic cluster through integration with environmental adaptation interventions

Develop cohesive urban structure

- Clarification
- Approach
- Operability
- Demonstration project: improving access to the waterfront

Local development of Vila Gilda

- Clarification
- Approach. Guideline-based slum upgrading process
- Operability
- Catalog of urban rules
- Development process of local intervention

# INTEGRATED STRATEGIC FRAMEWORK

## The strategic framework consists of the strategic vision (stating the objectives and development approach) and its complementary strategic actions.

The framework has been formulated by integrating the common objectives of the active stakeholders and the main challenges identified through socio-spatial analysis. The aim of the strategic framework is to allow projects to exploit the full potential of the area, which with the current fragmented developments is missed.

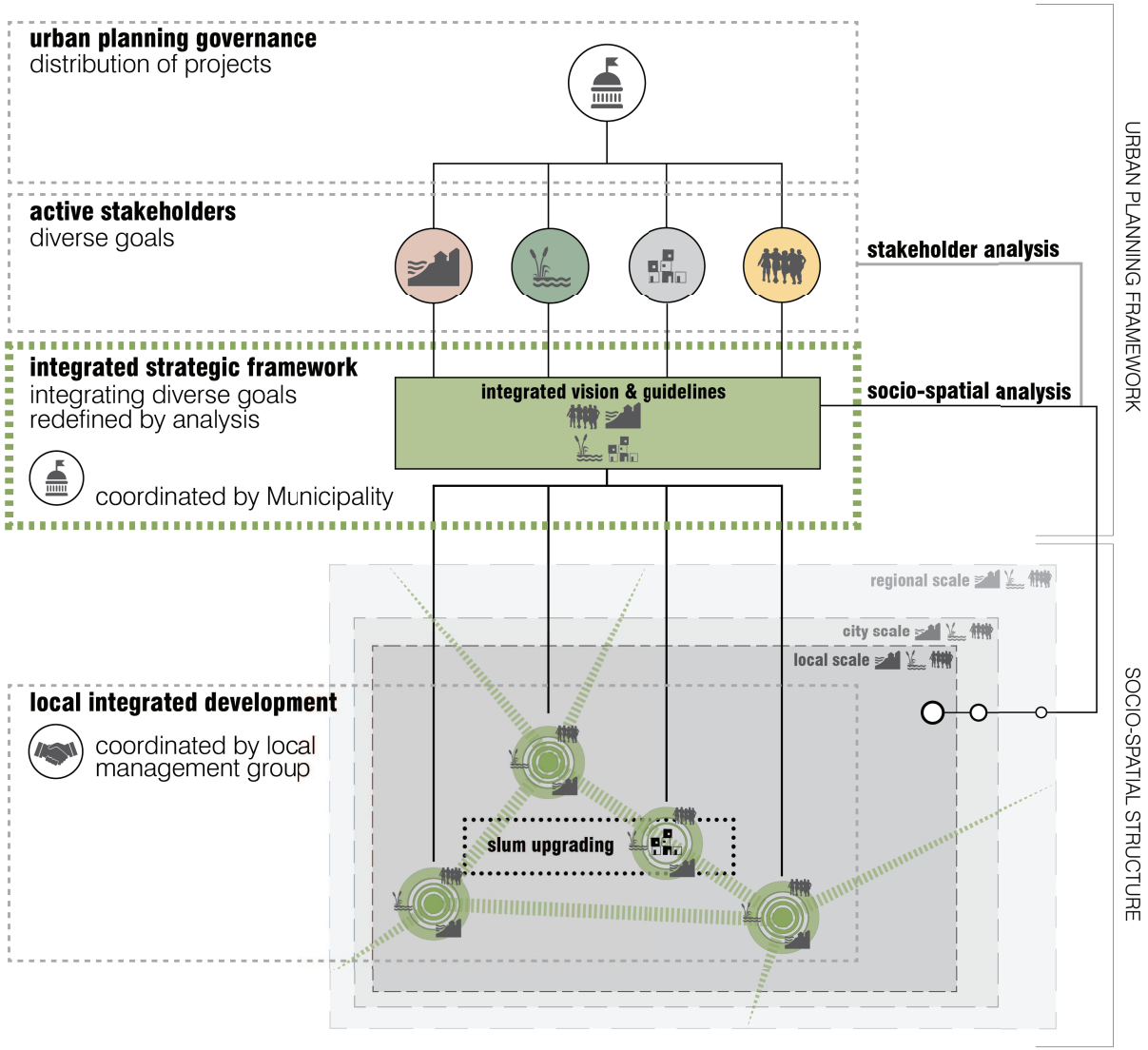
The intervention areas consists of places and axes which are currently having an important role in the urban structure of the neighborhood, or which have a high potential to become backbones of the neighborhood. For some of these, development plans have already been made, for example by the Santos Novos Tempos program. However, when developed within the strategic framework, the benefits of the development can be better distributed over the neighborhood and, the other way around, the Santos Novos Tempos program can benefit from other developments within the area. Besides the Santos Novos Tempos project, another big project in the neighborhood is the COHAB popular housing project. Also in this case, opportunities are lost as the project is not adapting to the existing situation and other forecasted projects in the area (see analysis of COHAB project). This can be improved by developing the popular housing within the integrated strategic framework for the area, joining forces with order projects in order to exploit the full potential of a particular location.

Hence, the objective of the strategic framework is to adapt different projects to each other, redefine them on the basis of the executed spatial analysis, in order to add value to the existing projects and achieve a more durable development for the neighborhood as a whole.

The framework can be seen as a range of actions which can be categorized within the research themes morphological structure, socio-economic structure and environmental structure, and can be organized from small to large scale, from strict to flexible and from important to less important. The actions are based on the common objectives stated in the integrated vision and can be executed independently from each other, however they should achieve the qualities stated in the integrated vision.

These actions a part of interventions which are setting the frame, the boundaries, for the smaller interventions. The large interventions need to be developed according to more strict regulations as they have a bigger impact, while the smaller interventions can have more flexible regulation, adjusted to the particular needs and conditions of each specific location. These projects will be guided by the framework, not regulated.
The larger projects, are mainly

infrastructural and environmental adaptations, combined with the improvement of the quality of public space on strategic locations.
The smaller projects are mainly the slum upgrading projects, developed in small clusters adjusting to the specific needs of the community. These also are combined with projects for the improvement of (semi-)public spaces. These public space projects can act as incentives for the development of housing.
The housing projects will need to confirm to the objectives and agreed qualities of the strategic framework. On the locations were the housing projects meet the infrastructural and environmental interventions, special regulations are set.




Source: authors own

# INTEGRATED VISION - SYNTHESIS OF LAYERS

## Respresenting the objectives of diverse stakeholders and the challenges resulting from spatial analysis in an integrated vision

**“The creation of strategic visions implies the design of shared futures, and the development and promotion of common assets.”**

Louis Albrechts (2004)

The collective vision is formulated on the basis of the spatial and the institutional analysis. From the institutional analysis, objectives for the area have been derived, which have been integrated with objectives derived from the spatial analysis. In this way, it is not only integrating the objectives of the currently active key stakeholders and programs into one vision, but it also redefines their set of goals and actions in order to achieve a higher quality and a more durable response to the problems they want to tackle. Redefining their diverse goals and actions has been done by not only studying the individual stakeholder projects and programs separately (in the institutional analysis) but by studying the area as a whole (in the socio-spatial analysis) with emphasis on the demands of the more vulnarable groups, and translating the results into clear objectives for the vision. In this way, the shared problems and objectives of the active stakeholders have been found, adjusted and integrated in a collective vision, in order to be able to provide better development opportunities.

The general map of the collective vision illustrates the synthesis between four key objectives:

- Develop environmental adaptability of urban structure.
- Stimulate socio- economic activity.
- Develop cohesive urban structure.
- Slum upgrading in favela Dique da Vila Gilda.

These four objectives will be clarified separately on the next pages, presented by maps in which the interventions to reach the objectives are illustrated.

The synthesis between these interventions is drawn in the general map, as well as the locations were several proposed interventions meet. These locations, appointed as strategic development locations, have a high opportunity for development as these are the places were the shared benefits for the different stakeholders are the highest.

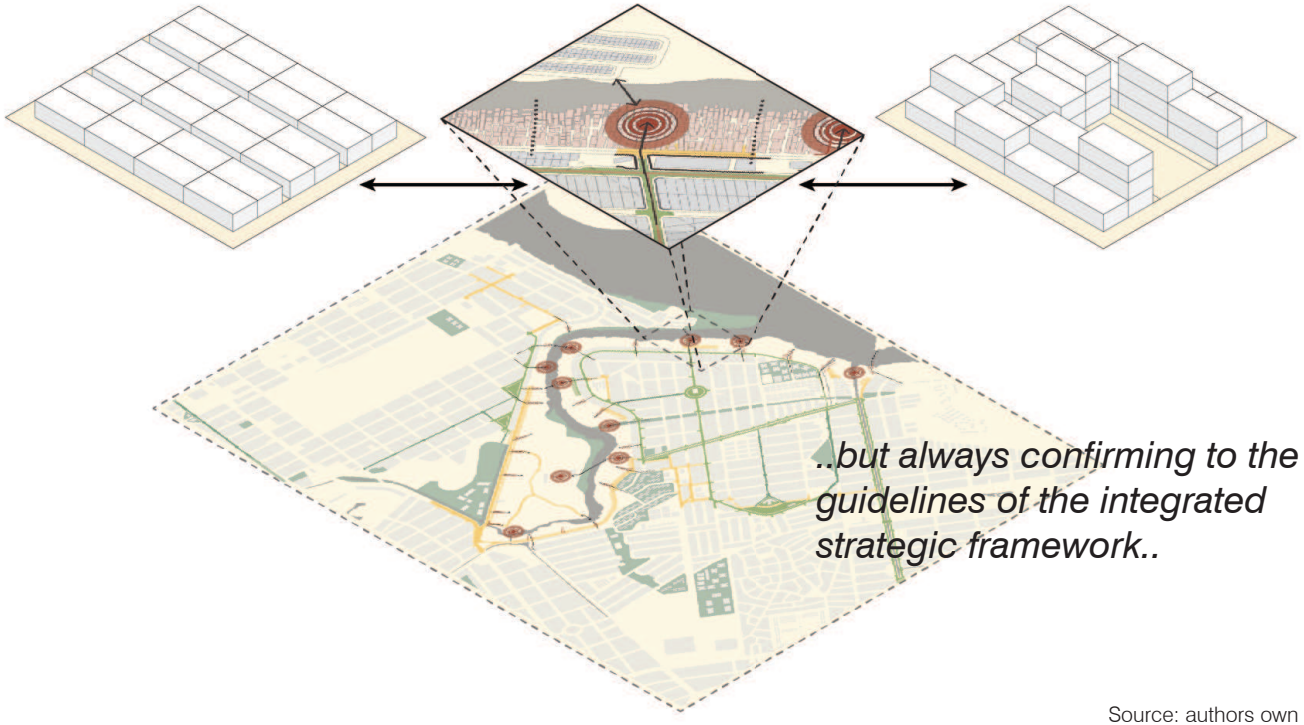

LEGEND scale: neighborhood
Integrated vision: synthesis of layers
strategic location for development
proposed connection
proposed public access to Vila Gilda
possible slum upgrading in Vila Gilda
proposed environmental adaptation & public space improvement
proposed environmental adaptation
proposed public space improvement
buildings
water
source: authors own
N
0 m
200 m
400 m
600 m

# IMPLEMENTATION OF INTERVENTIONS

## Local interventions must be developed as a part of the integrated networks.

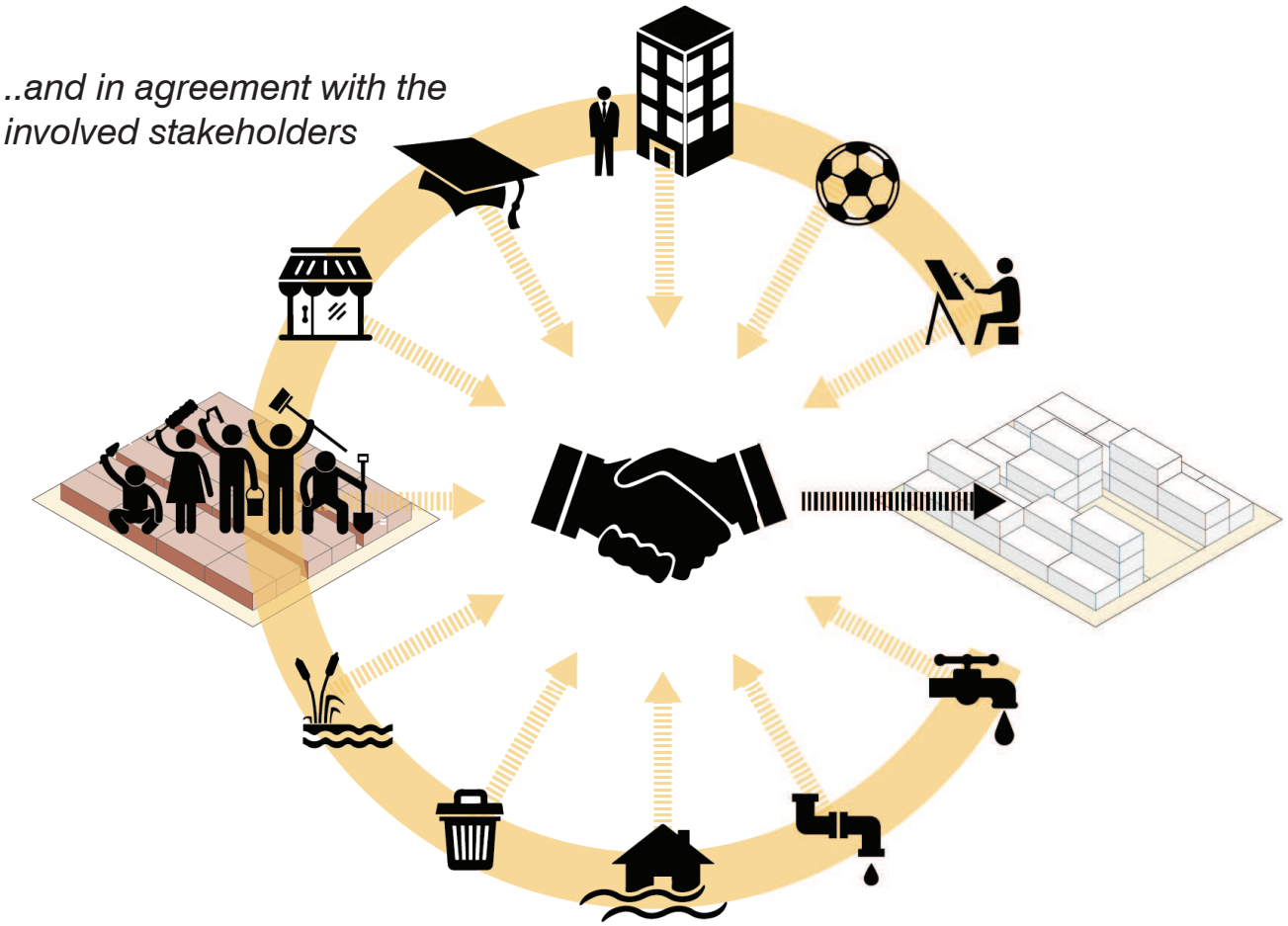
All the interventions pointed out in the strategic vision can be developed independently from each other, however they should confirm to the guidelines set out in the integrated framework and allow integration within the whole network of interventions. In this way, all the projects can be understood as an integral part of the development of the area, cooperating with and strengthening other developments. For each intervention, the urban plan should be developed in agreemented with all involved stakeholders.

*Each intervention can be executed independently from others, ..*



*..but always confirming to the guidelines of the integrated strategic framework..*

Source: authors own




Source: authors own

# ENVIRONMENTAL ADAPTATION NETWORK

## Reducing flood risk and restoring natural environments by decentralizing water management and improving the green-blue network, within the integrated strategic framework

### Clarification

*Objective*

The objective of the environmental vision for the neighborhood is to reduse the flood risk in the area around Dique da Vila Gilda, and restore some of the mangrove vegetation.

*Response to*

The suggested interventions are a (local) response to two of the major problems in the coastal region of Metropolitan area Baixada Santista, which have been encountered through spatial analysis and during interviews with Mr. Carriço (Secretário de desenvolvimento Urbano, Santos) and Mr. Neumann (Instituto do Mar, Santos). These two problems are the high flood risk and the extinction of natural vegetation.

Recently, the municipality of Santos started the Santos Novos Tempos(analyzed in the institutional analysis section), in order to cope with the recurrent inundations in the north-west region of Santos. This project aims to improve the already existing centralized canal system, however, it only increases the capacity of the primary infrastructure, without addressing collection and reuse of water, as a response to current water supply problems in the region, as well as the ability of the urban structure to receive and absorb affluent water in times of heavy rainfall and spring tide. Also, the project does not consider the expected changes in climate and the related sea-level rise.

*Clarification of the vision map*

The environmental vision map shows a system of interventions which together stimulate the environmental adaptation of the urban structure, based on the existing urban and green-blue structure, water management system and the Santos Novos Tempos project. The Santos Novos Tempos pumping station projects are appoined is yellow dots, along the waterfront. Spaces with room for reforestation of mangrove vegetation have been identified, as well as spaces for the retention, collection, infiltration and purification of water, such as wastelands. These locations are connected by the existing canals and streets. These connectors, running through the areas with the most severe flood problems, could be transformed in green-blue axes for water


LEGEND scale: neighborhood
Integrated vision: environmental adaptation
strategic location for development
SantosNovosTempos pumping station
SNT canal capacity increase
proposed green-blue network
proposed mangrove reforestation area
proposed permeable pavement area
proposed water harvesting area
buildings currently affected by heavy rainfall
buildings
water
source: authors own
N
0 m
200 m
400 m
600 m

# ENVIRONMENTAL ADAPTATION NETWORK

runoff. In this way, a green-blue network will be developed that functions as a decentralized water management system for the neighborhood, reducing the flood problems and allowing natural vegetation to restore. Locations where proposed interventions meet Favela Vila Gilda are pointed out as strategic locations for development. Those locations important to be developed in order to connect the neighborhood system to the waterfront, which in turn could stimulate the co-development of housing in Vila Gilda.

## Approach

The implementation of a decentralized water management system integrated with the canal system would be a more durable response to the frequent inundations in the area. As stated by Schuetze and Chelleri (2013), adapting to the effects of climate change is easier in a decentralized water management system than in a centralized, non-flexible infrastructure system. Also, it facilitates better in the collection, storage and reuse of water (Schuetze and Chelleri 2013), which could be valuable concepts in the process of future slum upgrading projects in the neighborhood.

Also, the reforestation of natural vegetation – most importantly, the mangroves – around the island of São Vicente is an objective of both of the municipalities the island hosts in order to restore the natural ecosystem of the region. This is currently highly threatened by the ongoing pollution and urbanization, accelerating the sedimentation and erosion on the island and having a negative effect on the fishing economy. Therefore, the reforestation of mangrove vegetation should be integrated in the urban planning framework as a key element for development.

On the right page, a set of actions which could be implemented as environmental adaptation measures within the framework is presented.

## SET OF ACTIONS

| | |
|---|---|
| *Canal system* (Santos Novos Tempos) | increase water capacity of canal system<br>implement new pumping stations |
| *Water harvesting* (Brown, 2005. in: Domènech, L. 2010) | implement ponds<br>implement wetlands<br>implement green roofs<br>implement permeable pavements |
| *Use of wastewater* (Angealakis & Durham, 2008. in: Domènech, L. 2010) | irrigation<br>ecological restoration<br>industrial use |
| *General* | include drainage system in 'connector' streets (MMBB, see reference on next page)<br>integrate water retention and harvesting areas and canal system in green-blue network<br>integrate with public space and urban structure network<br>restoration of natural vegetation (André Neumann, interview during fieldtrip 2015) |

## Operability

With the proposed interventions a green-blue structure will be developed with which the water capacity of the urban structure will be increased. Within this framework, the Santos Novos Tempos project can still be executed. However, by combining the interventions of the Santos Novos Tempos project with other interventions through all the layers, a higher quality and more durable solution will be achieved.
When developing one of the proposed interventions, the initiator (which will probably be Santos Novos Tempos or the municipality) must check what other interventions on the particular location are proposed within the other layers of the integrated strategic vision. Then, by inviting stakeholders which are related to these interventions, they could then directly be incorporated in the development. In this way, through integrated development, a higher quality could be achieved.

In relation to the environmental adaptation interventions, there are apart from Santos Novos Tempos and the municipalities more potential stakeholders which could involved in the projects. These are listed in the diagram on this page.

**POTENTIAL STAKEHOLDERS**

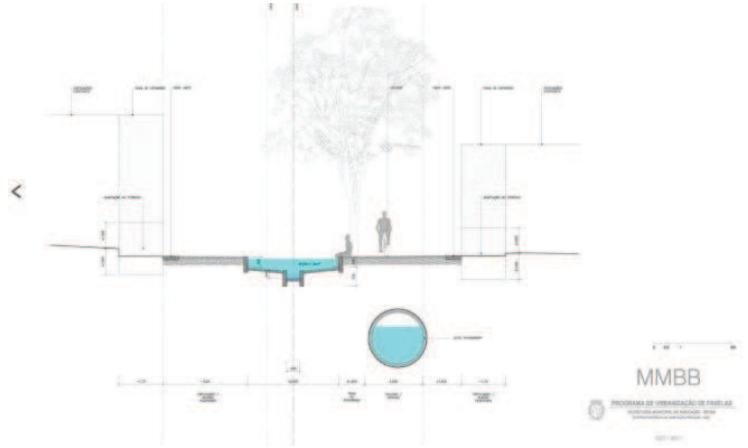
| | |
|---|---|
| *key stakeholder* | Santos Novos Tempos |
| *federal* | Ministério do Meio Ambiente<br>IBAMA - Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais |
| *regional/state* | Secretaria Estadual de Meio Ambiente<br>Secretaria Estadual de Saneamento e Recursos Hídricos<br>CETESB - Companhia de Tecnologia de Saneamento Ambiental<br>SABESP - Companhia de Saneamento Básico do Estado de São Paulo |
| *city* | Santos: Secretaria de Meio Ambiente<br>São Vicente: Secretaria de Obras e Meio Ambiente<br>Santos Novos Tempos - Worldbank<br>Instituto Eco Faxina |
| *neighborhood* | Local community<br>Parque Ecológico |

# ENVIRONMENTAL ADAPTATION NETWORK

## Demonstration project: connector street

*Reference:*
*Córrego do Antonio, MMBB*

The project ‘Córrego do Antonio’, in favela Paraisópolis in São Paulo, is a good example of how streets could be integrated in the rainwater management system. Street types like this could be developed as part of within the environmental adaptation layer of the integrated strategic framework. in order to connect the different water harvesting areas with each other. A demonstration project of a water harvesting area is elaborated on the next pages.




Drainage system integrated in public space, Córrego do Antonico, São Paulo, MMBB Arquitetos
Source: http://www.vitruvius.com.br/revistas/read/projetos/12.134/4239

# ENVIRONMENTAL ADAPTATION NETWORK

## Demonstration project: actively use wasteland in environmental adaptation network

The neighborhood of Dique da Vila Gilda, has a power line running through it. Underneath this line, there is a stretch of unused plots, as it it restricted to develop housing of public space below the high voltage cables. However, there is a potential to use wastelands in the environmental adaptation network, as suggested in the integrated framework. The plots could be used for rainwater harvesting in order to increase the water capacity of the urban structure, in addition to the initial Santos Novos Tempos interventions.

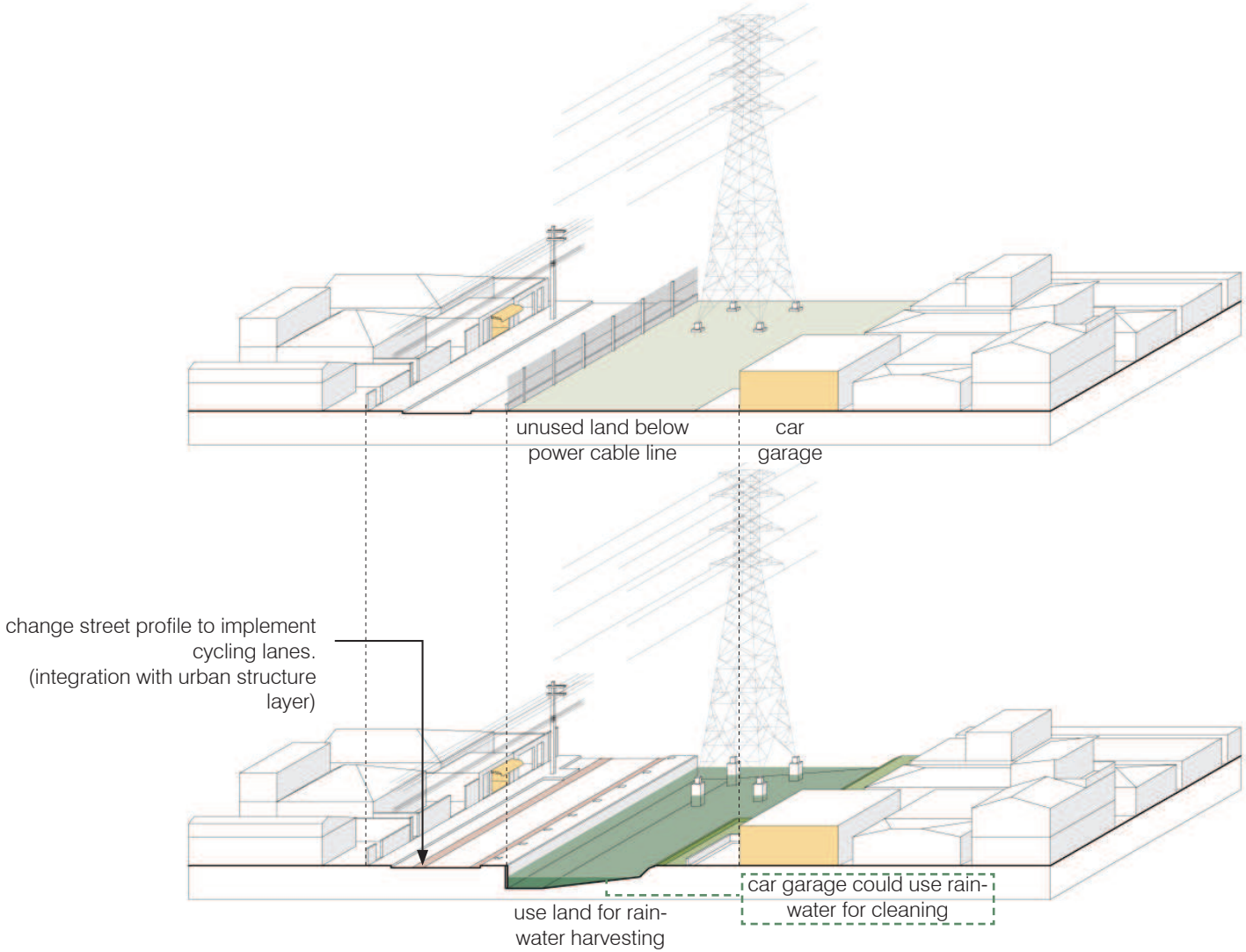
*Actions to impement and potential stakeholders for local development:*

*Initiative: Santos Novos Tempos*

-implement ponds (Santos Novos Tempos)
-industrial use of rainwater (local community)
-integrate with urban structure network (cycling lanes by Municipality
-integrate water retention and harvesting areas and canal system in green-blue network (Municipal coordination of integrated strategic framework


Unused land underneath the power cable line, in the neighborhood of Vila Gilda
Source: Google Streetview


Location of the plots.
Source: authors own




Isometric drawing illustrating the current situation (top) and the proposal (bottom)
Source: Authors own

# SOCIO-ECONOMIC NETWORK

Strengthening and connecting existing centers by improving public space network within the integrated strategic framework, including Vila Gilda in the neighborhood system

**“The tool [ ... ] is public space, since it is through this that a new form of interaction between slum and city can be generated.”**

Flavio Janches (2008)

## Clarification

*Objective*

The objective of the socio-economic layer of the vision is to stimulate socio-economic activity of the existing social, commercial, cultural, and institutional centers of the neighborhood and connect them to each other and, in particular, establish an integration between the centers of Dique da Vila Gilda and the rest of the area.

*Response to*

From spatial analysis, within the socio-economic layer, has been concluded that the neighborhoods around Dique da Vila Gilda have a deficiency of employment and commercial and cultural activities, leading to an unequal distribution of socio-economic activity on the island of São Vicente.

In order to improve the balance on the island, it is important to stimulate the socio-economic activity. This could stimulate the improvement of the living conditions and opportunities for development for the inhabitants in these subordinated neighborhoods.
This is endorsed in the urban planning vision of both the municipalities of São Vicente and Santos, as they state that strengthening the local economy and generating employment in the area around Dique da Vila Gilda is one of the key objectives for development. Also, it is in the initial goals of the Santos Novos Tempos project to improve living conditions and the local economies of subordinated neighborhoods. However, currently the focus seems to be only on the development of primary infrastructure systems.(Bloch and Papachristodoulou, 2012)
*Clarification of the vision map*

The vision map for stimulating socio-economic activity shows the strategic locations to improve public space in order to develop a network of social, cultural and commercial active places and streets. This proposed network is built upon existing centers in favela Vila Gilda and its surrounding neighborhoods which are found through analysis and indicated in the map as active


LEGEND scale: neighborhood
Integrated vision: socio-economic network
strategic development location
proposed public space improvement
currently active facades
buildings
water
source: authors own
N
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200 m
400 m
600 m

# SOCIO-ECONOMIC NETWORK

places. By enforcing these centers and connecting them – using the improvement of public space as a tool – a network will be established.
Vila Gilda, which now functions as a border between the cities of São Vicente and Santos, could fulfill an essential role in the activation of the area as it has the potential to become an attractive place to stay and a connector between both of the cities, by integrating its appealing waterfront along the  Rio dos Bugres in the public space network.
The water could be used as an opportunity to build social relationships, instead of being a segregating element. The locations which have a good opportunity to develop such attractive places are appointed in the map as strategic development locations. These are locations were the proposed network meets a proposed intervention for one of the other layers. Also illustrated in the map are the locations were a connection crossing Rio dos Bugres between São Vicente and Santos is suggested. These are situated on crucial locations in the proposed public space network, in order to activate the waterfront and stimulate socio-economic activity across the current border.

## Approach

Vitalizing Vila Gilda and its surrounding neighborhoods will be done by means of the improvement of public space, as this is a powerful tool to stimulate activities and interactions in and between neighborhoods. (F. Janches, 2008) So, by strategically improving the quality of public space around current social, commercial and cultural centers, new activities can be invited, centers can be connected to each other and less active areas could be vitalized. In this way the currently separated neighborhood centers could slowly evolve into a network of socio-economic interactions, including favela Vila Gilda in the structure and strengthening the local economy.

Also, with good public spaces, interaction between neighbors, entrepeneurs and institutions could be encouraged, as it nurtures the social relations. In order to invite users and facilitate these relations, they have to be equipped with facilities such as playgrounds, sport facilities of benches. It is important to locate them on strategic locations, having a good accessibility and place for certain events that could support public gatherings, such as local fair/market or other cultural events. (D. Tunas, 2008)

On the right page, a set of actions which could be implemented in order to develop a stronger public space network an stimulate socio-economic activity.

## SET OF ACTIONS

| | |
|---|---|
| *activation of public space* (Janches, F. 2008; Tunas, D. 2008; Boldarini) | improve quality of pavement |
| | equip with green |
| | equip with seating element |
| | equip with playground |
| | equip with sport facility |
| | equip with leisure facilities |
| | invite commercial functions |
| | assign place for cultural event |
| | assign place for local fair/market |
| | assign place for local food production (Hehl and Angélil, 2012) |

| | |
|---|---|
| *hierarchy* (Hehl and Angélil, 2014; Magalhães and Villarosa, 2012) | build on existing centers |
| | connect leisure, cultural, commercial and institutional functions |
| | integrate with green-blue and urban structure network |
| | integrate Vila Gilda in neighborhood network (strategic development locations) |

# SOCIO-ECONOMIC NETWORK

## Operability

In the integrated vision, a whole network of interventions is proposed, however it is not necessary - not desired even - to develop them all at once. Each location can be developed independently from another, important though is to follow the guides of the framework and integrate with the other layers of development for the particular location to be able to share the costs and benefits of the project and make the it understandable as a part of the whole. In this way, the public space projects can directly be integrated with projects of the environmental adaptation and urban structure, as well as the co-development of Vila gilda.

When developing a project, the process should start with the involvement of the community around the location, such as families, entrepeneurs and institutions and allow them to participate in the design process. In this way the value of the existing socio-economic structure can be used and the community will develop a sense of responsibility for the public space, which is important for its activation and maintenance. (Janches lecture, 2015)

**POTENTIAL STAKEHOLDERS**

| | |
|---|---|
| *key stakeholder* | Local community |
| *federal* | Ministério das Cidades |
| *regional/state* | Secretaria Estadual de Desenvolvimento Social |
| *city* | Santos: Secretaria de Assitência Social<br>São Vicente: Secretaria de Assitência Social |
| *neighborhood* | Local community<br>Arte no Dique |

# SOCIO-ECONOMIC NETWORK

## Demonstration project: local food production as catalyst for public space improvement

As presented in the socio-spatial analysis, the social housing compounds, constructed near Vila Gilda have a lack of socio-economic activity, are disconnected from the favela, and have large areas of impermeable surface.
Through the stimulation of local food production, involving the local community (the social housing, as well as the favela residents), the area could be activated, while at the same time improving the water absorption capacity.
In this way, new interactions between the social housing compound, the favela and local institutions could be established, and income can be generated by selling the food on local markets.

The attention for the public space will increase, stimulating locals to gradually improve and appropriate the spaces. The implementation of local food production functions in this way as a catalyst for public space upgrading.

Social housing compounds have large amounts of unused (and impermeable) surface, which could easily be transformed for to facilitate a public fucntion. Source: Google Streetview

Local food production as catalyst for the improvement of public space
Source: Hehl and Angélil, 2012

# SOCIO-ECONOMIC NETWORK

## Demonstration project: strengtening socio-economic cluster through integration with environmental adaptation interventions

The image on the top right of the page, show the location of a street connecting to neighborhood clusters of socio-economic activity. This street is appointed as a location for public space improvement interventions in order to stimulate the socio-economic activity in those clusters. When consulting the synthesis of layers map (bottom right), it is visible that also environmental adaptation proposals are suggested in this street.
This provides the opportunity to integrate the improvement of public space with the environmental adaptation measures. For this, integration with Santos Novos Tempos or CETESB can be fruitful in order to develop a good quality project, sharing the costs and benefits of the project.

The impressions on the right page illustrate what this integration between public space and environmental measures could look like. A transformation of the street profile is needed, but as the pressure on space is low, a road-diet can be established in order to make space for these interventions.

Combining diverse stakeholders goals in order to expand the opportunities for development is the strength of the integrated strategic framework.


Location of the street.
Source: authors own


Synthesis of layers
Source: authors own
Source right page: Google Streetview and own elaboration

# DEVELOP COHESIVE URBAN STRUCTURE

## Including Vila Gilda in the neighborhood system by improving access to the favela and its waterfront.

## Clarification

*Objective*

The objective is to work towards a cohesive urban structure in which favela Vila Gilda and the waterfront are included, which would allow for better social, urban and environmental development opportunities for both the favela and the surrounding neighborhood.

*Response to*

As concluded through analysis, favela Vila Gilda and the waterfront of Rio dos Bugres are not integrated with the rest of the neighborhood. It is hard to reach the favela, and it is almost impossible to get a view on the river. The hard boundaries are formed by blocks of social housing, and by the slum itself which has developed as a wall of serried houses only having accesses in the form of small and uninviting alleys. This boundary excludes Vila Gilda spatially, but also socio-economically from the rest of the neighborhood and makes the waterfront – which could be a valuable asset –inaccessible.
The inaccessibility of the waterfront is a problem which occurs on the whole northern side of the island of São Vicente. The suggested interventions in this layer are intended to (locally) open up the waterfront and demonstrate the potential for development of public and environmental zones along the river.

*Clarification of the vision map*

The vision map of this layer is closely related to the public space layer, as the developments assigned in this layer can facilitate the accessibility of spaces. Also, it is very much complementary to the co-development of Vila Gilda, as it defines the locations of access to the slum area.
With the black arrows, the proposed public accesses to the favela are pointed out. On these locations, specific rules for the development of the particular location are set up to make sure that a public access will be established.
Also, the map illustrates the proposed cycling network, connecting Vila Gilda with the rest of the island.


LEGEND scale: neighborhood
Integrated vision: urban structure
proposed connection
existing street approaching Vila Gilda
proposed public access to Vila Gilda
proposed cycling network
buildings
water
source: authors own
N
0 m
200 m
400 m
600 m

# DEVELOP COHESIVE URBAN STRUCTURE

## Approach

By gradually increasing the permeability of the favela, the favela and its waterfront will become better integrated in the urban structure of the whole neighborhood, allowing for better opportunities for development of for example public space. (Hehl and Angélil, 2012).
The assigned locations for public access to the favela, are an extension of the existing urban structure, maximizing the visibility and accessibility. Also, they are located at places were strategic development locations in the other layers have been appointed, in order to better integrate these in the urban structure. In this way, the urban structure of Vila Gilda will slowly be redefined in order to be better integrated with the green-blue and public space network, while at the same time it will keep its linear characteristics.

Besides the local structure of Vila Gilda and the connections with the neighborhood, a larger scale intervention is also proposed, namely the implementation of a cycling network in the area. Santos is known for its cycling network, but currently it only is located on the east side of the island. A project (see analysis) to connect the west side has been started, but, this does stretch out until Vila Gilda. As cycling is a cheap and easy access to transportation for the poor, the implementation of a cycling network, connecting it with the rest of the island is an important project to increase the mobility of the inhabitants.

**SET OF ACTIONS**

| | |
|---|---|
| *cohesive urban structure* (Hehl and Angélil, 2012; 2014) | improve accessibility of waterfront<br>improve accessibility of Vila Gilda<br>connect to existing urban structure<br>integrate with green-blue network<br>integrate with public space network<br>integrate cycling network<br>connect São Vicente and Santos |
| *development* | provide temporary housing<br>relocate in situ<br>develop the void (public or environmental) |

## Operability

Improving the accessibility will be done by setting rules for the development of particular locations, regarding the profile of the alley/street. When a certain location where a public access is proposed will be developed (environmental, public space and/or slum upgrading project), the project must be integrated with a public access to the favela. Specific building rules for these locations will be set up to make sure that this will be established.
The cycling network is very much integrated with the green-blue and public space networks. Thus, when developing a particular street which is proposed as a part of the cycling network, a cycling lane could be already integrated in the public space and/or environmental design.

So, the interventions in the urban structure can either be developed as a catalyst for other project, by opening up the waterfront stimulating further developments. Or, as a facilitator, when developments are already planned and a new connection to this particular place is needed.

Either way, involved with the local community is essential as the are mostly affected by a certain intervention. The set guidelines for this type of intervention are elaborated in the next chapter, appointed as ‘access street’.

**POTENTIAL STAKEHOLDERS**

| | |
|---|---|
| *key stakeholder* | Municipalities |
| *federal* | Ministério do Planejamento |
| *regional/state* | Secretaria Estadual de Logística e Transporte<br>RMBS - Região Metrololitana da Baixada Santista<br>COHAB - Companhia de Habitação |
| *city* | Santos: Secretaria de Desenvolvimento Urbano<br>Santos: Secretaria de Infraestrutura e Edificações<br>São Vicente: Secretaria de Desenvolvimento e Mobilidade Urbana |
| *neighborhood* | Local community |

# DEVELOP COHESIVE URBAN STRUCTURE

## Demonstration project: improving access to the waterfront

As concluded from spatial analysis, currently (01), the favela is closed of from the rest of the neighborhood, due to the serried constructions along the main-street, only providing access through small alleys.
In order to stimulate interaction between the favela and the neighborhood, and provide an opportunity for the development of public space along the waterfront, the favela may be opened up. This could be done by reorganizing some of the houses, in such a way the more open space is created. Images 02 and 03 illustrate what could be the effect of such an intervention.

*Actions to impement and potential stakeholders for local development:*

*Initiative: Municipality*

-improve accessibility of Vila Gilda and the waterfront (Municipality in consultation with local community)
-connect to existing urban structure (Municipal coordination)
-integrate with green-blue and public space network (Municipal coordination)
- provide temporary housing and relocate in situ (COHAB)
- develop the void (public or environmental) (local community and architect)

01

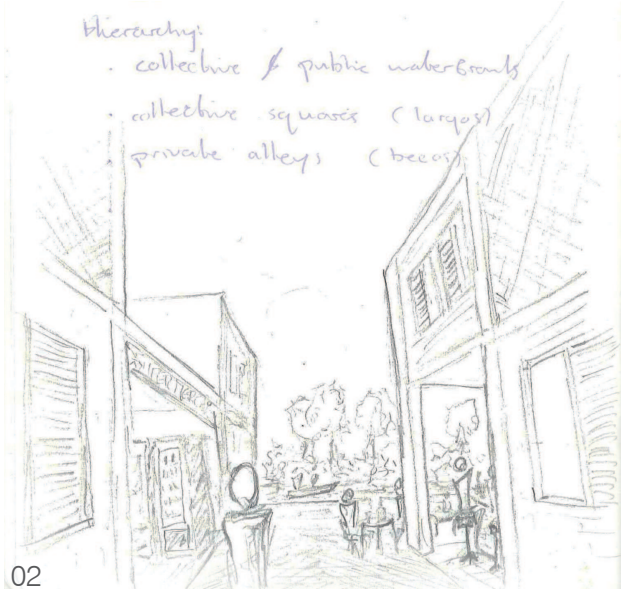
02

03

Images illustrating the effect of opening up the favela. Source: Authors own

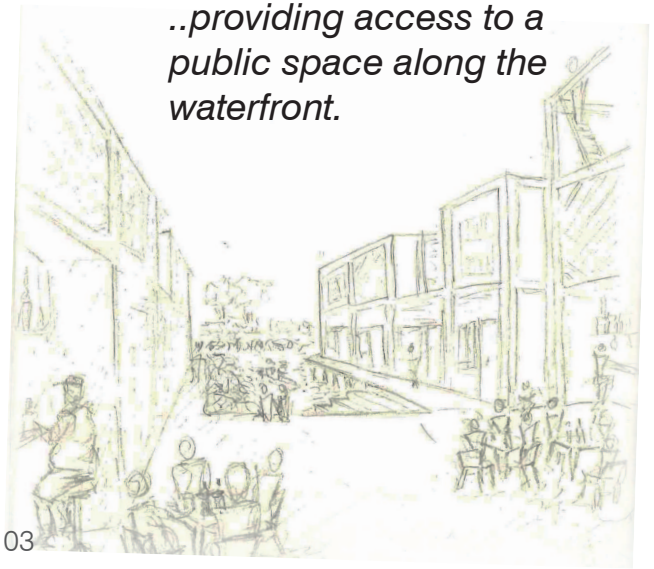

*Stimulating interaction between the neighborhood and the favela..*


01



02

*..providing access to a public space along the waterfront.*

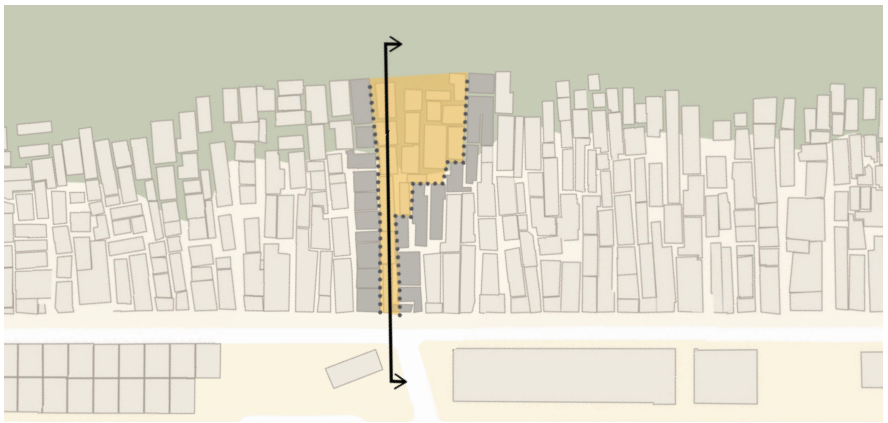

03

*..by reorganizing the houses and creating open space..*

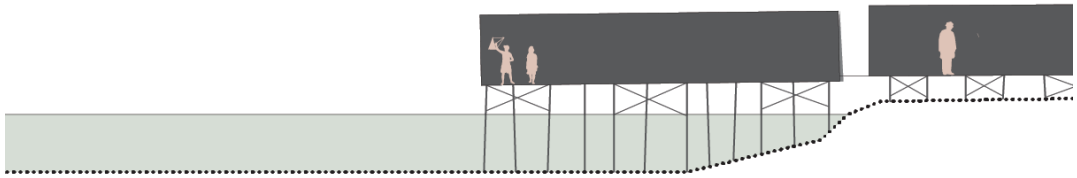
Sequence of drawings illustrating the effect of opening up the favela.
Source: Authors own

# DEVELOP COHESIVE URBAN STRUCTURE

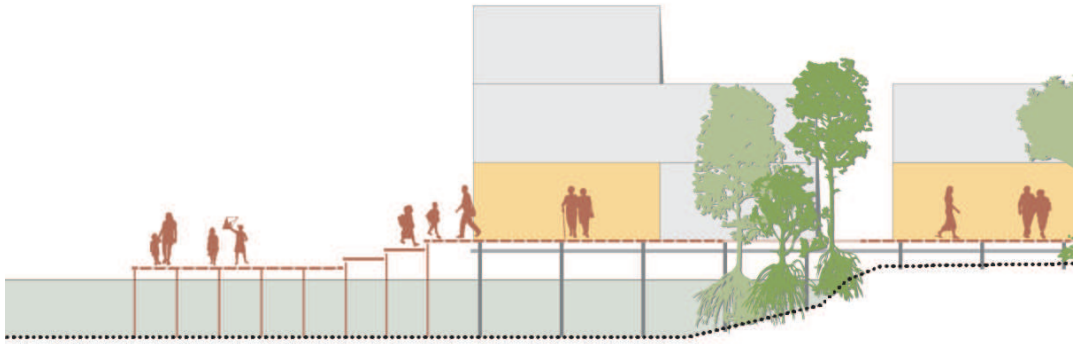
By reorganizing some of the houses, open space can be created.
Maintaining the same density, a void in the structure can be created by increasing the building height of the adjecent buildings.
In the next chapter, the rules for such a reorganization within the favela structure are elaborated.



*As most of Vila Gildas buildings have only one level..*



*..voids in the urban structure can be created by topping up some of the buildings..*



*..providing the opportunity for the development of public spaces.*


Sections illustrating the effect of opening up the favela. Source: Authors own

# LOCAL DEVELOPMENT OF VILA GILDA

## Local slum upgrading projects within the conditions set by the integrated strategic framework

*Objective*

By developing slum upgrading projects, favela Vila Gilda could gradually be transformed by with adequate and affordable housing, providing the basic infrastructure, space for production and environmental adaptation measures, all developed within the integrated strategic framework. In this way, an inclusive development of Vila Gilda in the neighborhood system could be achieved.

*Response to*

Providing an alternative for the commonly used approach for the upgrading of slums (in Brazil) has been the main aim of this project. Responding to the current replacement of the inhabitants of Vila Gilda to social housing blocks, which do not provide an adequate response to the actual problems, as concluded through literature research and analysis.
This is a problem not only encountered in Santos and São Vicente; for years the same kind of typologies are extensively repeated throughout Brazil, not meeting the necessities and specific conditions that popular Brazilian culture is calling for today. Therefore, we are urged to think of updated solutions for social housing.  (Nitin Bathla)
In Santos and São Vicente specifically, the problem stretches not only to the needs and conditions of the people and there culture, but the slums and the social housing projects also have a huge negative impact on the environmental conditions such as the water quality, biodiversity and flood risk. Therefore, the local response must consider environmental adaptation criteria as well as cultural and socio-economic values, all of which currently are not considered in the mainstream social housing developments. This could be regulated by setting guidelines for development in the integrated framework.

*Clarification of the vision map*

The vision map of the development of slum upgrading shows the houses of Vila Gilda which are eligible for slum upgrading developments. Based on the suggested locations of public access to the favela, stated in the urban structure layer, various clusters are defined. The exact boundaries of the clusters will need further analysis on location and this needs to be decided in consultation with the inhabitants. However, as this map illustrates, around each public access to the favela a cluster should be formed.
In red, the strategic development locations are appointed, which are locations with a high potential to develop as this is where proposed interventions from multiple layers could be integrated. In these clusters the slum upgrading could be co-developed with other interventinos, for example, a public space along the waterfront.


LEGEND scale: neighborhood
Integrated vision: co-development Vila Gilda
strategic location for development
proposed cluster boundary
proposed access to Vila Gilda
possible slum upgrading in Vila Gilda
buildings
water
source: authors own
N
0 m
200 m
400 m
600 m

*"A better living environment is key factor to social improvement. It is very essential for the informal settlement to have the basic infrastructures such as access to clean water, sewage, sanitation, electricity, garbage collection and communication. It is also essential to guarantee the good accessibility; the street and road network. More than that, the government would need to provide public facilities, such as the health, education and other social facilities, which are going to be the key to the social empowerment of the inhabitant." (D.Tunas, 2008)*

## Approach

*Guideline-based slum upgrading process*

The suggested slum upgrading approach, is a gradual development of Vila Gilda, based on certain guidlines in order to establish a good quality of each of the projects, while at the same time leaving the opportunity for each cluster to develop its own identity.

Of key importance in the slum upgrading process is to not only provide affordable housing, but also educate the residents on citizenship; being responsible for their environment. This could be stimulated by offering spaces for education and social facilities (1). Also, when developing housing, these must always be connected to the cities, electricity, water supply and sewer system (2). (Tunas, 2008)

Also, awareness for natural environments could be increased by providing public spaces along the waterfront. This could help in reducing the domestic waste pollution, as the solution for this problem has to come from the inhabitants themselves. In this way, the public space would not only be used as a place for leisure, but it could have an active role as educational center.

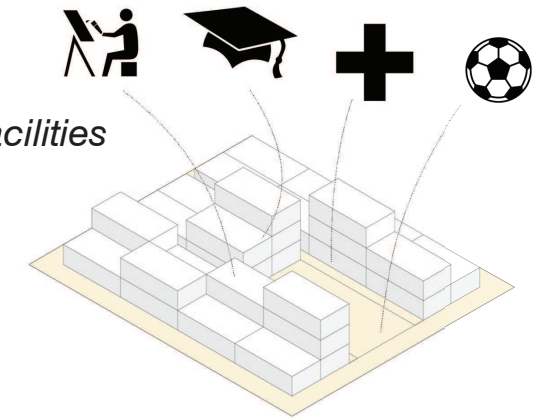
When developing a large amount of plots, it is favourable to mix different household typologies (3), but always provide the minumum space of 45m$^2$, which is the federal standard (4).

When relocation of households is needed for the development of and environmental or public space, it must always be the objective to relocate them in situ, preferably in the blocks adjecent to the space which directly stimulates the integral development of housing and public and environmental space(5). By doing this, social structures are being maintained and the affected household have the opportunity to profit from the new dynamics and interactions which are being stimulated by the space. By actively involving the households, as well as the surrounding community, they can develop a sense of responsibility for the space, increasing their willingness to maintain the space. (6)

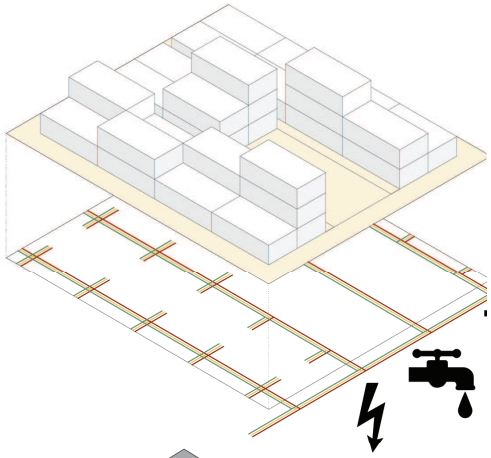
On the next pages these guidelines for the slum upgrading process are illustrated in conceptual diagrams.

# GENERAL GUIDELINES FOR SLUM UPGRADING

*(1) Provide public facilities to stimulate social empowerment*

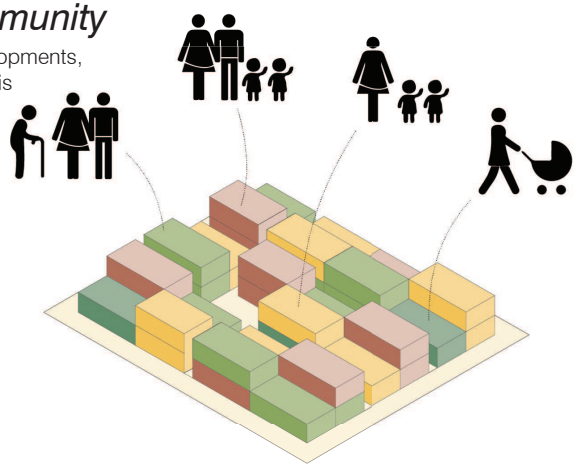


*(2) Improve the living environment by providing basic infrastructure*

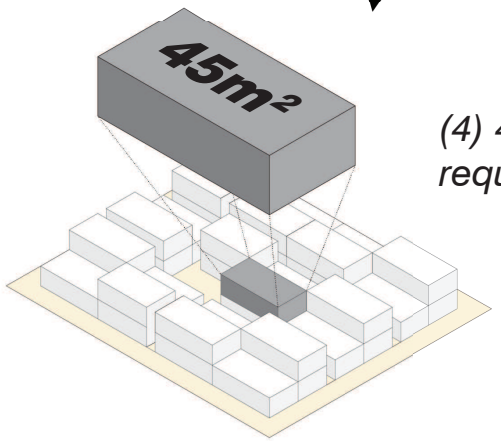


*(3) Mix household typologies for a more tolerant, cohesive and heterogenous community*

Only relevant on large scale developments, for example when a whole cluster is developed at once.

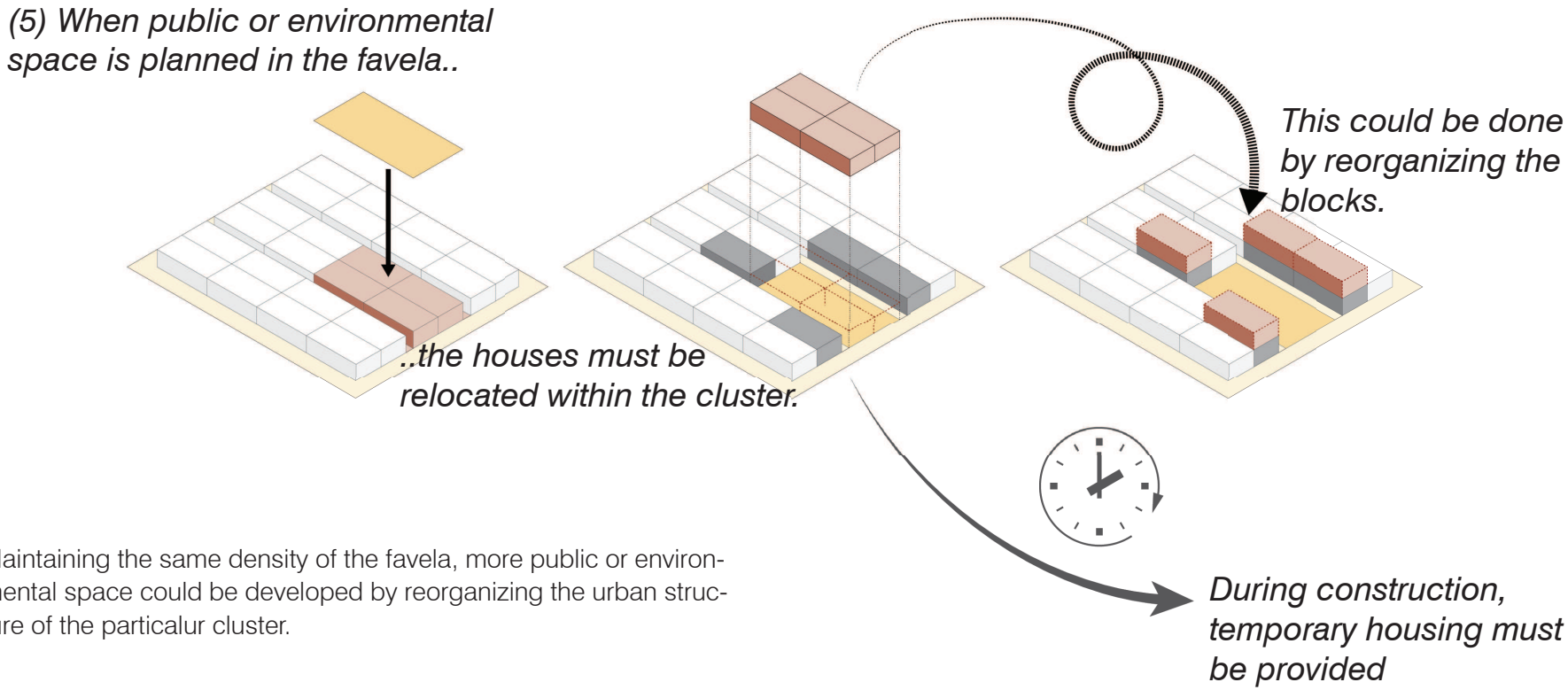


*(4) 45m² is the minimum required housing size*




Guidelines 1, 2, 3 and 4 (described on the previous page) to structure the slum upgrading developments.
Source: authors own.

# GENERAL GUIDELINES FOR SLUM UPGRADING

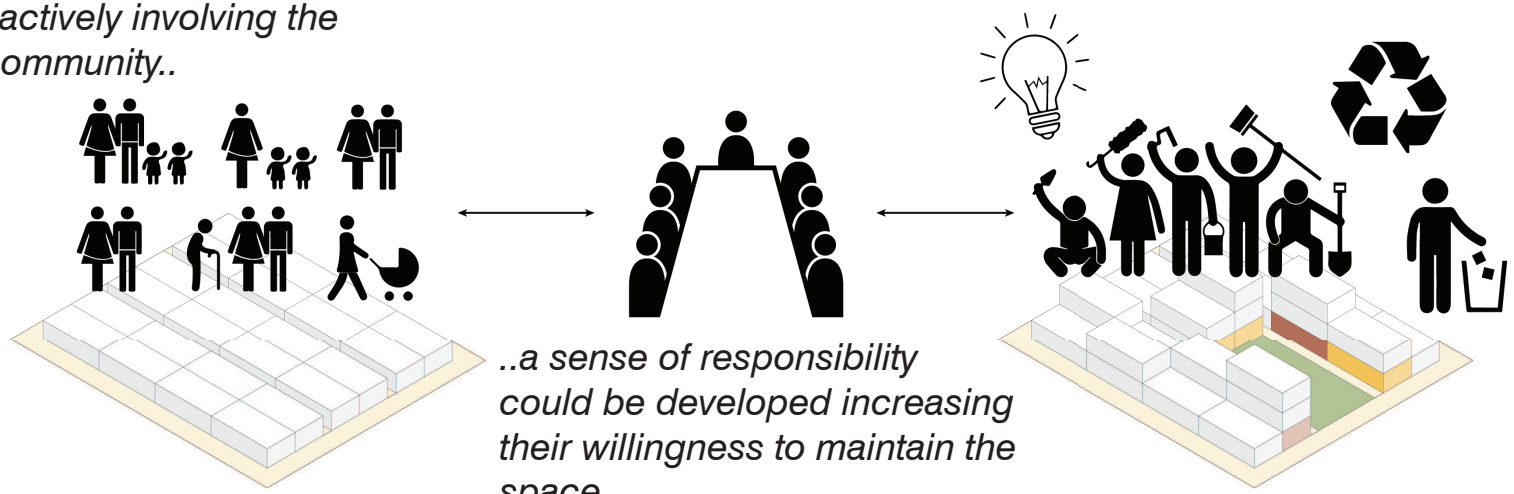



Maintaining the same density of the favela, more public or environmental space could be developed by reorganizing the urban structure of the particalur cluster.

Guidelines 5 (described earlier in this chapter) to structure the slum upgrading developments.
Source: authors own.

**“It becomes more than just a public space, it is an educational center where citizenship is practiced and green attitudes are taught.”** Hehl & Angélil (2012

*(6) By actively involving the local community..*



*..a sense of responsibility could be developed increasing their willingness to maintain the space.*

Guidelines 6 (described earlier in this chapter) to structure the slum upgrading developments.
Source: authors own.

## Operability

The conditions to which the developments need to confirm are set within the strategic framework. These are visible in the general map and the three related layers. On the basis of the proposed interventions in this strategic vision, clusters for the development of the favela can be defined. The formulation of clusters is desirable in order to facilitate and promote self-management of the community supported by technical and social teams. (Fabiano & Muniz)

Each particular cluster should be developed regarding the needs and opportunities which are present on this particular location. This requires further analysis on a small scale (cluster scale), as well as involvement of the community. Also, the development should allow for the proposed interventions in the strategic vision to be developed as well, in this way, the projects in Vila Gilda can be understood as a part of the developed networks in the whole neighborhood. (Janches lecture, 2015) In fact, it provides the opportunity involve multiple stakeholders to the slum upgrading projects by co-developing them together with the proposed environmental adaptation, public space and urban structure interventions. This could generate more money, engagement and eventually a higher quality environment.

## Catalog of urban guidelines

In order to maintain the basic quality of the projects, a catalog of urban guidelines to regulate the development of the urban structure have been set up, apart from the general guidelines illustrated on the previous pages.

This catalog of urban guidelines provides a framework of rules and suggestions highlighting certain qualities that are important for the urban plan. Rather than designing each urban plan, it sets rules for future urban interventions, and leave room for each cluster to to develop an own identity, for example based on the cultural assets and social structure of the particular cluster.

The guidelines can be divided in the categories of urban structure, socio-economic network and environmental system:

- building height
- street size & pavement
- permeability
- functions
- waste collection
- rain water collection
- grey water filtration
- vegetation

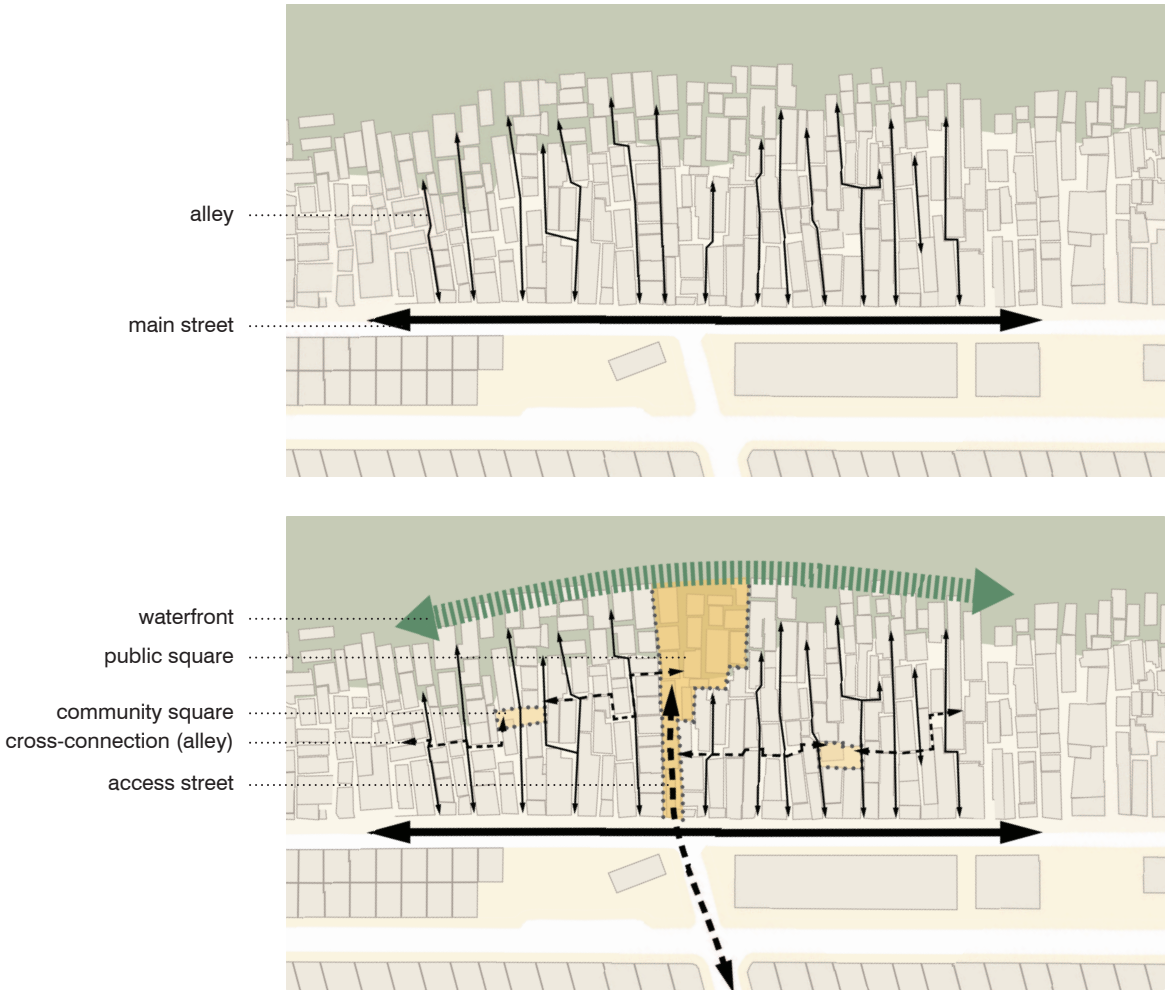
Through analysis on the local scale, different street typologies in favela Vila Gilda have been recognized: the **main street** and the alleys. As slum upgrading developments need to respect the existing, which is one of the rules of development within the integraed strategic framework, different guidelines have been set up for both of these typologies to maintain thee characteristics.

Also, new street typologies are being proposed in order to improve the integration of Vila Gilda in the neighborhood

structure. These are the access street, the public square, the community square, and the waterfront.

By implementing these typologies in the favela, it will become more accessible, the transition between public and private will be better defined and it could make use of its waterfront. Each of the typologies could facilitate the activation of surrounding spaces and stimulate the creation of centers and subcenters including Vila Gilda in the neighborhood system.

The maps on the right illustrate how these typologies could be configurated in a particular section of Vila Gilda. On the next 4 pages, the catalog of urban guidelines is presented.

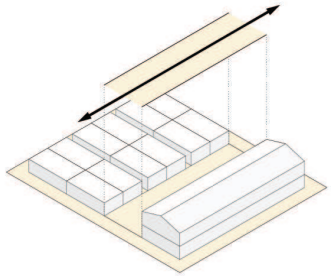


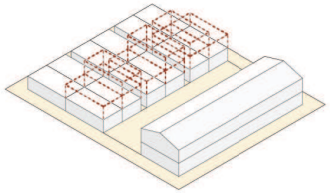

**Top**: existing urban structure of a section of Vila Gilda. No use of the waterfront, lack of accessibility in to Vila Gilda, strong segregation between public and private streets, no public squares.
**Bottom**: proposed urban structure for a section of Vila Gilda. Use of the waterfront, improved acces to Vila Gilda, improved transition between public and private streets, public squares.
Source: Authors own.

# CATALOG OF URBAN GUIDELINES

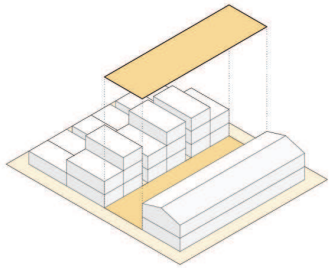
| identification | building height | street size&pavement | permeability |
|---|---|---|---|

## MAIN STREET

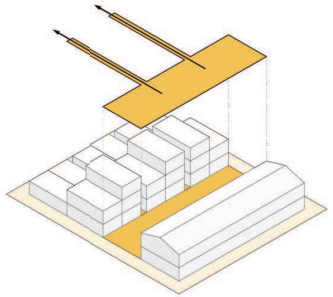




The buildings may have one floor, no more than 50% of the buildings may have two floors.

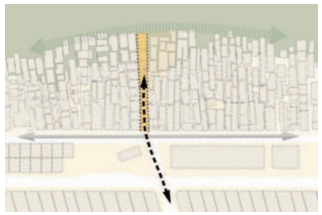


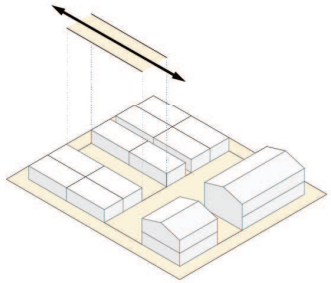
**Width**: use existing building line.
**Pavement**: existing pavement may be used.

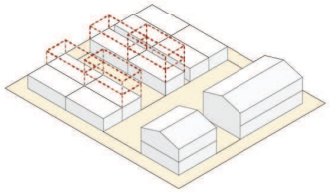


Main street connects to alleys providing access to the favela.

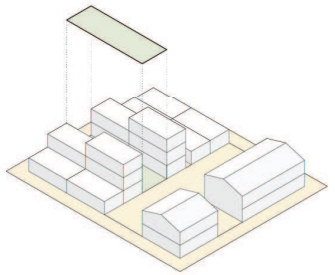
## ACCESS STREET



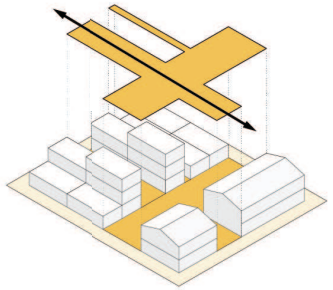




The buildings may have one floor, Only the buildings on the corners may have two floors.

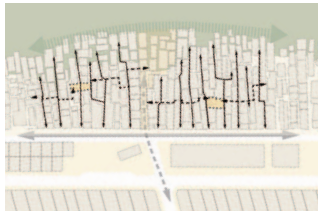


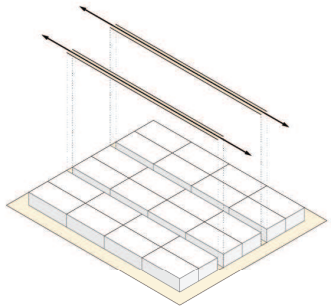
**Width**: to be determined locally.
**Pavement**: the material must be permeable.

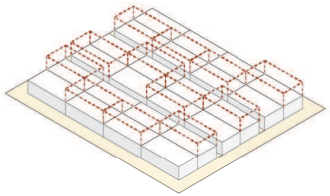


Access streets to the favela, as alternatives for the alleys, can stimulate the integration in the neighborhood.

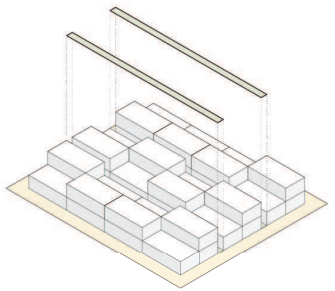
## ALLEYS & COMMUNITY SQUARE



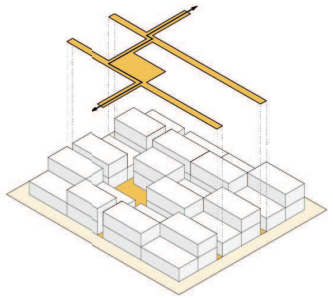




No more than 50% percent of the buildings may have one floor.



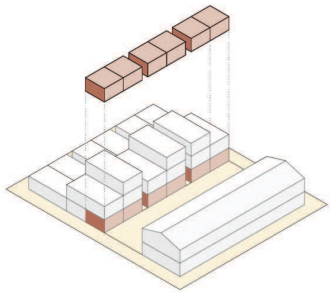
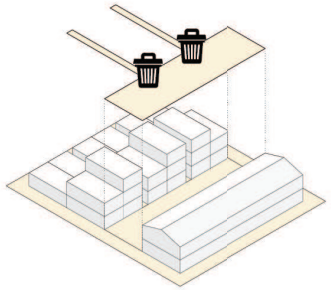
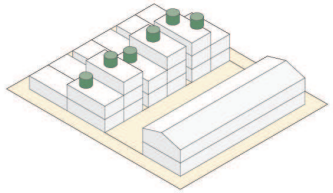
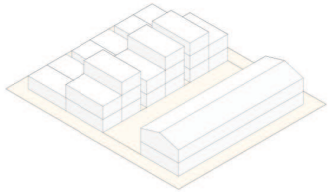
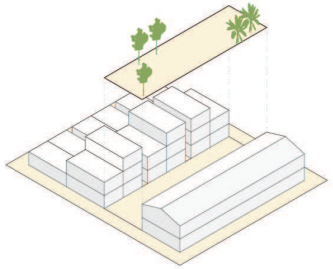
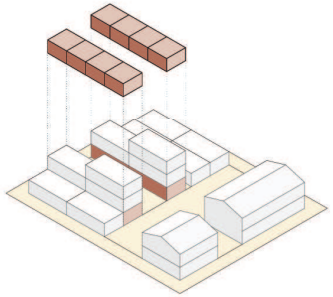
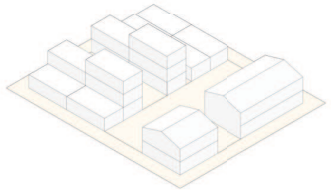
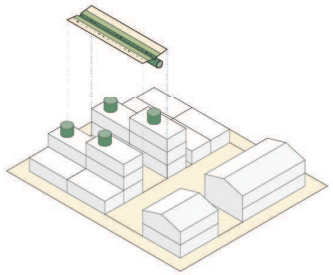
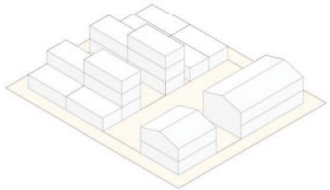
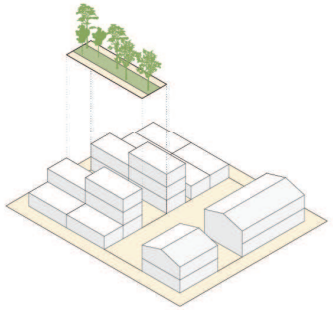
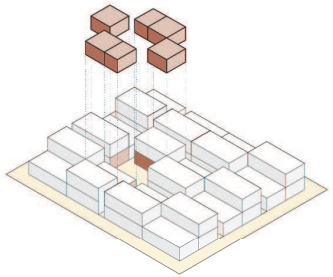
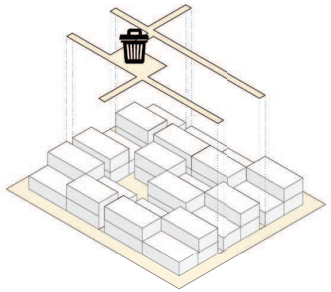
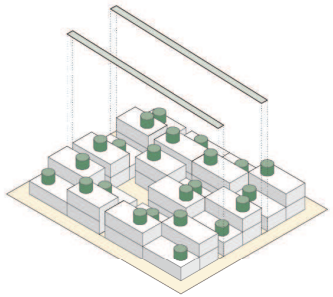
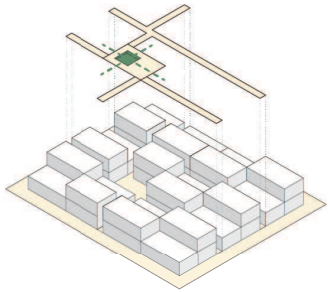
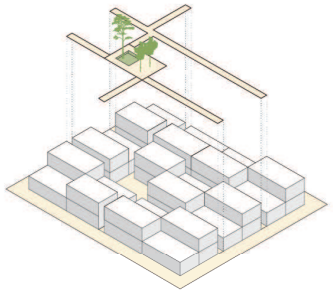
**Width**: to be determined locally.
**Pavement**: the material must be permeable.



Cross-passage ways and community squares between the alleys can stimulate activation of spaces in the favela



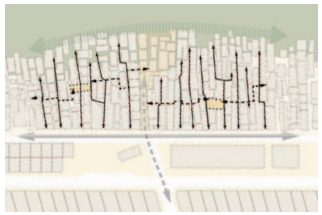
Source: authors own

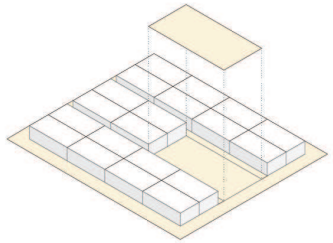
| functions | waste collection | rain water collection | grey water filtration | vegetation |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| To be determined in consultation with the local community. | Currently, the main street is used for waste collection by some inhabitants. | Rain water collection tanks may be installed on the buildings. | | Currently, the main street is the only place in the favela which has vegetation. |
|  |  |  |  |  |
| To be determined in consultation with the local community. | | Rain water collection tanks may be installed on the buildings. A canal for collective rain water collection may be installed in the street. | | The access street must be planted with vegetation. |
|  |  |  |  |  |
| To be determined in consultation with the local community. | Community squares may be used for waste collection. | Rain water collection tanks may be installed on the buildings. | Community squares may be used for collective grey water filtration. | Community squares may be planted with vegetation. |

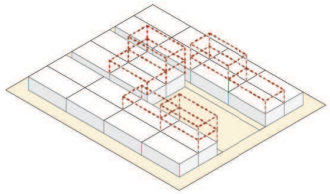
# CATALOG OF URBAN GUIDELINES

| identification | building height | street size&pavement | permeability |
|---|---|---|---|

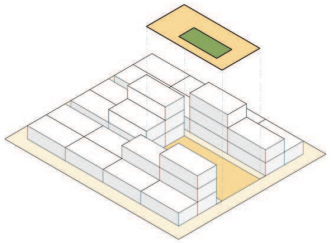
## PUBLIC SQUARE



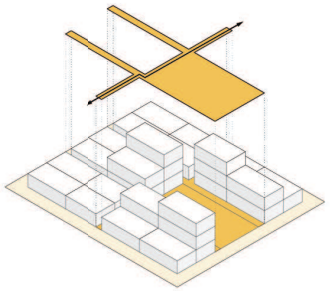




The buildings may have one floor, no more than 50% of the buildings may have two floors.

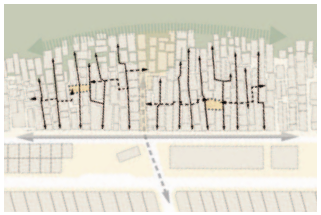


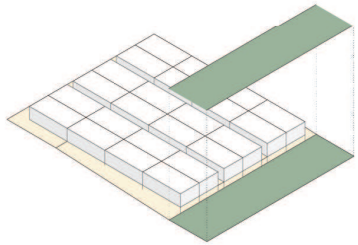
**Area**: min 100m2.
**Pavement**: to be determined locally. At least 20% must be green/blue surface

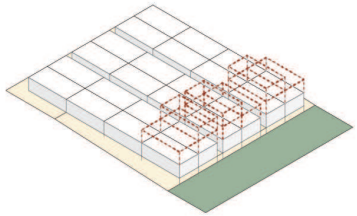


Cross-passage ways connecting the public space can stimulate its activation.

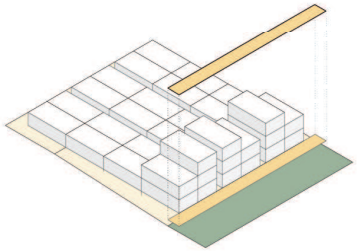
## WATERFRONT



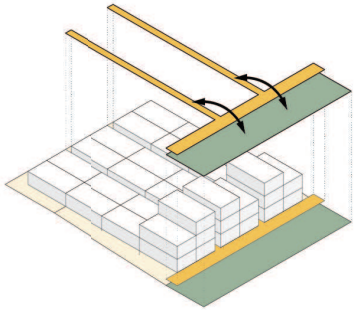




The buildings may have one floor, no more than 50% of the buildings may have two floors.



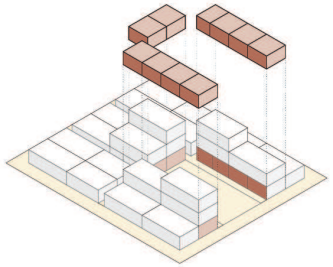
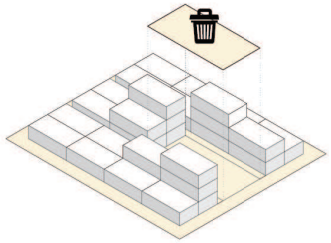
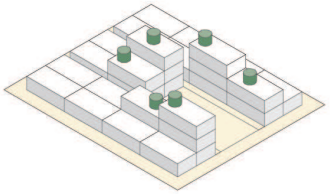
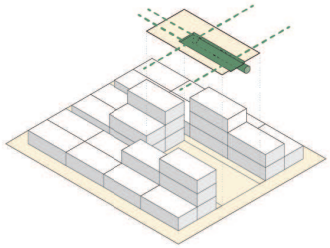
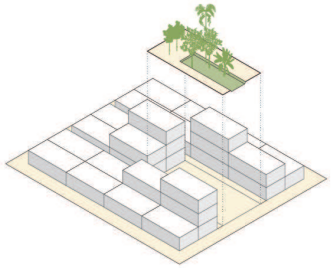
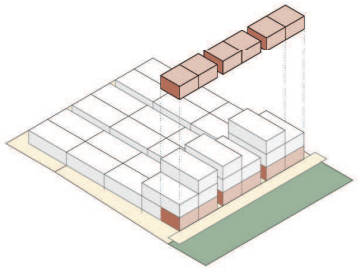
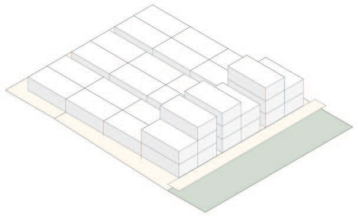
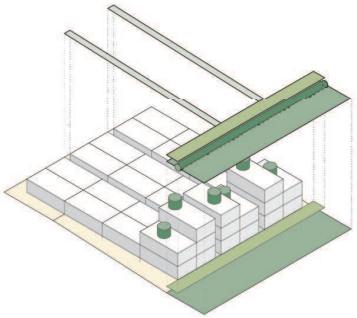
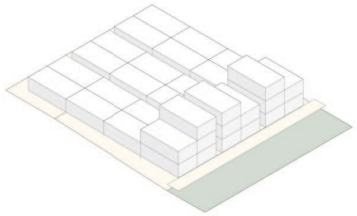
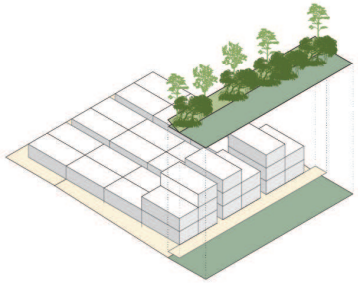
**Area**: to be determined locally.
**Pavement**: to be determined locally.



Access to the waterfront can stimulate the integration of the favela in the neighborhood. The relation waterfront - urban structure has to be determined locally.



Source: authors own

| functions | waste collection | rain water collection | grey water filtration | vegetation |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| To be determined in consultation with the local community. | Public squares may be used for waste collection. | Rain water collection tanks may be installed on the buildings. | Public squares may be used for collective grey water filtration. | Public squares must be planted with vegetation. |
|  |  |  |  |  |
| To be determined in consultation with the local community. | | Rain water collection tanks may be installed on the buildings. A canal for collective rain water collection may be installed along the waterfront | | The waterfront must be planted with vegetation. |

# DEVELOPMENT PROCESS OF LOCAL INTERVENTION

## Development from first initiative to local development, within the integrated strategic framework

On the right page, an overview is presented about what need to be taken into account when a certain stakeholder is taking initiative to develop a project in Vila Gilda.

The initiative could come from several stakeholders, and could be a proposal for a morphological, environmental, social housing or socio-economic intervention or a combination. The development of the particular intervention should start by consulting the integrated strategic vision and the general guidlines for slum upgrading, to check to what condition the project needs to confirm, and what the opportunities are to integrate the project with local interventions that are suggested within the integrated vision.

When the local opportunities and conditions have been discovered, the particular stakeholder should integrate with other stakeholders that are related to these opportunities and conditions. Which will be the key stakeholders that also contributed to the formulation of the integrated strategic framework: the Municipalities, Santos Novos Tempos, COHAB and the local community.

The initiating stakeholder and at least one of the other key stakeholders (and always the local community) must set up a local management team. This team, will coordinate the local integrated development.

The management team must organize a public session, in order to inform and involve the broad public. This links to the *Estatuto da Cidade*, a Brazilian legislation formulated in 2001, stating that all urban planning processes must be participatory (Huijding, 2013). Then, based on the conclusions from the public session and the diverse key stakeholder goals an integrated urban plan must be developed, confirming to the general and urban guidelines for slum upgrading development, which have been set in the integrated strategic framework.

Using this plan, a participatory strategic plan must be set up, defining the phasing and the tasks of the key stakeholders and the broad public.

Then, coordinated by the local management team, the implementation of the local intervention can start.

By monitoring and evaluating the project, recommendations for the integrated strategic framework can be provided. For example recommendations for changes in the sets of guidelines. Also, the integrated strategic vision must be updated constantly, by integrating the completed projects in the maps and documents.
In this way, the integrated framework will be constantly improved, by learning from earlier implementation processes.

## initiative for local intervention

**initiating stakeholder**

Morphological
Environmental
Social housing
Socio-economic

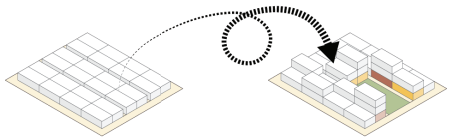
## integrated strategic framework

coordinated by Municipality

**consult integrated vision**

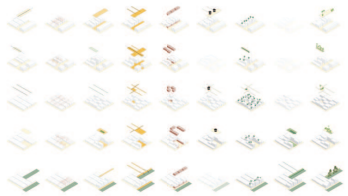
conditions
&
opportunities

**consult general guidelines for slum upgrading**



**integrate with key stakeholders**
setting op local management team

**confirm to catalog of urban guidelines**

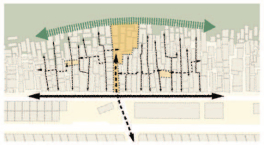


## local integrated development

coordinated by local management team

**public session**
informing and involving broad public

**develop integrated urban plan**



integrating diverse goals
exploiting potential of location

**set up participary strategic plan**
defining tasks and phasing

**implement, monitor and evaluate**

*Estatuto da Cidade*: participatory process

Source: authors own

# Part 05.2 / DEMONSTRATION PROJECT
## SLUM DEVELOPMENT WITHIN THE INTERATED STRATEGIC FRAMEWORK

The previous chapter ended with the description of the development process of a local intervention, from the initative towards the implementation and monitoring.

On the next pages a demonstration project will be presented, bringing in practice the various steps that were described in the previous chapter. Through the demonstration project, the various relations between the integrated vision, the guidelines, the stakeholders, the broad public and the local urban and strategic plan will be clarified.

The project aims to show how the opportunity of a particular location can be exploited by making various stakeholders work together within the integrated framework.

CONTENT

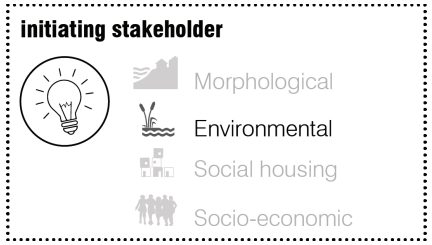
## Demonstration project

Initiating stakeholder
Consult integrated vision & consult general guidelines for slum upgrading
Integrate with key stakeholders
Public session, develop integrated urban plan & confirm to catalog of urban guidelines
Set up participatory stratgic plan
Implement, monitor and evaluate

# DEMONSTRATION PROJECT

## Development of a Santos Novos Tempos initiative within the integrated strategic framework

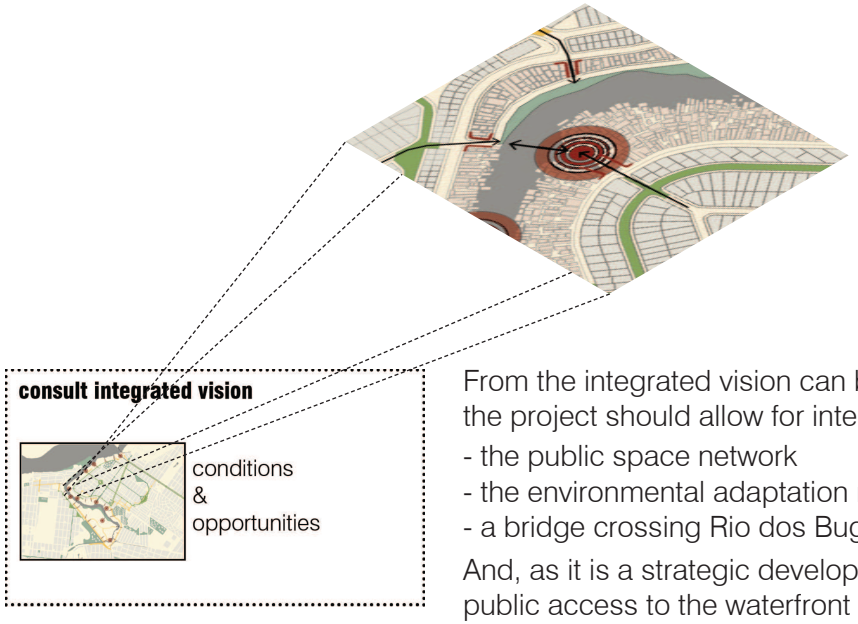
On the location of the images on the right, Santos Novos Tempos draining program is proposing a pumping station. The local residents have been relocated to social housing compounds elsewhere in the city.
By only construction a pumping station, many opportunities are lost on this particular site.
This demonstration project will illustrate how the full potential of the site could be exploited by developing it within the integrated framework, following the steps described in the chapter 'DEVELOPMENT PROCESS OF LOCAL INTERVENTION'.




*Santos Novos Tempos is the initiator of the project. On the next pages the process for the integrated development of the pumping station will be illustrated.*

Source: Google Earth

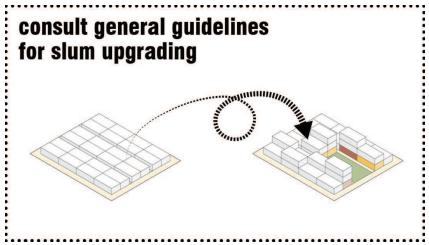
*Santos Novos Tempos consults the integrated strategic vision and the general guidelines for developing in slum area, in order to explore the conditions and opportunities on this particular location.*




From the integrated vision can be concluded that the project should allow for integration with:

- the public space network
- the environmental adaptation network
- a bridge crossing Rio dos Bugres

And, as it is a strategic development location, public access to the waterfront must be provided




The relevant guidelines are:

- provide public facilities
- relocate households within cluster
- provide basic infrastructure
- involve local community
- 45m$^2$ is the minimum housing size
- provide temporary housing

*Having recognized the conditions and opportunities for an integrated development of the pumping station, Santos Novos Tempos will set up a management team by integrating with key stakeholders, related to the encountered conditions and opportunities.*

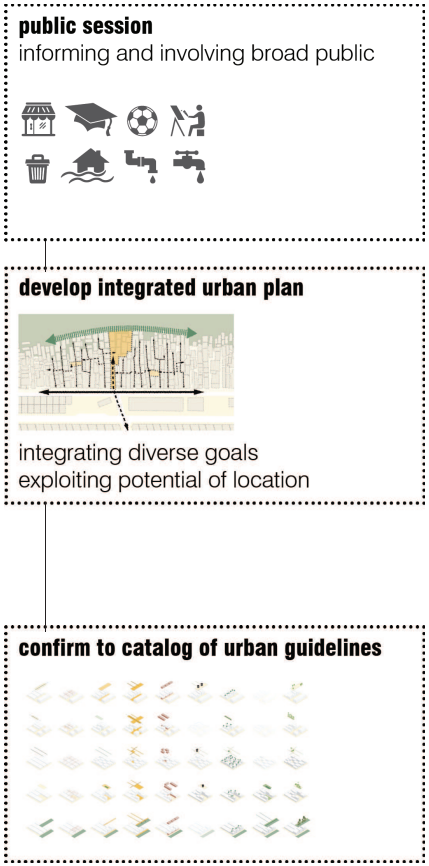
**integrate with key stakeholders**
setting op local management team

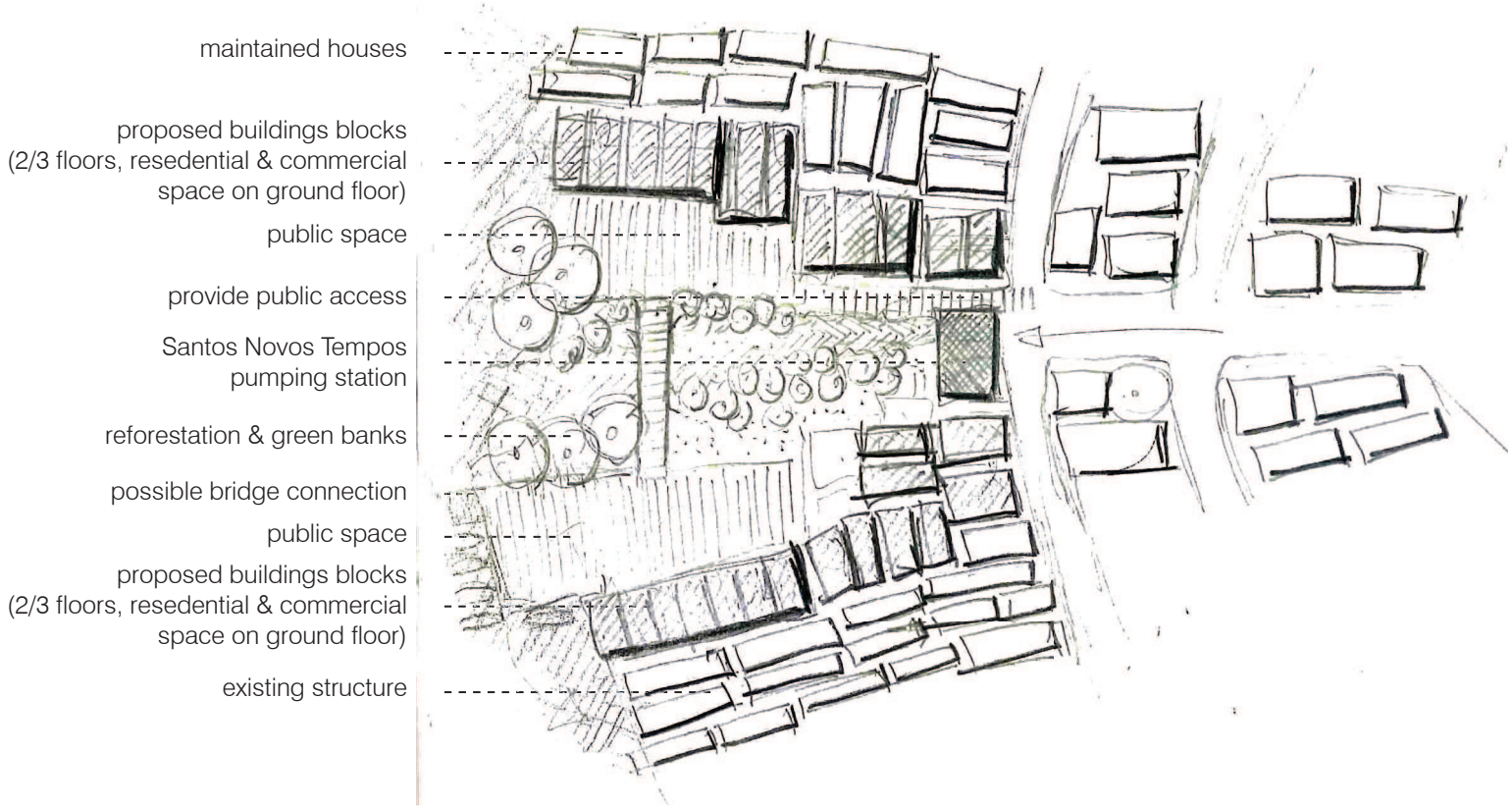
The management team will exist of:
Santos Novos Tempos,
Municipality of Santos,
Ambienta
and representatives of the local community.

In this case, Ambienta is preferred above COHAB and CDHU, thanks to their participatory approach stimulating self management, providing a better opportunity for developing a lively area, which this location could use as a strategic development location.

| CONDITIONS AND OPPORTUNITIES | RELATED STAKEHOLDERS (key stakeholders in black) |
|---|---|
| - integrate with the public space network | - **Municipality of Santos** |
| - integrate with environmental adaptation network | - **Santos Novos Tempos** / CETESB / Eco Faxina |
| - a bridge crossing Rio dos Bugres | - Municipalities (both São Vicente and Santos) |
| - public access to the waterfront must be provided | - Municipality & housing developer (COHAB / CDHU / Ambienta) |
| - provide public facilities | - Municipality of Santos |
| - relocate households within cluster | - Housing developer (COHAB / CDHU / **Ambienta**) |
| - provide basic infrastructure | - SABESP |
| - involve local community | - **Local community representative** |
| - 45m$^2$ is the minimum housing size | - Housing developer (COHAB / CDHU / Ambienta) |
| - provide temporary housing | - Housing developer (COHAB / CDHU / Ambienta) |

*The management team then organizes a public session where the broad public will be informed and involved. Based on the public session and confirming to the urban guidelines (set in the integrated strategic framework), the management team develops an integrated urban plan.*



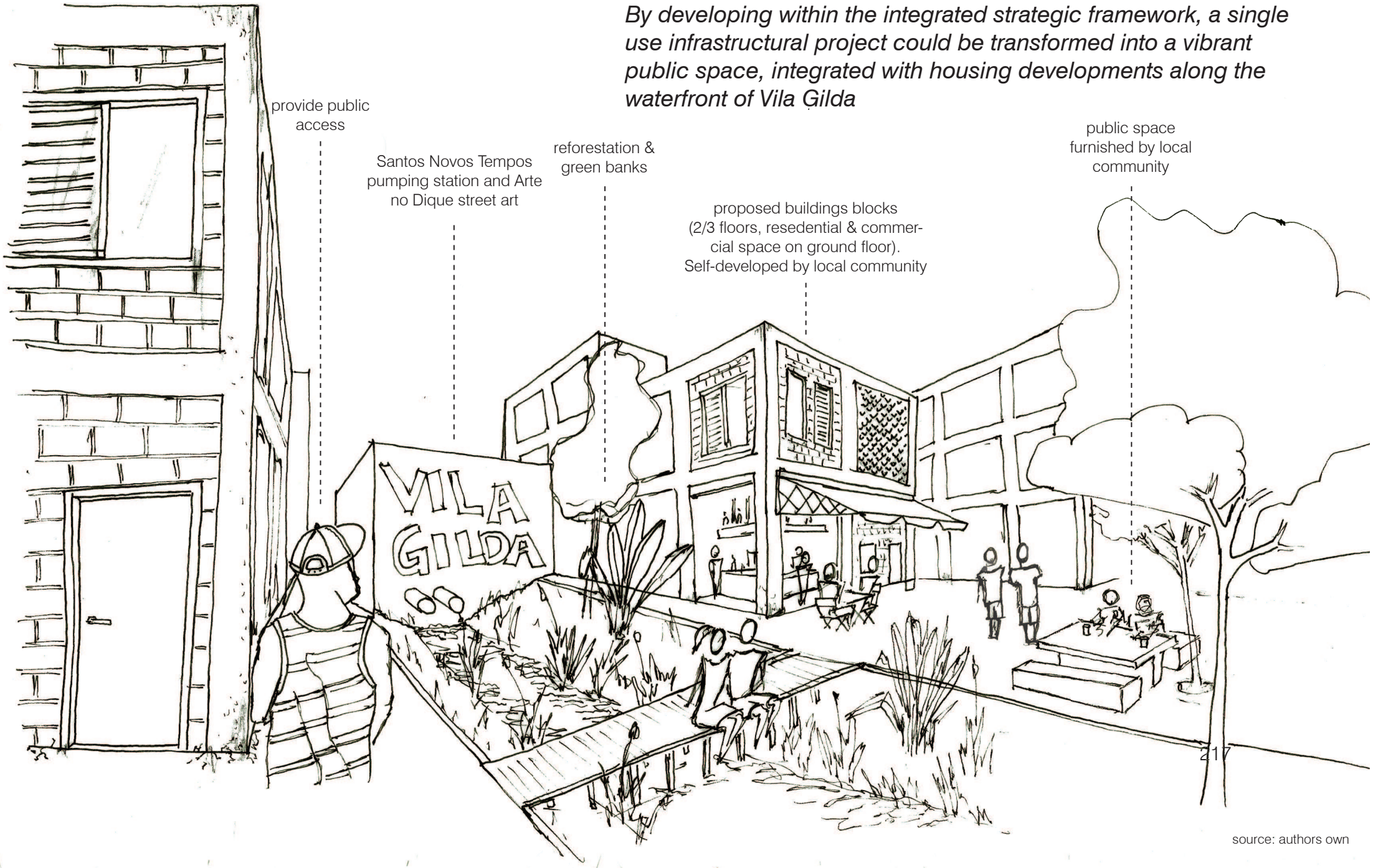




source: authors own

*After the design of the urban plan, a local strategic development plan is set up in which the phasing and the tasks of all the involved stakeholders are defined.*


| COMPONENT | ACTION | STAKEHOLDERS | PHASE |
|---|---|---|---|
| *environment* | construct pumping station | Santos Novos Tempos | I |
| | connect to draining system | Santos Novos Tempos | I |
| | clear banks | CETESB + Eco Faxina | II |
| | treat soil | CETESB | III |
| | plant vegetation | CETESB + Eco Faxina + local community | VI |
| *housing* | design process | Ambienta + local community | I |
| | temporary housing | Municipality (COHAB) | I |
| | demolish existing housing | Local community + technical assistance | II |
| | connect plots to sanitation network | SABESP | III |
| | construct new housing blocks | Local community + technical assistance | IV |
| *public space* | design process | Ambienta + local community | I |
| | pave street | Municipality + local community | V |
| | construct street furnishing | Municipality + local community | VI |
| | construct street lighting | Municipality + local community | VI |
| | public art | Arte no Dique + local community | VI |

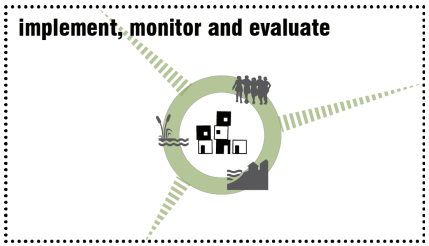
*By developing within the integrated strategic framework, a single use infrastructural project could be transformed into a vibrant public space, integrated with housing developments along the waterfront of Vila Gilda*






source: authors own

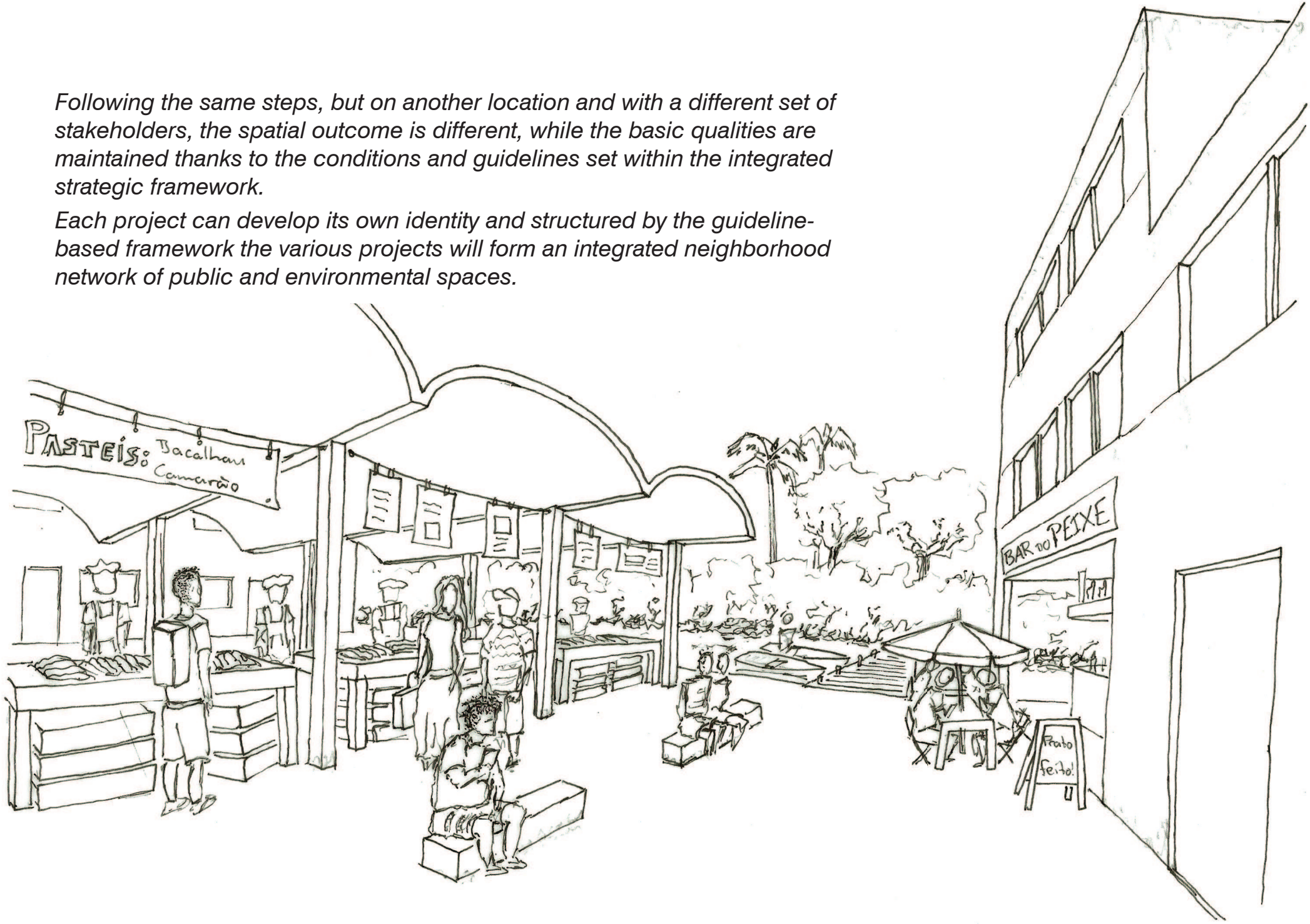
*Already during the development, the management team  is monitoring and evaluating the process, and giving feedback to the Municipality, the coordinator of the integrated strategic framework, in order to gradually improve the conditions and guidelines for developement.*




During the process of this particular project, the development of an urban plan around Santos Novos Tempos' pumping station, the catalog of urban guidelines have been reshaped. As this was the first project where the guidelines were put into practice, they needed to be adjusted some times.
Also, during the process of this test case it was encountered that a local management team, incuding the local community is essential for the operability of the projects. This initially was not included in the guidelines and the development process diagram.
Important for the project will be to monitor the maintenance of the space and housing blocks, as this usually is one of the problems in the evolution of slum upgrading projects. The assumption is that in this case, the engagement of the local community in the process can give them a sense of pride and responsibility through which the continiued existence of the public space will be ensured.

*Following the same steps, but on another location and with a different set of stakeholders, the spatial outcome is different, while the basic qualities are maintained thanks to the conditions and guidelines set within the integrated strategic framework.*

*Each project can develop its own identity and structured by the guideline-based framework the various projects will form an integrated neighborhood network of public and environmental spaces.*



# REFLECTION
## PROCESS

Essential in the development process of this project was the transition of abstract diagrams, incorporating lots of information acquired through research, into drawings. Through the whole project, from the regional scale analysis, towards the local scale interventions, drawing was the key for progress, in order to understand the complexity of the diagrams, to be able to communicate and to test and determine decisions.

# PROJECT

The most challenging part of the project was the formulation of the integrated strategic framework on the basis of stakeholder and socio-spatial analysis, which was the actual objective of the project.

The resulting framework has a clear structure and attempts to leave freedom for a local development, while setting conditions and guidelines in order to maintain the larger scale organization.

These conditions and guidelines will need to be evaluated constantly when developing projects within the framework. Through testing out diferent possibilities,  (as with drawing) problems and opportunities will arise which then need to be refleced in the framework, in order to improve the development of future projects.

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# INTERVIEWS

André Neumann, Instituto do Mar

Fabiola, inhabitant Vila Sapo

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Marcos Boldarini, Boldarini Arquitetos

Paulo Alas, Ministério das Cidades

Rafael Ambrosio, Ambienta

Regina del Cista, Companhia de Habitação da Baixada Santista

Renato Guimarães Pereira, Companhia de Desenvolvimento Habitacional e Urbano

Samara, inhabitant VanGuarda

# APPENDIX I: TESTING THE INFRASTRUCTURE WALL

## The infrastructure wall archetype could be used as a tool for the incremental development of housing, within the integrated strategic framework

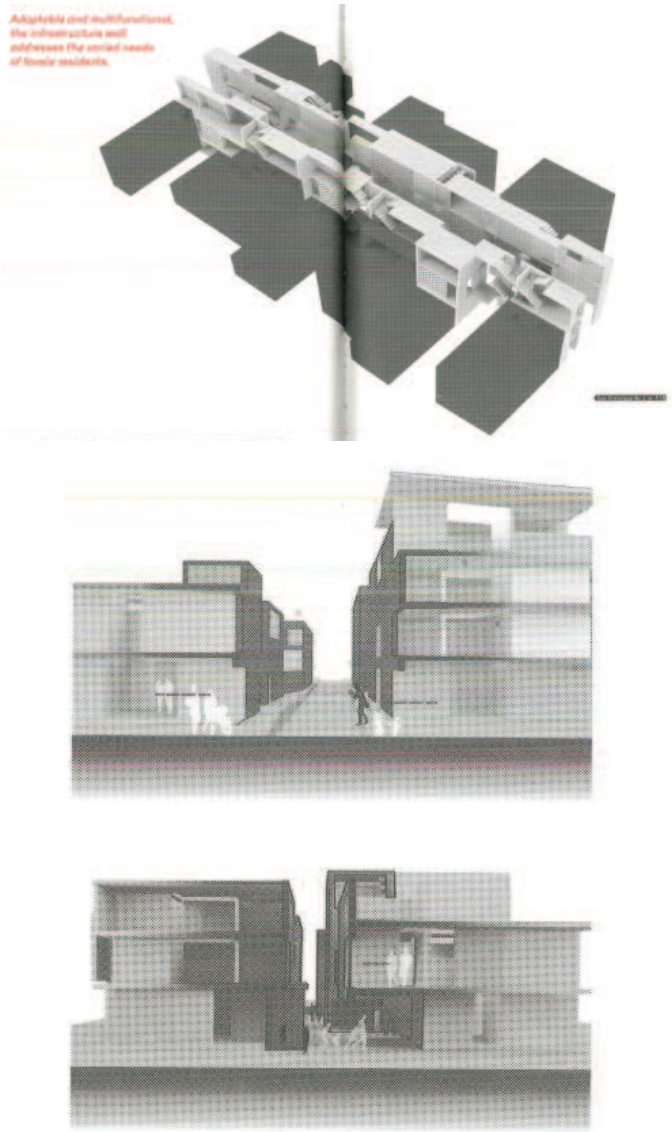
This study aims to test how the infrastructure wall (Hehl & Angélil), could be used as one of the methods for  the flexible development of Vila Gilda.

By taking the COHAB unit standard of about 50m2, the study explored how many units would fit on the same surface as the favela, and what are the possibilities for facilitating functions, public space, hierarchy and environmental measures.

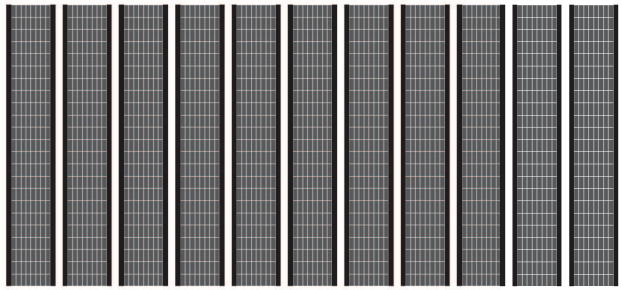
The infrastructure wall could be an architectural model to implement in the slum upgrading developments, however it could also be another model or method.

Important though is, that each development should only be initiated after consulting the local community and carefully studying the particular characteristics of each cluster. Then, a proper model for development could be imlemented, within the rules and conditions of the strategic framework.

In this study this has not been done, as this is only an abstract exploration of the possibilities.



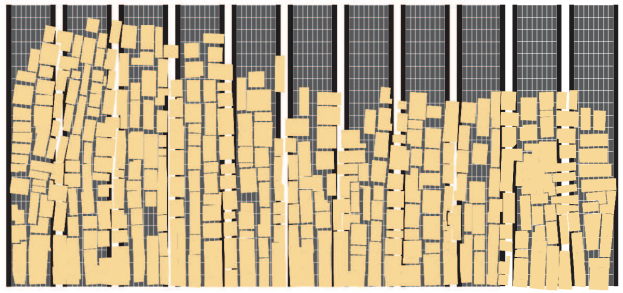
infrastructure-wall test grid



infrastructure-wall unit

**440** housing units (COHAB-standard: 50m2)

fit grid to favela

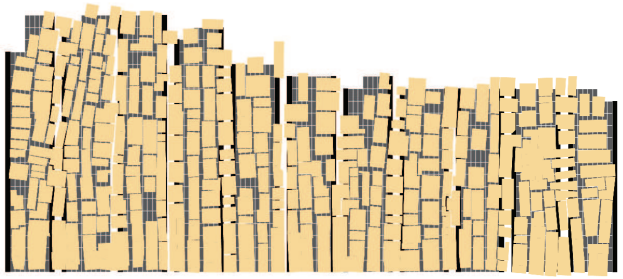


favela structure

infrastructure-wall unit

**370** housing units in favela

fit grid to favela

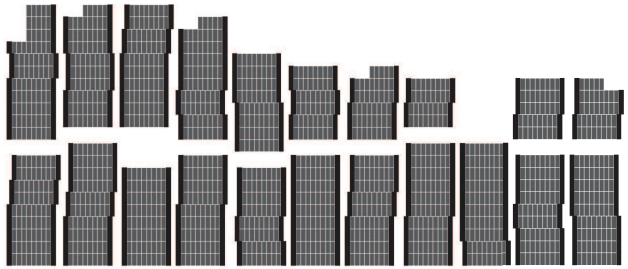


favela structure

infrastructure-wall unit

**377** housing units

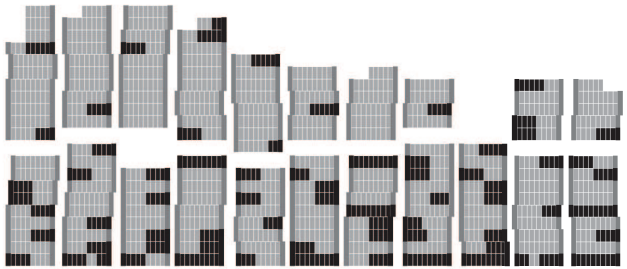
provide public space



infrastructure-wall unit

**345** housing units

## building height



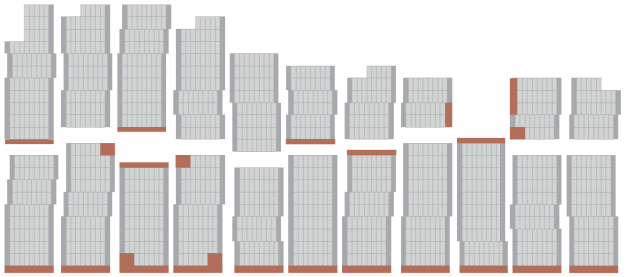
one-floor buildings

two-floor buildings

**345** housing units

**+ 70**

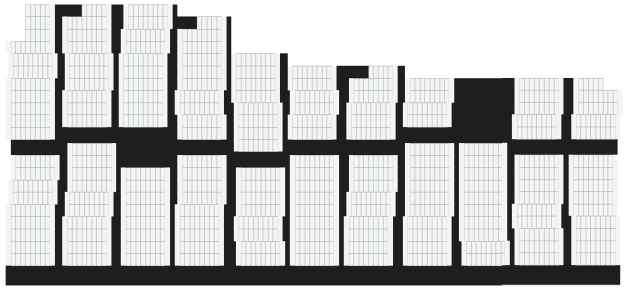
## functions



resedential

commercial

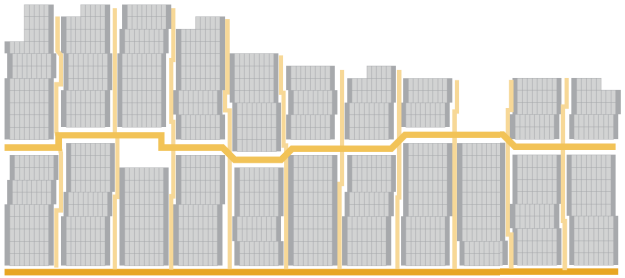
## open space



built structure

open space

## routing

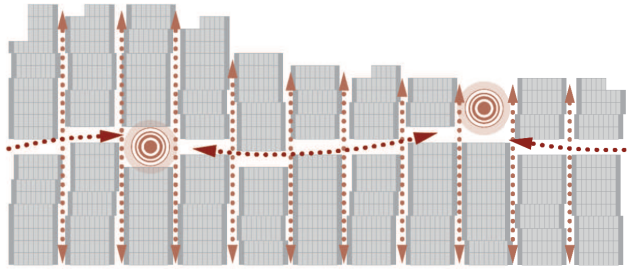


public

collective

private

## clusters

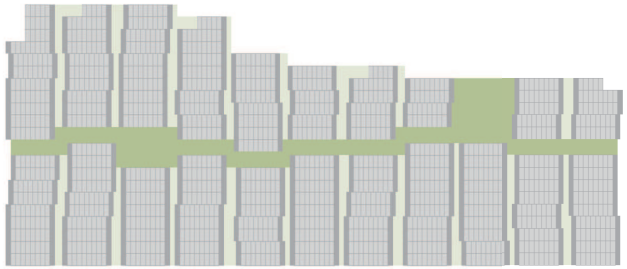


community node

collective social structure

private social structure

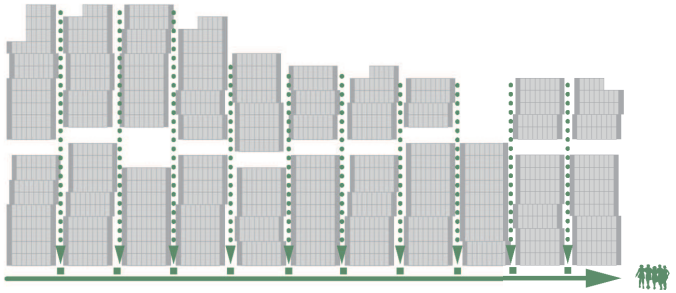
## green structure



space for green structure

commercial

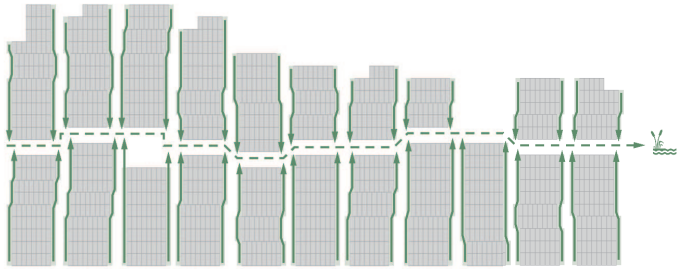
## waste collection



local waste collection

cluster waste collection

## water discharge



grey water cluster discharge

grey water local discharge