Integrated
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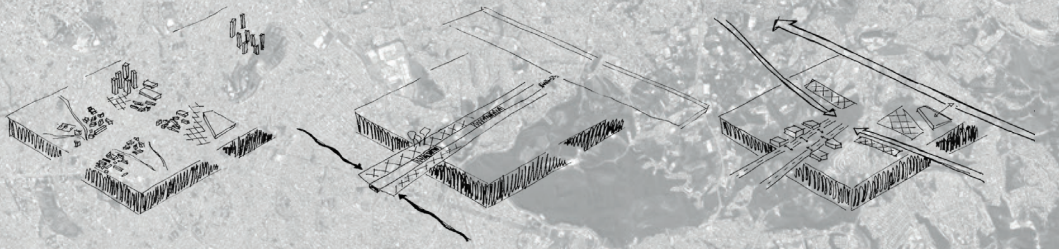
Infrastructure

The local dimension of metropolitan mobility systems in São Paulo:
An exploration of the planning and design of sustainable nodes of mobility and their impact on local spatial qualities.



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TU Delft Explore Lab
Research Report

Graduation Research
TU Delft Explore Lab Studio

Supervision
Ir. H.A. van Bennekom (Architecture)
R.C. Rocco de Campos Pereira (Research)
Ir. J.A. van de Voort (Building technology)
Student
M.C. Kempenaar

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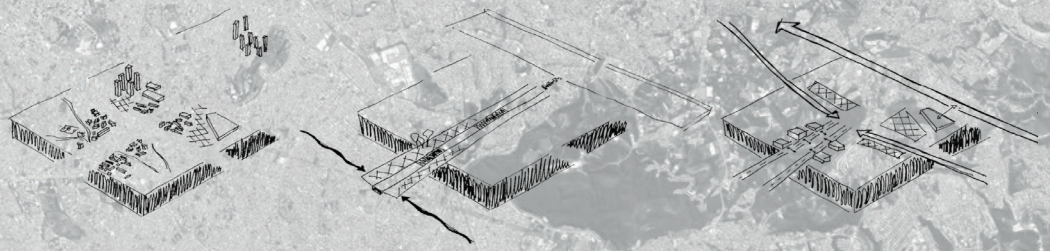

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Content

PART A - LITERATURE REVIEW

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#1
Introduction:
São Paulo, A city of production.

1.1 São Paulo, A city of production.

Does São Paulo work?
Fernando de Mello Franco starts his explanation about the city of São Paulo with a simple statistic: '20 million people inhabit the metropolitan area of São Paulo, this is 10% of the total amount of inhabitants, close to 200 million, of Brazil. São Paulo occupies 0,009% of the Brazilian territory and on this area produces 17% of the national GDP, which with 170 billion dollars is one of the top 10 GDP's of the world.' (Franco 2011)
Yes, São Paulo does work.

But the question is less simple, because whom does it work for? It clearly does not work for the almost 3 million people, out of a total of almost 11 million municipal inhabitants (Worldbank 2010) that live in what is often referred to as the 'informal city'. Described in different ways but commonly understood as 'a state of exception and ambiguity' (Roy 2005) or a mode of production of space defined by the territorial logic of deregulation.' (A. Roy 2009)
It does also not work for a very large part of those living in the 'formal city' that is dispersed from central urban areas where employment and public services are centralized. These residents suffer of daily commuting time up to 6 hours per day and the quickly increasing costs of public transport. And even 'the rich' whom live and work in the privileged central areas are often isolated from the city as they increasingly reside in 24h secured gated communities.

What we see is a city that is structured to function for a very small amount of people and that excludes a large part of its inhabitants. We see a city structure that is articulated on a very mono-functional way. Constantly enforcing its economic potential of production but neglecting social issues and environmental disadvantages, which are, increasingly, created by this mono-functional perspective. And we see a city structure that works on the scale of the metropolis, but disregards the more specific and local networks that structure city. Resulting in a fragmented urban environment, where investments are not aimed at transforming the urban landscape into a sustainable living environment.

We therefore ask ourselves, how can we revert this imbalance?
Can we combine future investments that introduce improvements for the production of the economy and simultaneously provide a higher (local) quality of life? Can we adopt a different strategy in the (re) development of the city's structure with the aim to transform São Paulo into a more sustainable and inclusive city?

This is the main question that drives this research and it presents us with

a number of challenges related to infrastructure, sustainability and the integration of both concepts.

1.2 São Paulo, continuously dominated by infrastructure

In its history, the urban development of São Paulo has always been heavily intertwined with the development and transformation of the infrastructural network. The city was founded in 1554, on a strategic place, optimal to explore the inland territory in almost every direction. This exploration by the indigenous people, and later the colonizers, was primarily done by the waterways of Tiête river, and the adjacent Pinheiros and Tamanduateí river that, already in the city, flow into the Tiête river. The Tiête river flows to the North-West; inland to first the Paraná river and finally to the Rio de la Plata bay of Buenos Aires and Montevideo where the river reaches the Atlantic. In the first few decades of the 19th century the city expanded its infrastructural network by constructing a railway network, enabling more possibilities for production. From the start of the 20th century the automobile industry became increasingly important for the city and its region and its network of highways slowly expanded. Especially in the 1950s, 60s and 70s this network expanded rapidly and became the most dominant mode of mobility in the metropolis we know now. Until the day of today, the city's main success is due to the transformation and expanding of this infrastructure, with mainly the goals of production and economy in mind. Main business districts and industrial areas have developed along its main rivers, railways and highways, fostering the economic powerhouse of the South American continent. (Delijaicov 1998)

1.3 Infrastructure entangled with social-, economic- and environmental challenges.

The infrastructural network is developed from a very centralized perspective and especially attends those areas that are already developed. The development of the infrastructural network is dominated by an increasing demand for individual motorized traffic, to which a significant part of the inhabitants does not have access due to lack of economic means. Sustainable and collective forms of transportation are subordinated. The current state of the infrastructural network of the city is partly responsible for large socio-economic inequalities between the center and the peripheries of the metropolis.

As a result of the rapid development of the city, people out of other regions in the country (and abroad) have migrated to São Paulo in great numbers. This 'urban poor' of São Paulo constructed their dwellings mainly in the peripheries and along this same infrastructure, resulting in illegal settlements that occupy the most hazardous areas of the city. The

inclusion of these unofficial inhabitants and the urban spaces they occupy within the formal structures of the city is vital to reduce social inequalities and promote a more homogeneous city landscape.

As a third it is important to stress the relation of the city's infrastructure with its hydrological network. It's railways and highways are constructed along the rivers and streams, as this was the flattest, most accessible and cheapest land to construct. It is in these regions where environmental problems, such as large flooding and water contamination, most prominently emerge.

The defined conflicts between social-, economic-, and environmental dimensions of the urban environment are spatially entangled with the physical infrastructural network. It is especially in these areas where the growing problematic of São Paulo is most perceptible. On the other hand, we argue, that it is also these areas on which one should divert the focus to, and develop an integrated solution for the future. A future that demands for a different São Paulo, especially now.

Why does the city, especially now, need a different approach for its future development? We argue, that São Paulo stands at a critical point within the development of its city and metropolitan region. The city awaits important challenges and transformations regarding the future structuring of its urban landscape. We will elaborate on these challenges.

1.4 São Paulo, a sustainable city?

The society of São Paulo is in transformation. A decelerating rate of population growth opens up opportunities for a different approach towards urban development, different than just one of continuously expanding. Socially the city must address issues of inequality and exclusion effectively to move a large part of its current population out of poverty. The growing middle class demands for more public services, social values and political impact. (Sassen 2010)
Environmentally São Paulo has increasingly to deal with heavy flooding and contamination of its water resources that directly mark its geographical borders. Due to decades of excessive growth of population and with that urban expansion, the city is reaching these borders. The only way to anticipate on this is to address the city's most precarious environmental regions.
Economically São Paulo cannot afford to continuously rely on its industrial economy only. It should proactively develop its urban built environment to effectively promote the transformation towards a resilient, largely service based economy. (Sudjic 2010) (Braga 2006)

Until now the urban development of the city is structured by its infrastructure. And this infrastructure is developed out of a purely technical perspective, aiming only to thrive the production of the city. But this productive city is not a human and liveable city; it is not a sustainable city. And the urban scheme of the productive city proves to be incapable to leverage other urban, i.e. social and environmental, values. We argue a different urban scheme is required, and this scheme should be centred on the concept of sustainability.

" For sustainability to occur, it must occur simultaneously in each of its three dimensions" (social, economical, environmental). (Larsen 2012)

Guiding the transformation of São Paulo by the concept of sustainability offers the potential of developing a more balanced urban environment. Urban development will not just promote a productive city, but a sustainable, and inclusive city. But how can these dimensions be addressed by the development of infrastructure?

1.5 São Paulo: A sustainable and inclusive city, by the (re) development of infrastructure

There are two reasons to argue that São Paulo can transform into a sustainable and inclusive city by tying this process of transformation to the transformation and (re) development of its predominant infrastructure.

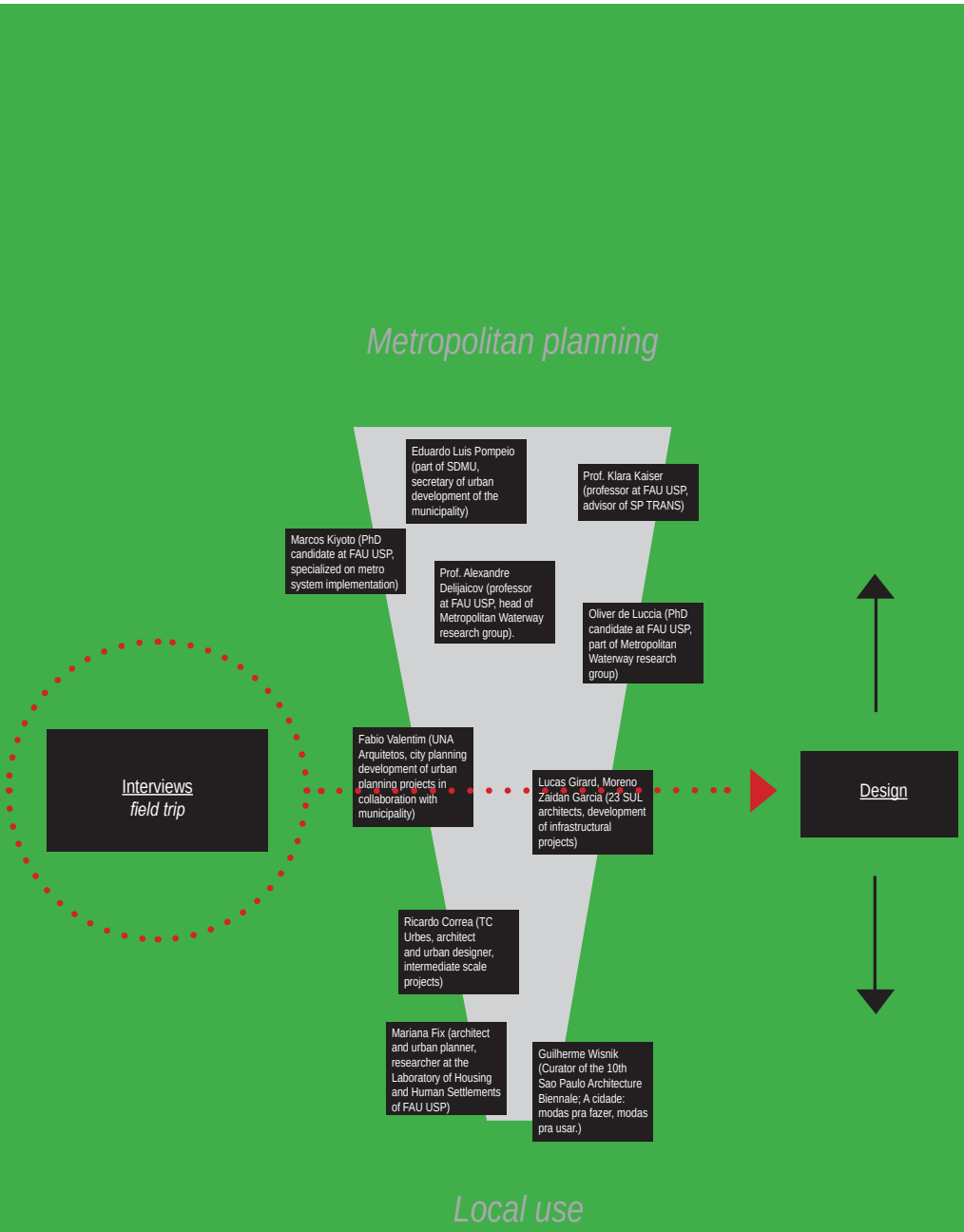
The first is the essential link that exists between the city's physical infrastructures with its social-, environmental-, and economical dimensions. They are spatially entangled and by their conflicts they all make up a part of the systematic problems that the metropolis faces. For a systematic solution their integration should be solved.
Secondly new large investments will have to be made to support the (re) development of the city's infrastructure and with that sustain economic growth. (Braga 2006) These investments are thought to focus on the (re) development and expansion of the infrastructural networks. With the means of these investments now the potential exists to not only fundamentally transform the city's infrastructure, but systematically transform the city as an integrated whole.

Therefore this research believes the main issue that needs to be tackled in this development is how mobility systems in the metropolis, in this case São Paulo, physically expressed by infra-structures, can become more than just technical and civil engineered structures driven by 'just' economical values? How can mobility foster urban development in decentralized regions and not only 'serve' the centralized metropolitan

scale but 'negotiate' its bordering regions and inhabitants? How can the infrastructural network become a backbone for economic growth, environmental preservation and social development? How can we design a mobility system that is the trigger in changing towards increasingly interactive urban spaces for the future, integrated with specific local surroundings, and adaptive to the ever-changing conditions of the metropolis as a whole?

B
Expert Interviews

Ten experts on urban planning and urban development in São Paulo are interviewed on their specific area of expertise to form a broad perspective of the current state of planning and development approaches in the city, and how different aspects are interlinked. The experts are deliberately chosen to have somewhat contradicting perspectives, offering valuable point of reference in the discussion on the scale of implementations and a top-down or bottom-up approach.


Metropolitan planning
Eduardo Luis Pompeio (part of SDMU, secretary of urban development of the municipality)
Prof. Klara Kaiser (professor at FAU USP, advisor of SP TRANS)
Marcos Kiyoto (PhD candidate at FAU USP, specialized on metro system implementation)
Prof. Alexandre Delijaicov (professor at FAU USP, head of Metropolitan Waterway research group).
Oliver de Luccia (PhD candidate at FAU USP, part of Metropolitan Waterway research group)
Interviews
field trip
Fabio Valentim (UNA Arquitetos, city planning development of urban planning projects in collaboration with municipality)
Lucas Girard, Moreno Zaidan Garcia (23 SUL architects, development of infrastructural projects)
Design
Ricardo Correa (TC Urbes, architect and urban designer, intermediate scale projects)
Mariana Fix (architect and urban planner, researcher at the Laboratory of Housing and Human Settlements of FAU USP)
Guilherme Wisnik (Curator of the 10th Sao Paulo Architecture Biennale; A cidade: modas pra fazer, modas pra usar.)
Local use

10 x
Experts' Profiles

Eduardo Pompeo Martins works for the planning department of the municipality of Sao Paulo (SDMU). The coming 4 years (until 2017) they develop the new urban planning strategy of the municipality. Eduardo graduated at FAU USP in 2012 with a project and research related to the Hidroanel research group.

Klara Anna Maria Kaiser Mori is Professor at FAU USP and focuses on territory and infrastructure. She worked at the *Companhia Metropolitana de São Paulo* (SPTrans, Metro Sao Paulo) from 1985 untill 1999, and now is still connected to this company as an advisor and planner.

Ricardo Correa is architect and urban planner (FAU USP) and is founder of *TC Urbes*. With his office he focuses on intermediate scale urbanism and they specialize in mobility and accessibility. Next to his office Ricardo designed an *urban bike* especially constructed for Sao Paulo.

Oliver de Luccia graduated at FAU USP and started his own architectural office *Ponte arquitetura*. He is researcher at the *Grupo Metropole Fluvial*, a research group of FAU USP, and is performing a PhD on the specific region of *Tiquatira*, situated in the eastern zone of Sao Paulo.

Guilherme Wisnik is head-curator of the 10th architecture Binnele of Sao Paulo (2014), called *The city: ways to make, ways to use.* He is architect, critic, historian and writer of several novels on architects as Oscar Niemeyer and Alvaro Siza.

Fabio Valentim is architect and urban planner since 1995 and co-founder of Una Arquitetos. He is a professor at the Escola da Cidade and lectured abroad in the United Kingdom, Switzerland, Portugal and Uruguay.

Eduardo Pompeo Martins works for the planning department of the municipality of Sao Paulo (SDMU). The coming 4 years (until 2017) they develop the new urban planning strategy of the municipality. Eduardo graduated at FAU USP in 2012 with a project and research related to the Hidroanel research group.

Marcos Kiyoto is specialized in the metro system of Sao Paulo and Performed a PhD proposing an altered metro network for the future development of the metro system of Sao Paulo based on a decentralized city vision.

Eduardo Pompeo Martins works for the planning department of the municipality of Sao Paulo (SDMU). The coming 4 years (until 2017) they develop the new urban planning strategy of the municipality. Eduardo graduated at FAU USP in 2012 with a project and research related to the Hidroanel research group.

Lucas Girard and Moreno Zaidan Garcia graduated at FAU USP and started the office *23sul arquitetura* together with 9 colleagues in 2005. The office works on several public buildings and infrastructural related projects. Moreno is also performing a PhD at FAU.

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Klara Kaiser
on Metro implementation and segregation

You are an expert on mobility in Sao Paulo, and especially the Metro system and its development. A big change occurred when SP Trans (and several other transport systems) privatised at the beginning of the 1990's, how come?
The biggest consequence of this privatisation is that the State lost its control, as it was done to radically. The private focus is purely functional. Approaching the construction of the metro system just economically, bringing the budget down to a minimum. What means cutting away important elements that make a metro 'function' as an important element in the city.
The difference is very clear if we look at metro stations implemented in the 1980's, for example line 2, and the new line 4, which is constructed right now. The first having stations with multiple accesses on different levels in the city, carefully implemented in the urban fabric; the latter constructed right next to the biggest hospital of South America, but not accessible from this hospital. The state should be able to prevent this kind of failure.

Implementation also slowed down due to this privatisation, rather than speeding up.
True. The metro network we have now was already planned in 1985. We are in 2013(!). One of my students, Marcos Kyoto, discusses this in his PhD thesis. Slow development results in land price speculation by construction companies, financial market, and developers. This 'pushes' the original inhabitants (mostly poor) out of the region where a metro network is implemented. So who benefits here? A quick implementation will create a more homogeneous mobility network.

But still a metro station has an enormous effect on its region of implementation?
Yes, and this has to become positive effect for all. Not the negative one I sketch above. The Butanta region for example changed dramatically after the implementation of a metro station. Increase of retail, commercial functions, business, etc. But also negative effects as increase of traffic, buses parked all over, etc. Mainly because only the metro is developed, and other infrastructure is not integrated in this planning.

Lack of integration; there seem to be a lot of isolated metro projects.
There are different private companies that own the different metro lines. Therefore the system that should work together and should be integrated is totally inconsistent. In my opinion there are several reasons for these projects to be isolated and constructed in a very fragmented way.
One is that the elite only construct for themselves. The rest of the inhabitants are explored.
Second is the fact that projects now are only a reaction on a situation. When you still have to start with implementing a metro line on one of the most problematic parts of your mobility network, you are clearly too late.

In your thesis you address a culture of segregation you see on a larger scale, Brazil as a country, or as territory. Does this influence this discussion on a smaller scale?
In a way, it is the same discussion. Simplified I see three main problematic elements that create this culture of segregation as you call it. The first being a political reason, constantly focusing on the preservation of the existing in opposition to innovation. A politics of conservatism.
Secondly Brazil is segregated territorial. There is an isolated system of government. Government, states and municipalities don't work together as one system. Almost all states are focussed on exporting to foreign countries. Importing goods from China or the UK is cheaper than importing from Bahia.
The last form of segregation we could define as financial. There exists a lack of budget. To realise a project there is a private investment required of such an amount that this investor can directly dictate the project. Which often results in segregated city spaces, not integrated.

So which scale to focus on?
Both. It is impossible to focus just on the one or the other and create integrated development.
Planning should always work on all scales at the same time. For me it is not about a 'conflict' between the large scale and the small scale. We need large-scale metropolitan planning, so that it exists right now is already a positive, as Sao Paulo has never had large-scale planning in its history. But naturally we should include the small scale within our planning strategies. Let me be very clear, for me it is not about about thinking small; it is about thinking accessible!

Although there now exists a large-scale strategy, this is far from integrated. Where to start?
Integration is goal we should have in mind to make our planning effective. At the moment infrastructure, habitation, social segregation etc. are all approached as separate projects. Very few planners recognize the relation and try to use their forces to create integrated solutions.

But this is also determined by our history. The city especially expanded in times of a dictatorial government, so there was no planning force. And the figures are also extreme; in 100 years Sao Paulo had an average growth of 200.000 people a year, with almost no planning at all. Of course we have island projects and lack of integration. Right now we have the possibility to plan our future city, and growth has slowed down. We should benefit from this moment.

"It is not about a 'conflict' between the large scale and the small scale... it's not about about thinking small; it's about thinking accessible!"

With the Arco do Futuro?
It's a start. In my opinion the proposed decentralisation of this large-scale development has a great potential for Sao Paulo. There are of course many details, but as always the main challenge is translating all this planning into execution. And what we sometimes forget, we should always ask the question why the implementation is made? And not just modernize thoughtless, just for the sake of modernization.

#2
Research Framework

2.1 Problem statement

In the introduction we clearly outlined the many, if not infinite, challenges of urban development that lay ahead of us in transforming the urban landscape São Paulo. Challenges that emanate from an imbalance between social-, economical- and environmental dimensions in the regions built environment. Challenges that are deeply related to the physical network of infrastructures and therefore we seek the solution in the systematic transformation of these infrastructures and their bordering urban spaces.

Therefore This research states that, also for a future development towards a more inclusive city, the transformation of São Paulo's infrastructural network has great potential in solving several of above described challenges, but only if it is developed with a different, more integrated and integrative, strategy in mind. Until now, the mobility systems of São Paulo are developed extremely centralized, inefficiently, poorly integrated and out of a purely technical perspective. This is in the first place if its implemented and not remains just on paper.

2.2 Main research question

The driving hypothesis for the performance of this research (and design project) is the identification of mobility systems in the metropolis, in this case São Paulo, physically expressed by infra-structures, as more than technical and civil engineered structures driven by 'just' economical values. Thus other values should be integrated within the transformation of the infrastructural network of the metropolitan region, this now being the backbone for all urban transformations. These other values are included within the leading research and design hypothesis:

2.2.1 Research question

How can infrastructure become a backbone for systematic urban transformations in São Paulo, and what role can design, by means of a spatial strategy, play in improving the integration of environmental-, social- and economical values that guide the transformation of this mobility environment?

2.3 Sub questions and parameters

The main research question holds four different parameters that all have to be carefully defined and described. Therefore we could say that we have four sub questions, namely, how can we define the concept or parameter of (1) physical-, (2) environmental-, (3) social- and (4) economical urban value; how is this urban dimension influenced by the context of São Paulo and how does this parameter spatially influence a mobility environment (design)?

These four parameters are equally important in reaching the goal of an integrated mobility environment. We try to define how every parameter can contribute to the design of a mobility environment, and explore on which different scales of implementation (i.e. top-down, bottom-up) these values are, or are not, articulated, and if this articulation is effective.

The research parameters and their related key words:
(1) Physical – Infrastructure – mobility - …
(2) Environmental – streams – greenery – pollution – fluidity - …
(3) Economic – Commerce – productivity - …
(4) Social – community – dwelling – public spaces -participation …

2.4.1 Goal

The goal of this research is to demonstrate the possibility and potential of a different, and systematic, approach towards the (re) development of the infrastructural network of the São Paulo metropolitan region. Our strategy is to utilize a mobility environment as backbone or trigger for an integrated urban transformation. The research exemplifies this strategy by articulating a proposal for one specific mobility environment.

Goals:
(1) Develop a clear position on how the concepts of multi modality, related to physical infrastructures; spatial multi functionality and social-, economic- and environmental sustainability can be integrated in the development or transformation of a metropolitan mobility environment.
(2) Develop an urban strategy for a sustainable and inclusive node of mobility (mobility environment) that articulates local (spatial) qualities.
(3) Develop a design for a multimodal mobility terminal that is inserted in, or in itself part of, the sustainable and inclusive mobility environment, and demonstrates the similar concepts as the urban strategy.

2.4.2 Relevance

Social and environmental value

As we propose the development of an environment that integrates social-, economic- and environmental values within a sensible spatial strategy, this research and development is very relevant for a, highly necessary, systematic transformation of the urban living environment of São Paulo, and above all, for those who are part of it, the inhabitants.
A successful spatial articulation of a mobility environment can include public space and leisure spaces. It can contribute in the living and working areas of its users and inhabitants. Physical mobility can be tied to social mobility of a before isolated region. Otherwise the research can provide solutions for the preservation of important elements of our natural

environment, such as greenery and water, included rather than excluded within urban transformations.

Scientifical value
The defined problem of a mobility environment that is developed with 'just' economic values in mind and neglects the potential of integrating social and environmental values is a generic problem. Nevertheless a generic solution is highly idealistic. Therefore the goal of this research and design is to develop a specific solution for the specific case. However generic elements from this research and design could be transferred to the development of mobility environments in other situations.

As this research and design is in search of an integrated solution for the (re) development of mobility environments, aspects of architecture, civil engineering, urban design and governmental planning will be combined in this proposal. Therefore it can also provide a different insight for these disciplines.

2.5 Perspective; scope of the research and position of the researcher

The research defines the infrastructural network as an important backbone for urban transformation. We primarily aim to formulate conclusions on how to articulate such and urban development spatially, and therefore take the perspective of an architect and urban planner.

We believe architects and planners have the tools to transform social, economical and even environmental developments into spatial articulations and a strategy for urban development. It is important to note that we believe that this is only possible if we have an understanding of the complexity of the urban environment and the many processes that take place within this environment related to other disciplines. For this reason we also address the complex 'collaboration' of disciplines that influence the development of mobility nodes within the argumentation of this research. We hope with this that the research to some extend can contribute to the collaboration between different disciplines.

To differentiate between architects and urban planners we envision the latter to develop a spatial urban strategy for a region and the first to articulate a building or group of buildings with spaces in-between as a part of, or in our case the initiation of, this strategy. We envision this spatial articulation not as a form of readymade problem solving, but rather as steering into a direction.

Furthermore it is important to note that the researcher has a foreign perspective, as a Dutch student of TU Delft, on the specific situation of research, being São Paulo, Brazil. The researcher became familiar with São Paulo and its social, cultural and spatial differences with The Netherlands during a study and internship period of 1 year and a field trip of 1 month, but however holds a somewhat 'outside perspective'. This is utilized to reflect on the existing differences between the specific situation of research (SP) and the origin of the researcher (NL). i.e. the planning strategy, use of public space, design utilization.

2.6 Thesis structure

In chapter 1 we introduce the concept of infrastructure related to urban transformations. We outline the problems and the potentials in using infrastructural networks and especially their neighboring mobility environments as a strategy or 'trigger' for urban development. This chapter includes a background of São Paulo, describing the city's problems relating to mobility and the historical development of the city relating to its infrastructure.

Chapter 2 deals more specifically with the core of the problem that this thesis investigates. We define the main question and sub questions, based on parameters that influence the impact of a mobility strategy on urban development and especially on local spatial qualities. We describe how these parameters relate to the overall concept that guides the research. Furthermore we clarify by which method we will elaborate on these parameters and their relation to mobility. Finally an expectation of the research results and its relevance in a broader perspective is formulated.

Chapter 3 until 6 elaborate on the main research issues by describing theoretical concepts that relate to the four issues. These chapters include information gathered by interviews done with ten experts that work with issues related to infrastructure, mobility environments and urban transformations in São Paulo. One main case is used to empirically analyze the different issues. This case forms the basis of the design that follows up the research.

In chapter 7 we present our general conclusions and discuss the remarks of the research. Furthermore this the chapter shows how the lessons learned are translated in a spatial (visual) urban strategy, as a step towards the design phase.

2.7 Methodology – which concepts do we use

2.7.1 Theory review
The physical-, environmental-, social- and economical landscape of São Paulo is described and interpreted by the discussion of different methods and theories relating to these aspects.

2.7.2 Interview with experts
Ten experts on urban planning and urban development in São Paulo are interviewed on their specific area of expertise to form a broad perspective of the current state of planning and development approaches in the city, and how different aspects are interlinked. The experts are deliberately chosen to have somewhat contradicting perspectives, offering valuable point of reference in the discussion on the scale of implementations and a top-down or bottom-up approach.

2.7.3 Case study
Tiquatira (site) – Out of a first general analysis of several mobility nodes and development regions of São Paulo the site of Tiquatira is defined as having the highest potential for our research. This node, its relation with the urban surrounding and the metropolitan region and its specifica local (social, environmental, economical, geographical and spatial) qualities are extensively researched and mapped in an analysis.

2.7.4 Research by design
Based on the previous analysis and mapping of the case area and the conclusions of the research an urban strategy for a multimodal mobility node is articulated. One element within this strategy is further developed and is advanced into an architectural design.

2.8 Expected results and relevance
The aim of the research is primarily to test the stated hypothesis, but also to form an inspiring and informative basis for the design part. The design will visually and physically articulate the research conclusions, and therefore forms a good benchmark for the research results.

Because we also address the complex 'collaboration' of disciplines that influence the development of mobility nodes within the argumentation of this research. We hope with this that the research to some extend can contribute to the collaboration between different disciplines, and not just remain on the island that architecture often remains.

The research will:
(1) Describe the importance of mobility as a strategy for urban development against the background of the city of São Paulo. The research makes use of concepts relating to mobility, i.e. poly-centrality and inter-

modality, but will focus on utilizing these concepts for a specific situation, therefore concentrating on a specific node in the eastern periphery of São Paulo.

(2) Place the potential of urban transformation guided by (an) infrastructural network(s) in a broad perspective by describing four research parameters; defined as the physical-, environmental-, social- and economical urban values of São Paulo. It will explain why these parameters are important, and how they can be utilized in the development of a mobility node.

(3) Clarify the importance of local influences (the local dimension) when developing a mobility environment. The research describes for all parameters how this local dimension plays a vital role.

(4) Develop an urban strategy defined as a result of the theoretical research and the site analysis. The mobility node will connect slow- (pedestrian/cycling), bus-, car-, water-, metro-, and rail transport.

(5) Form the basis for the development of a design of a mobility terminal that is part of the above-described urban strategy. The design will further elaborate and express in more detail the systematic principles of the urban strategy.

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Ricardo Corrêa
on the intermediate scale

Ricardo, with your office you show interest in many things, but most importantly you try to develop solutions in a certain intermediate scale. Is that what this city needs most?
We are interested in big themes as infrastructure and public space. We always try to start with the question of how do we want our living environment to be? In the end the city is a reflection of what we are and what we do as people.
This thinking on a big scale, we do more in the form of a manifest. A guideline on how we want our living environment to be. What kind of city, what kind of place do we want? With these guidelines we can and should work on the local scale. Here these guidelines should transform to practical and physical articulated solutions. The intermediate scale is great for this transformation.

Could you explain, with for example infrastructure or mobility in mind?
I approach mobility as a consequence of something else. The reason that you make use of mobility is not mobility. Mobility can, and will, change over time. We could for example imagine people working at home; so daily mobility becomes less vital.
What is more interesting to think about as architects and urban planners is the reason you make use of mobility. That is to go somewhere, to be somewhere. How do we want this place to look like, to attract people? That is what we should design for. Spaces for people to be in the city; spaces to move in, to meet others, accessible spaces.

Public spaces?
Public spaces are very important for the city, and we in Sao Paulo don't have a lot, and we don't know how to use them.
In the last political term of Maluf (a famous mayor of SP) a law was created for all public space to have a fence or wall, in order to be able to close the space. Benches, and other places where you could sit or lay down were removed, because they were in use by homeless people. He was clearly thinking in terms of security, killing all spatial and public qualities. I would say if there were 25 homeless people in the space every night, place 50 benches. Closing places off prevents people of meeting each other. Public spaces are for meeting, without it a city can't exist.

But security can become a problem in public places.
The best way to create a secure environment is to have a lot of people around. Opening up spaces. And create facilities that are necessary, not gates. Public toilets, good pavements for pedestrians, bicycle lanes. All elements that are missing in this city, because it isn't approached as a social thing; it's a city thought out by and for the few rich, for those who move by car.

Famous meeting places in Sao Paulo are shopping malls. This is not the kind of places you talk about?
Places should offer a mix of different people. This creates social mobility. At the moment social classes don't mix. There is no social

mobility, rich travel by car, and meet in the shopping mall. The poor go by bus, or on foot. We can only change this mentality by creating places for everyone.

"the city is a reflection of us, the people that live in it."

So how should we adjust our planning strategies?
We should start to design for people. For a healthy living environment. Most developments think in avenues, linear thinking. People, at least pedestrians, don't move linear, the move in circles. So we can focus on points of development. With quick infrastructure connecting these points.

What you sketch is a decentralized approach, using a combination or quick traffic between centres and slow traffic within each centre.
Yes this combination is very interesting. Our focus is a lot on pedestrian and cycling infrastructure as we feel these work very well in the intermediate scale we discussed. We call them modas suaves, meaning smooth modes of mobility. I believe these smooth modes can be a great solution for a healthier living environment is we can successfully combine them with sustainable mobility on tracks; metro and train.

The connection joint, or transfer station is very important in this concept. What are your thoughts on these points of gravity?
These points are indeed very important for the articulation of our new urban landscape. As an architect and urban planner I really approach these joints as spaces, not places. The station is a portal of access to other places. But more importantly the station is also a space itself. For me, this physical place of interaction in the city is essential. Here again the station is the reason, and mobility the consequence. Engineers think in matters of connection, architects should think about the spaces of the place itself.

How can we foster these spaces with diversified groups of people?
By integrating 'attractive functions' within these spaces. A mix of dwelling, retail, leisure and so on is important to attract different people. Of course such an environment has to grow over time. But the combination of different mobility's is a great way to accelerate such growth.
It is important to stress that I rather speak of inter-modality than multi-modality. Multi implies that one can choose, take the bus one day, the next day the bicycle, and the following the car. Inter meaning that one connects the one to the other. This being much more interesting as one creates places of transition, that can become important public places of diversity in the city. Heterogeneous places.
Next to this Inter-mobility is financially a more interesting concept for a municipality to construct. As the places around the joint can be commercialised and rented out, like the Dutch NS makes more profit by renting out their station facilities than on the tickets of the trains.

But this commercialisation can also become a problem when a city is expanding rapidly.
Not directly, as there must be found a strategy to pay for all these new interventions and transformations of the city landscape. Private investors are therefore almost indispensible. The problem arises when Government loses control and only the extremely large investors develop, having a monopoly.
Now in Sao Paulo urban interventions are to

big, there is no possibility for small investors to enter in the process. In other words it is almost impossible to create a more diversified living environment. Big contractors construct everything, and everything in the same way. Politics drive this development, because they are to dependent on the private constructors.

And this is why current investments are so centred on just some specific regions?
Yes, stated extremely that is why the periphery is not planned at all and the rich commercial neighbourhoods are constructed by the 'private' only.
If we take a closer look at the peripheries and how they developed in the last 50 years I see two main reasons that explain its rapid and auto constructed growth. The first being Sao Paulo's territory, which has almost no limits. Second, and this relates to your question, being the ghettoization of the city by the rich. Constructing just their own living places, and approaching the rest of the environment only economically. This led to an enormous amount of city built without planning.
A deliberate way of no planning is also planning.

How can politics change their powerless position?
As I described this deliberate way of no planning relates to the lack of political vision. Although I have confidence in some of the plans by the new PT municipality, the too often still only focuses on production. Explaining the need of mobility as just a way to decrease the travel time between home and work, making production more efficient; a classic capitalistic statement.

So how do you feel this focus should become in the future?
We should think more in processes. Ask always the question why you want to connect (in relation to mobility)? Why? Just to become more productive, or to offer social mobility and create a more homogenous city, with a heterogeneous group of people. A space that will be used by all, and for all to have the opportunity to use this space in their own way. The space can make possible new sorts of uses. New use that is generated by spaces, as a contrary to spaces that are generated by use, the functionality.

You are one of the few offices that focus on the intermediate scale, and you look a lot at examples of some European countries. Do you feel that Brazil is behind?
We are, although also in Europe there are not to many offices working on this typical scale. Right now cycling infrastructure is slowly becoming an issue in Sao Paulo. Already 15 years ago, in 1999, the EU stated cycling to work transport as on of the biggest challenges for the next decennium. In 2009 the EU defined an energy efficient city as a new priority. Sao Paulo has not even begun to think of that, although the city model of now is extremely energy inefficient.
Brazil is very much behind on city development, because there is not yet a pro-active approach. Only just recently we started thinking about water systems, as now, only after 20 million people came to live here we will have a problem with drinking water facilities. We don't look ahead because we never experienced a scarcity of natural supplies.

A lot of people in Europe believe now Brazil, and other BRICS, are catching up. Do you agree?
I believe we can, although for me its not primarily about doing or becoming exactly the same as Europe. We should clearly manifest how we want our living environment to be, and then we can change it in every way we want. As Gilberto Freyre (famous Brazilian writer, poet, etc.) says in one of his writings: the city is a reflection of us, the people that live in it.

Guilherme Wisnik
on ways to *make* and ways to *use* the city

You are the head curator of the coming Architecture Biennale of Sao Paulo: Modas pra fazer, Modas pra usar. 'Ways to make, ways to use'. Why this theme?
We aim to create a dialog. Between those who construct the city, and those who use the city. Therefore the biennale focuses on both sides. We will expose the way the city is constructed; showing specific projects, planning and economical forces that play a role in the construction of the city. Secondly we have the ambition to show the perspective of the user. Views of activist groups, how pedestrians feel in the city, and use the space.

Does there exist a conflict between these two different views?
Not necessarily. But clearly projects that only focus on one goal, being constructed, and do not take into account the environment, like the Minhocão elevation, create a conflict. But a lot of other projects take into account the user, and ask the question how their construction will be used.
A big problem is that projects often just remain on a macro scale. On this scale it seems to be very difficult to imagine the daily use.

This is part of Brazilian building culture, large-scale projects?
Yes it is, and we also need large-scale projects. To develop a fundamental part of our urban landscape, the infrastructure. As said I feel that most of the large-scale projects lack a certain intelligence that includes the micro scale directly in its primary planning strategy. You used to work for the Hidroanel research group; for me the Hidroanel project has the expression of a very totalitarian planning project, a large urban vision on a very 'FAU way' , but otherwise, and this is a great potential, if you observe it more in depth, it has this intelligence that already includes problematic of the micro scale. This should be developed further, but it is one of the reasons why we will exhibit the project in our biennale.

How to develop this further, and how to develop more of these projects?
Well I believe it is most important to emphasize more on the possibility of a different approach. Now we see almost no projects that act on an intermediate scale. This scale is very interesting as it makes it easier to think about the micro scale in a more strategic way, integrated it within the planning directly. A second advantage is that this scale is suitable for 'test' projects as I call them.

As for example the 'Sao Paulo test site' that was part of the IABR in Rotterdam of 2012, by initiative of MMBB?
Exactly. This was a very interesting approach as it aimed to include a lot of different actors. Actors that could have a say, and therefore a design or development that was flexible, organised more as a process than a project. Of course this was also more a research and introduction of problematic, but it can generate a lot of interesting solutions.
This intermediate scale, which is very rare in Brazil (or maybe everywhere in the world) has a great potential. And I believe that

Fernando Mello Franco (founder of MMBB and the new Secretary of Urban development of the SP municipality) has the potential to integrate this different strategy in the municipality.

What are other examples of this intermediate scale?
Edificio Copan as a building successfully generated urbanity. It's a great example. More recent, the praca das artes is an interesting project as it is really implemented in the existing urban fabric. It acts as an addition to the existing, but also as regeneration because of its functions that attract a large public. The entrances on three different sides of the building block create a new public route, which on the negative only opens when the building opens and does not exist on its own. We can not really speak of public space, but semi-public.
Another example we will discuss with the biennale is the Parque dom pedro urban plan. I like the project very much, because it has a lot of interesting elements of integration between infrastructure, economy, public services and public spaces. You can feel that they give thought to the user, the citizen. But otherwise it also inhabits a certain 'FAU', or maybe elite way of approaching urban planning and especially public space.

"Architects shouldn't approach public spaces from a European perspective but look at where public space exists for us *Paulistanos*."

Which you disapprove?
Not necessarily disapprove. It makes me curious. What I see a lot is that public spaces designed by architects and urban planners are very determining in Sao Paulo. These public spaces, parks and squares, don't create public space in the city. Every square is private, closed of at night, and only open to a certain public. There does not exist a public culture in this sense in Sao Paulo. I believe this has to do with the way architects and urban planners approach public spaces, searching it in squares and parks that are a historical European tradition. Maybe it stems of old times, a culture of slavery, or patrimonialism. Instead we should look at where public space exists for us Paulistanos. At street corners, temporary marketplaces and so on.

The culture of public space in Sao Paulo is lost you say?
One could state the citizens in a way have to learn how to use the space of their city. This is the main incentive for our biennale theme. Interesting is for example the success of the new development of praca Roosvelt. There has been, and still is, a lot of discussion about this new space. But it is used by the citizens, day and night. Despite of its design and materialization, which you indeed can criticize, it achieves the most important goal; being used. This square is a signal that the population of Sao Paulo is conscious that they need to use their city. It is not a beautiful project, but it opens up, and is always accessible.

Is it this consciousness of the population reflects itself in certain forms of activism and self generated projects?
Yes, and I hope these initiatives can trigger further development of these important spaces. The minhocao is a well-known example, having an incredible cultural program what is born out of protest. Public space should be dynamic, create conflicts, accessible for people to meet. People want

different places where they can see different things. The population itself can, and will, make spaces appropriate for use

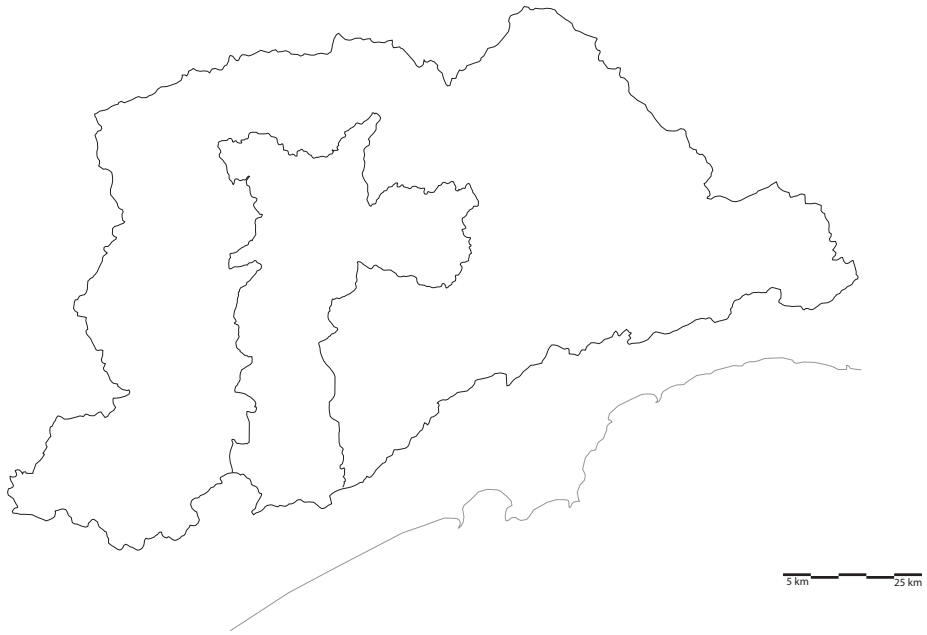
A sign that more of these spaces will arise in the future?
Hopefully. People want different places, where they can see different things. The population that can make space appropriate for how they want to use it. This informal region of public space is way more interesting for public life. Again this fits the intermediate scale we spoke about. Until now public spaces are mainly approached from an engineering perspective, resulting in large scale, generic spaces that are poorly used, like the Anganhabau valley.

But as you mentioned yourself, the development of infrastructure on a large scale is also vital for the development of Sao Paulo.
We are indeed still constructing important parts of our infrastructure. How we design this is vital for how the city will look like in the future. Don't understand me wrong, this macro scale is extremely important to focus on, but we should not be thinking about infrastructure as a functional element. Infrastructure should be a regenerator of urbanization, as it is for example in the watery voids proposal of MMBB.
From 1968 untill 1973, so in just 5 years, Sao Paulo's infrastructure changed significantly. Under governance of Maluf it became a city dominated by car traffic. This is still the case, and although the automobile industry is still very dominant in the region, we should realize that we are now in a different epoch. The important challenge for nowadays architects and planners is to work on solutions for problems that exist on the macro scale, that directly regenerate the scale of the street and the neighbourhood.

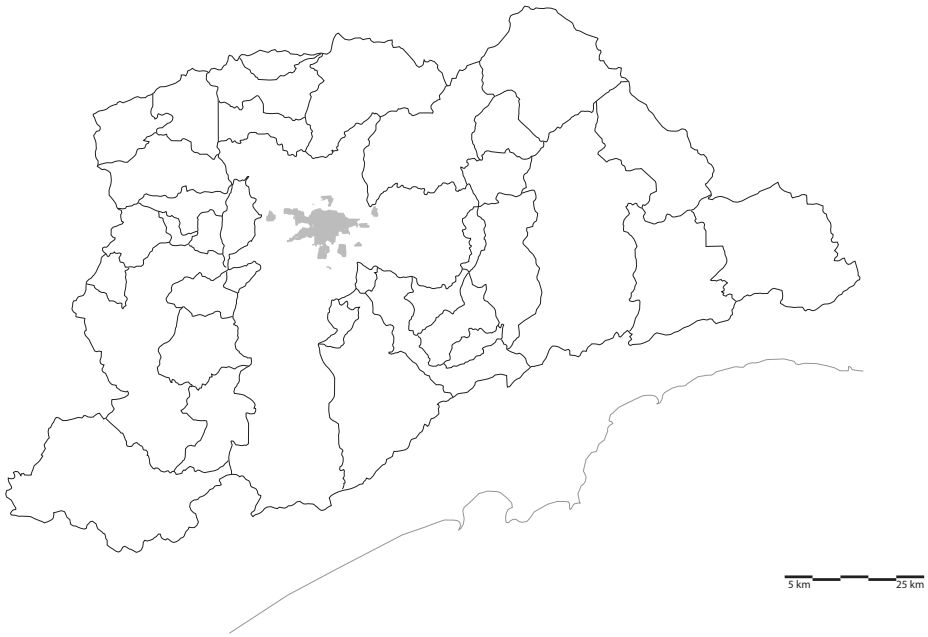
Is the new municipality and especially the plans for Arco do Tiete, a first step within this new epoch, or just another Berrini development?
I hope it is, and lets be positive. Of course the money rules, especially in these kind of large scale developments. When comparing the Arco do Futuro, or actually the Arco do Tiete, to former developments we see some interesting changes. Development opens up to smaller stakeholders and constructors, instead of the famous Nova Luz development, done by foreign architects and just one (!) constructor.

Nonetheless, apparently again 20% of the Arco do Tiete area has already been bought by one constructor. This is impossible to stop?
As said money rules, and we also need the private to invest. We cannot go without, but they should not dictate, without the possibility for other actors to interfere. Municipality should act stronger in this debate.
Interesting difference in the Arco do Tiete strategy of Fernando Haddad is that the development now moves towards places where a large part of the inhabitants reside, and not the other way around. Its focus is to approximate the capital and employment near to a great part of the population in the east and north zone. In terms of decentralization this has the potential to generate a lot of benefits.

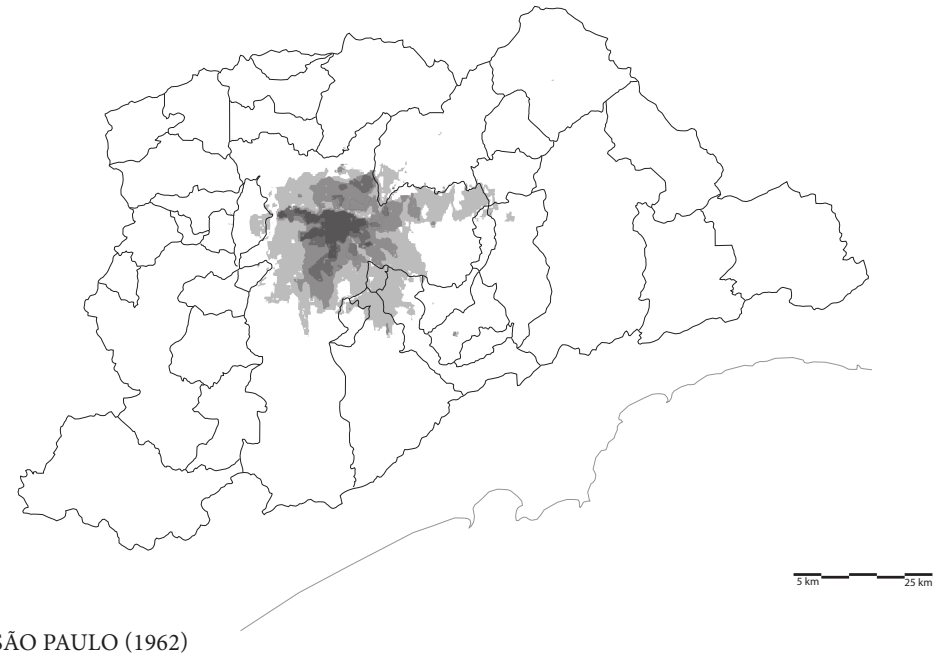
Could the Hidroanel proposal play a role in this new epoch and new approach you sketch?
I believe it can, because it inhabits certain intelligence, as I already mentioned. But also here there are still a lot of steps to make. With the biennale we placed the project in the how to construct the city part. What is still not clear enough is the Hidroanel on the scale of its user, how will it be used? This is an important issue the Hidroanel will have to address. And not only the Hidroanel, but all future development of Sao Paulo, which is why fostering this discussion between user and constructor is our main ambition.



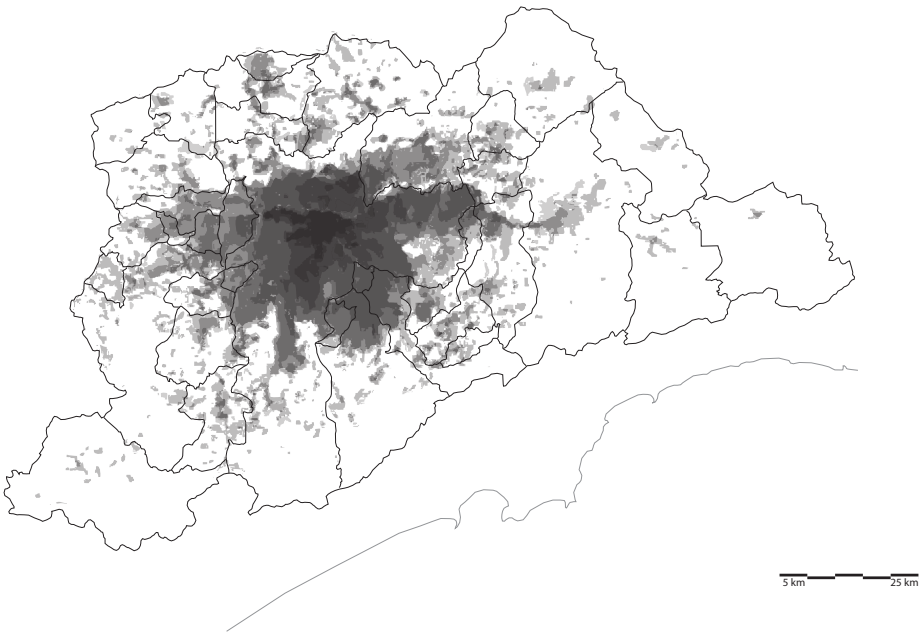
SÃO PAULO
METROPOLITAN REGION
Source: ibge



SÃO PAULO (1905)
239.820 INHABITANTS



SÃO PAULO (1962)
4.739.406 INHABITANTS



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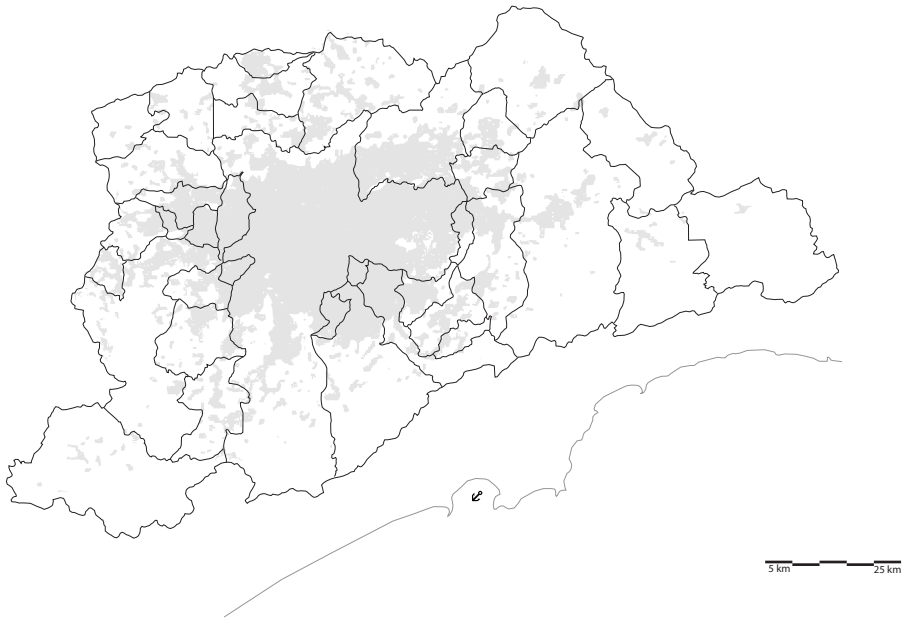
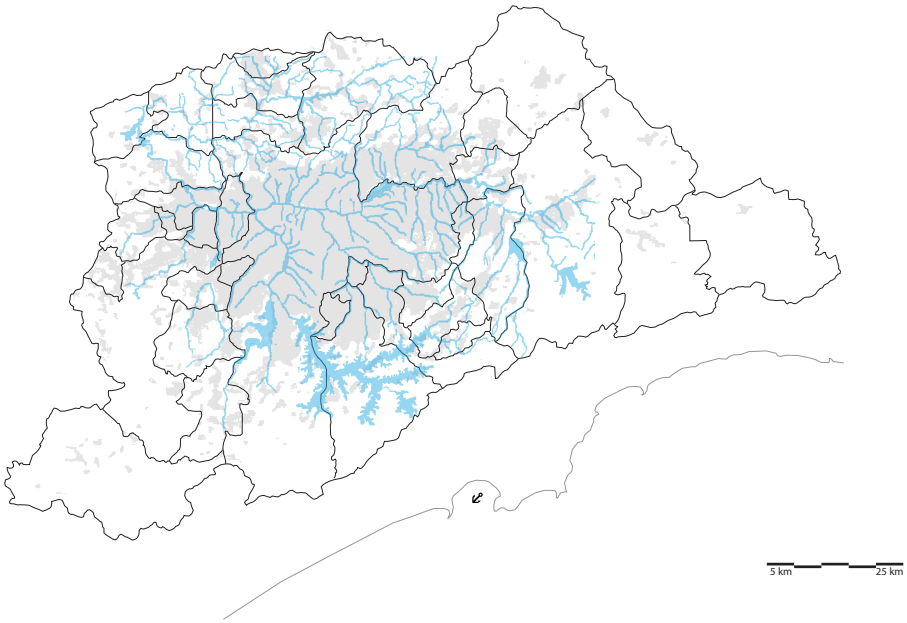
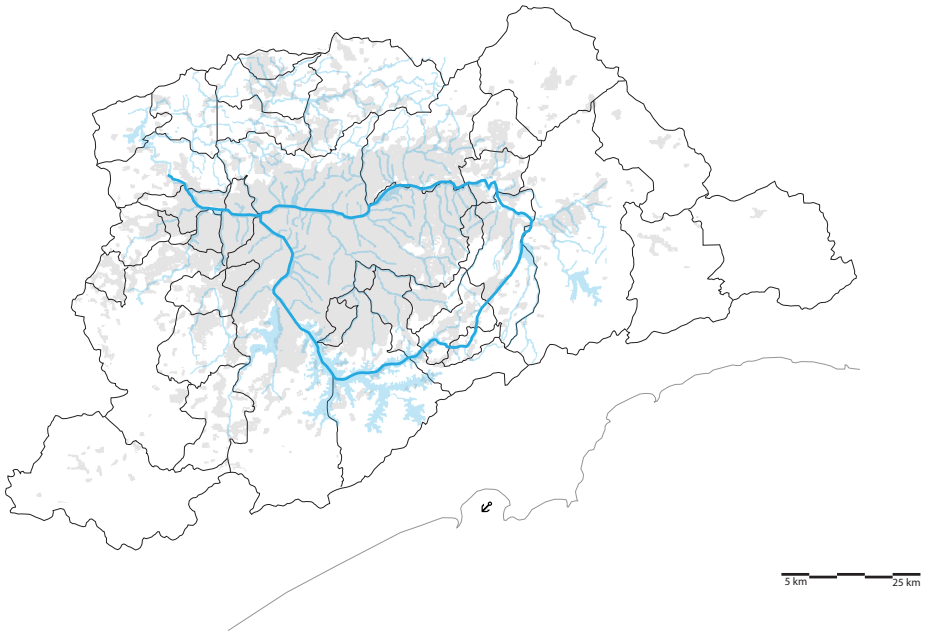


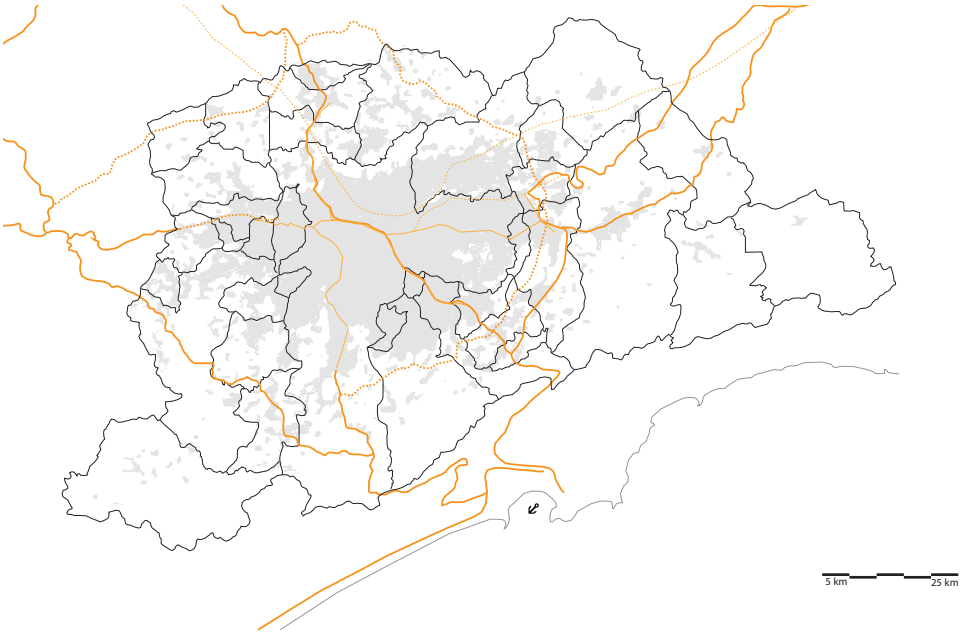
BUILT FABRIC
Source: Emplasa



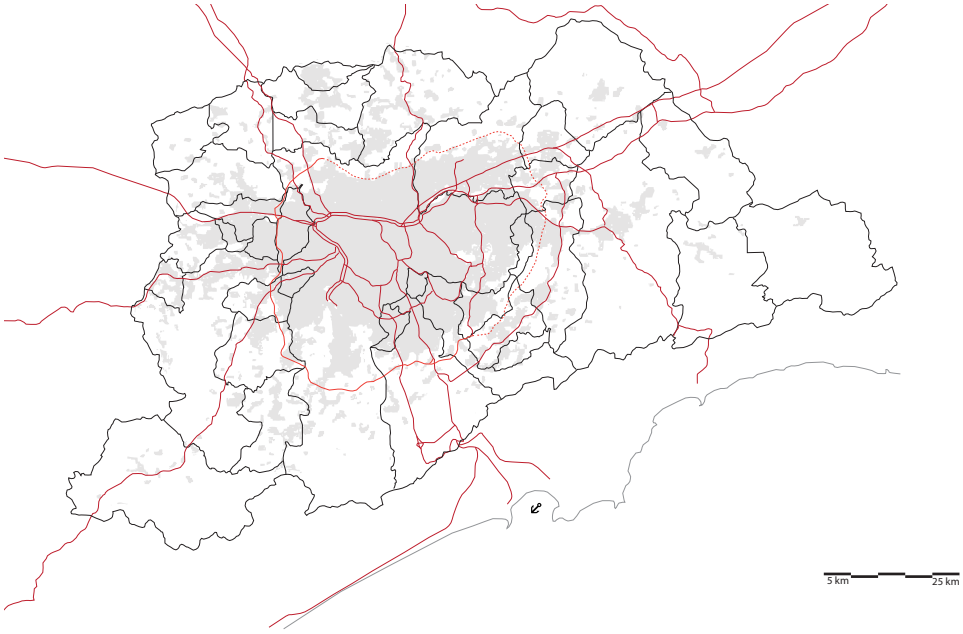
HIDROGRAPHY



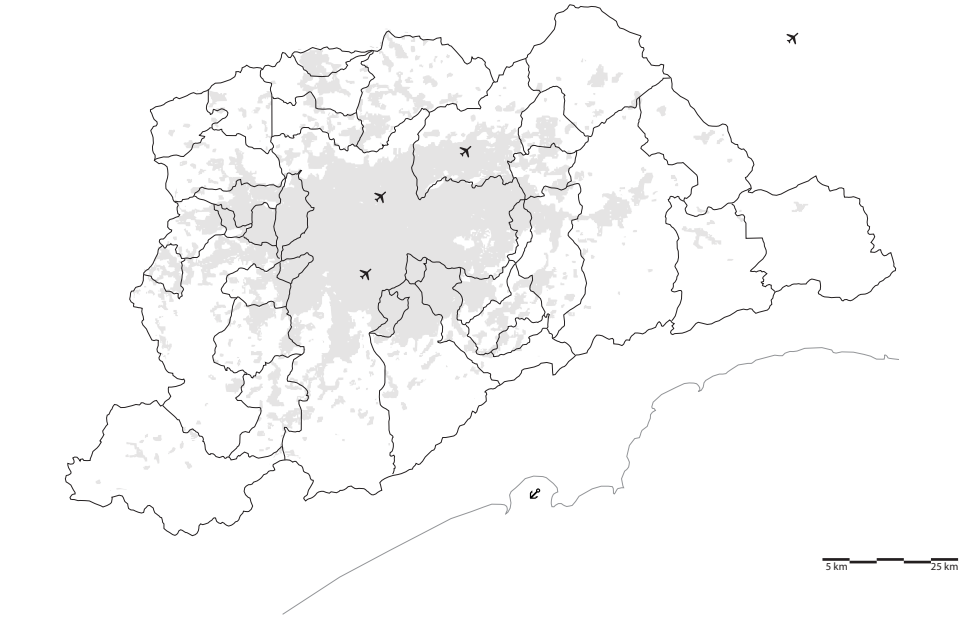
PLANNING FOR METROPOLITAN WATERWAY RING (HIDROANEL)



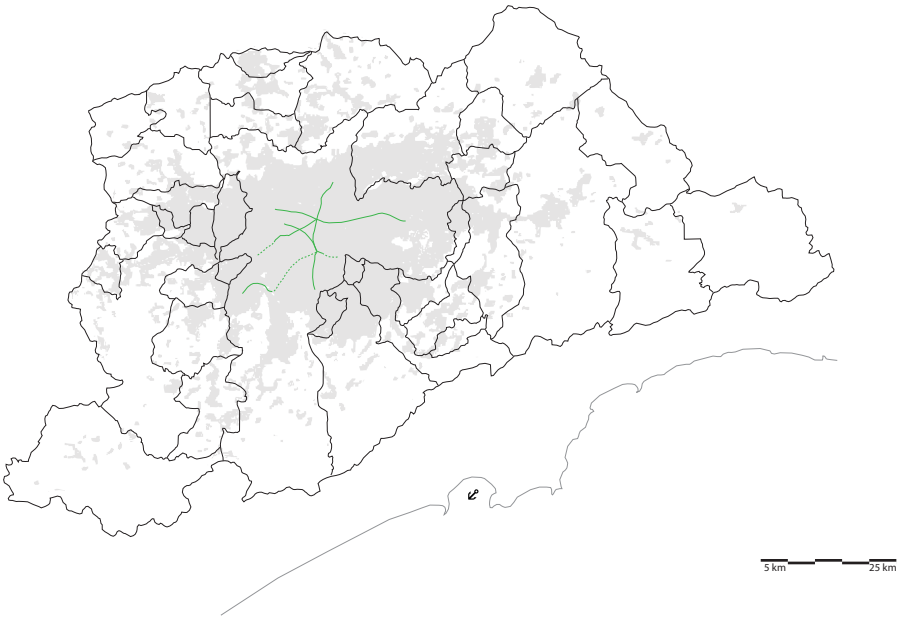
RAILWAY NETWORK



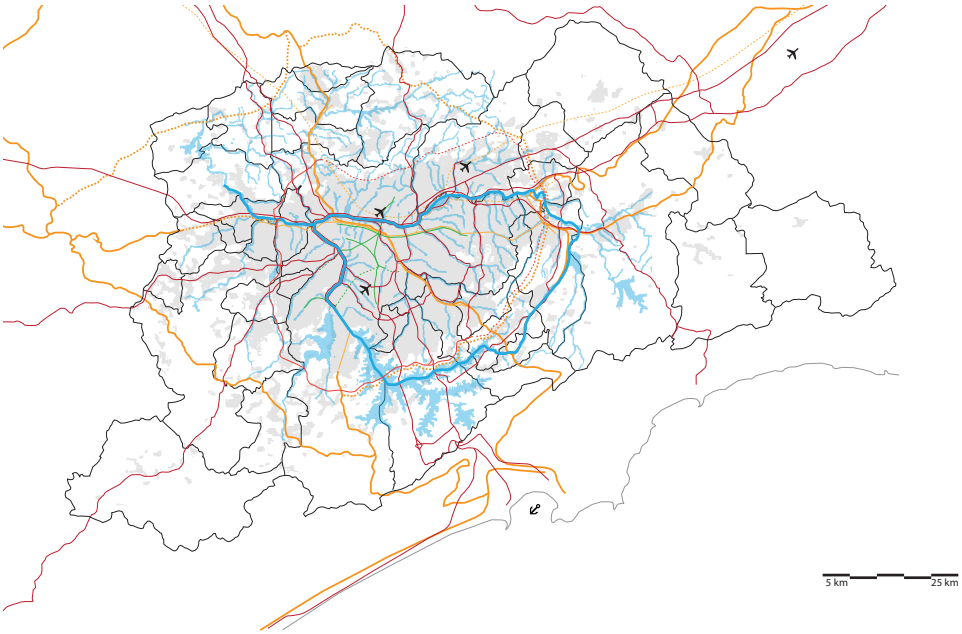
HIGHWAY NETWORK
Source: Emplasa



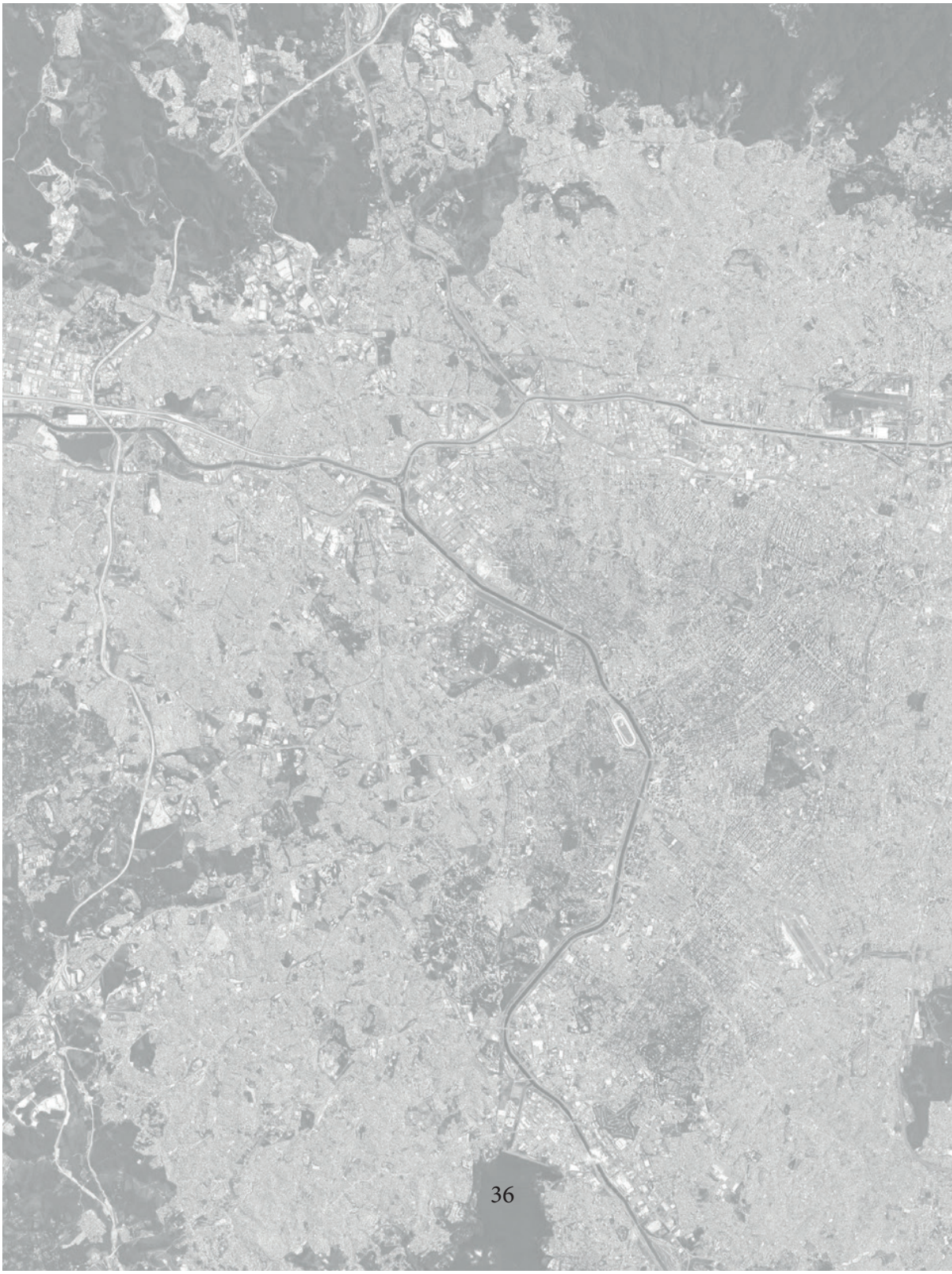
AIRPORTS & SEAPORT



METRO NETWORK



METROPOLITAN INFRASTRUCTURE NETWORKS



Source: Emplasa

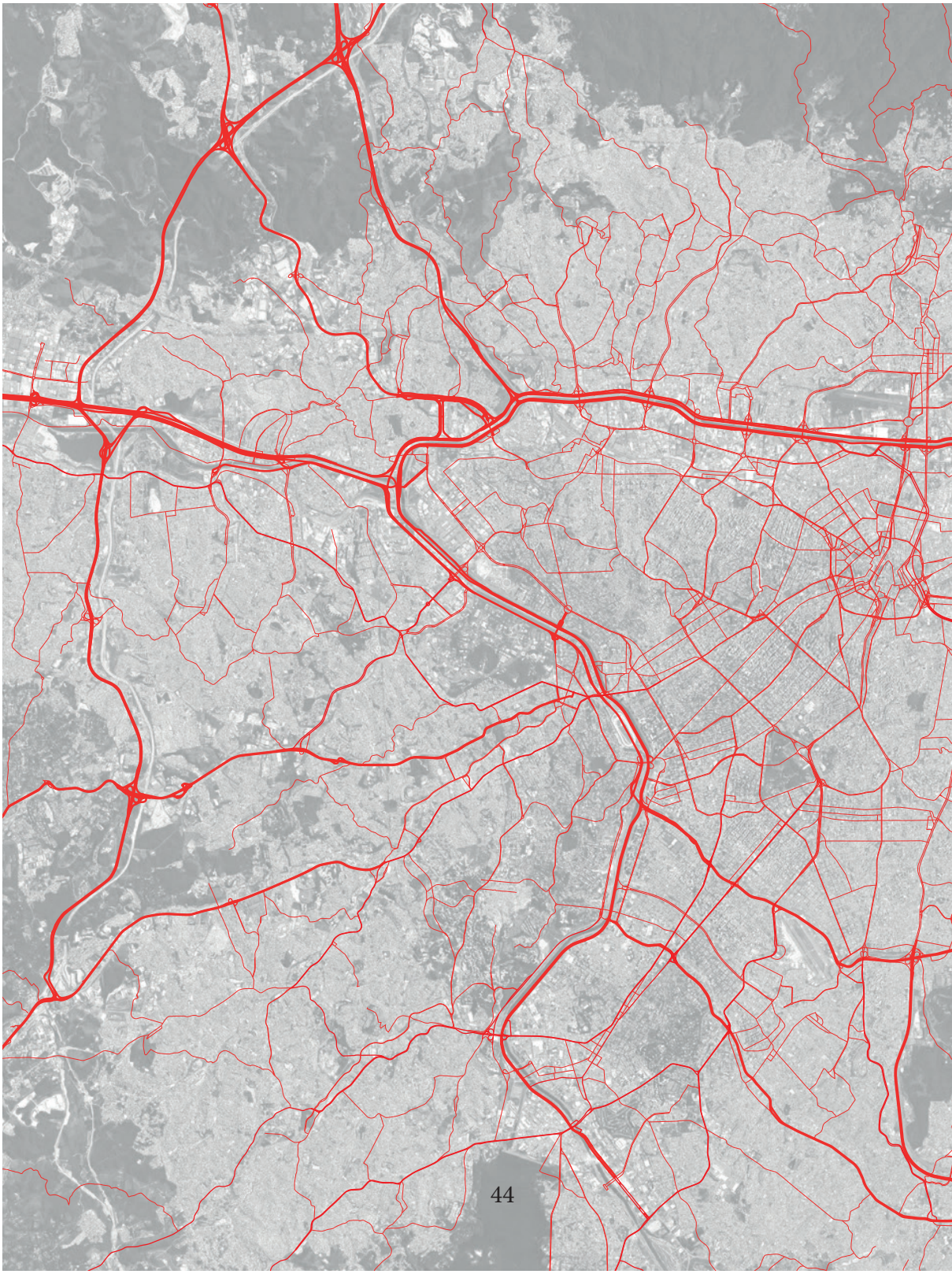
HIDROGRAPHY

GREEN AREAS

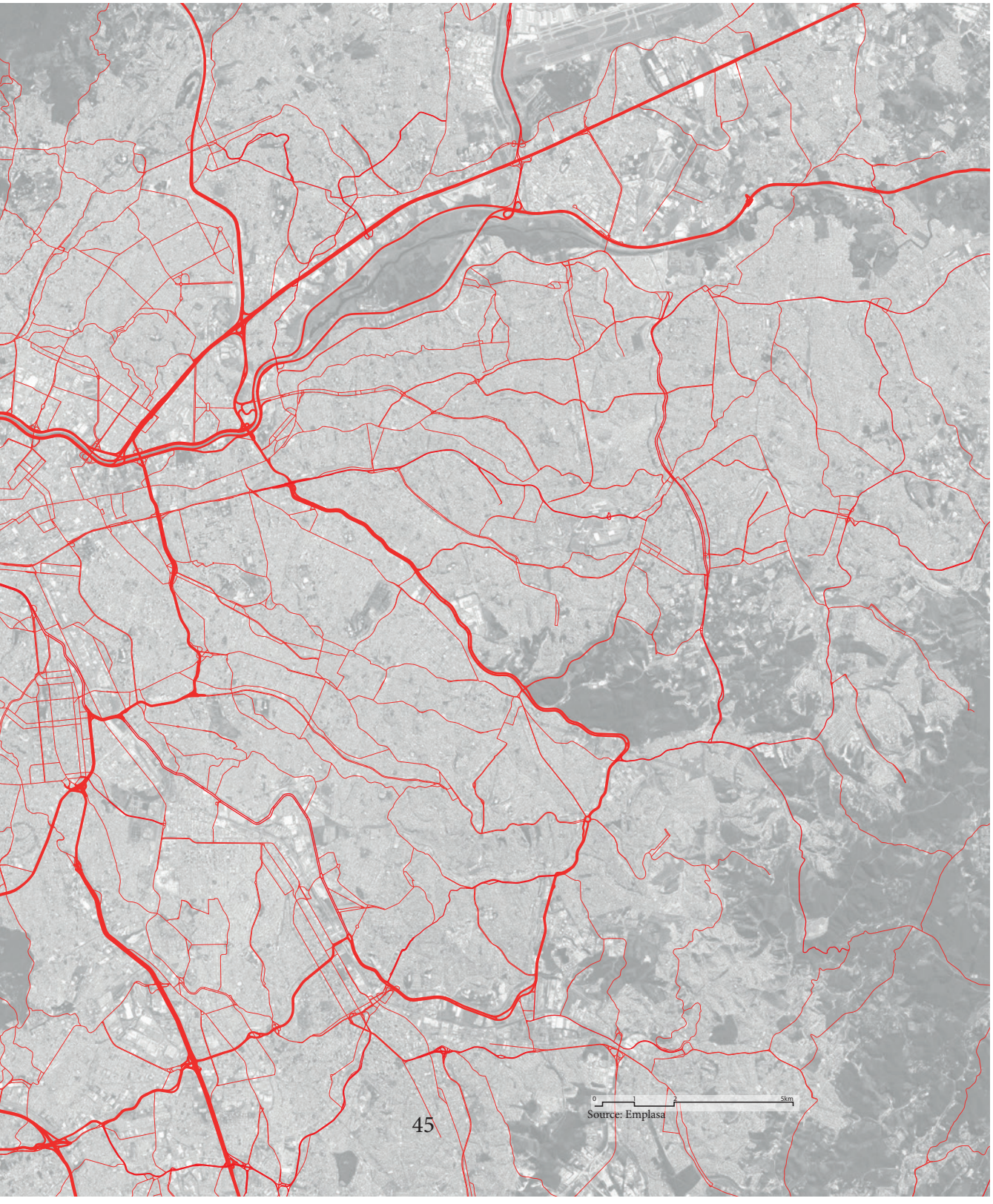
Source: Emplasa

RAILWAY NETWORK (INCL. PLANNING)

Source: Emplasa



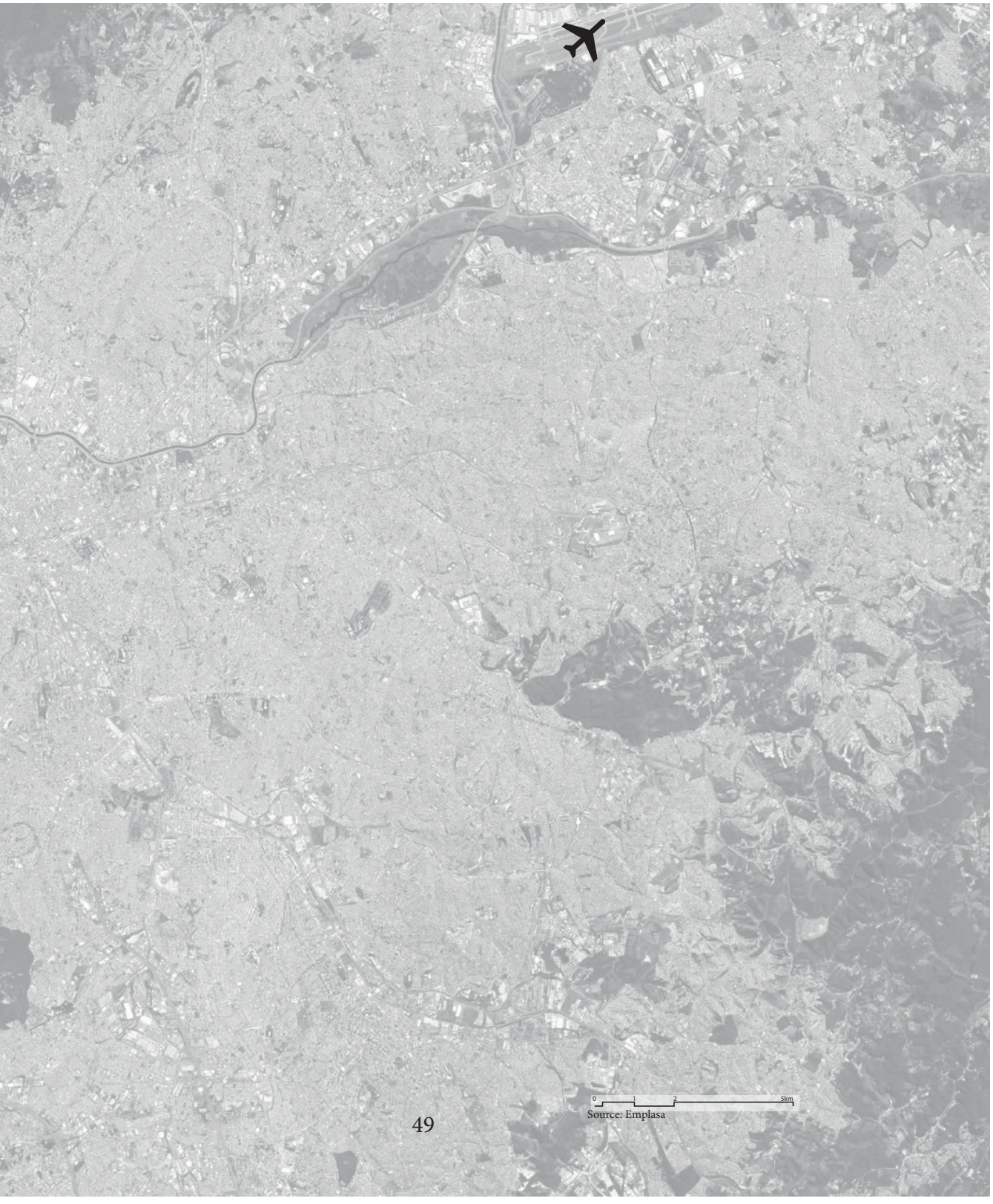
ROAD NETWORK



METRO NETWORK (INCL. PLANNING)

Source: Emplasa

AIRPORTS



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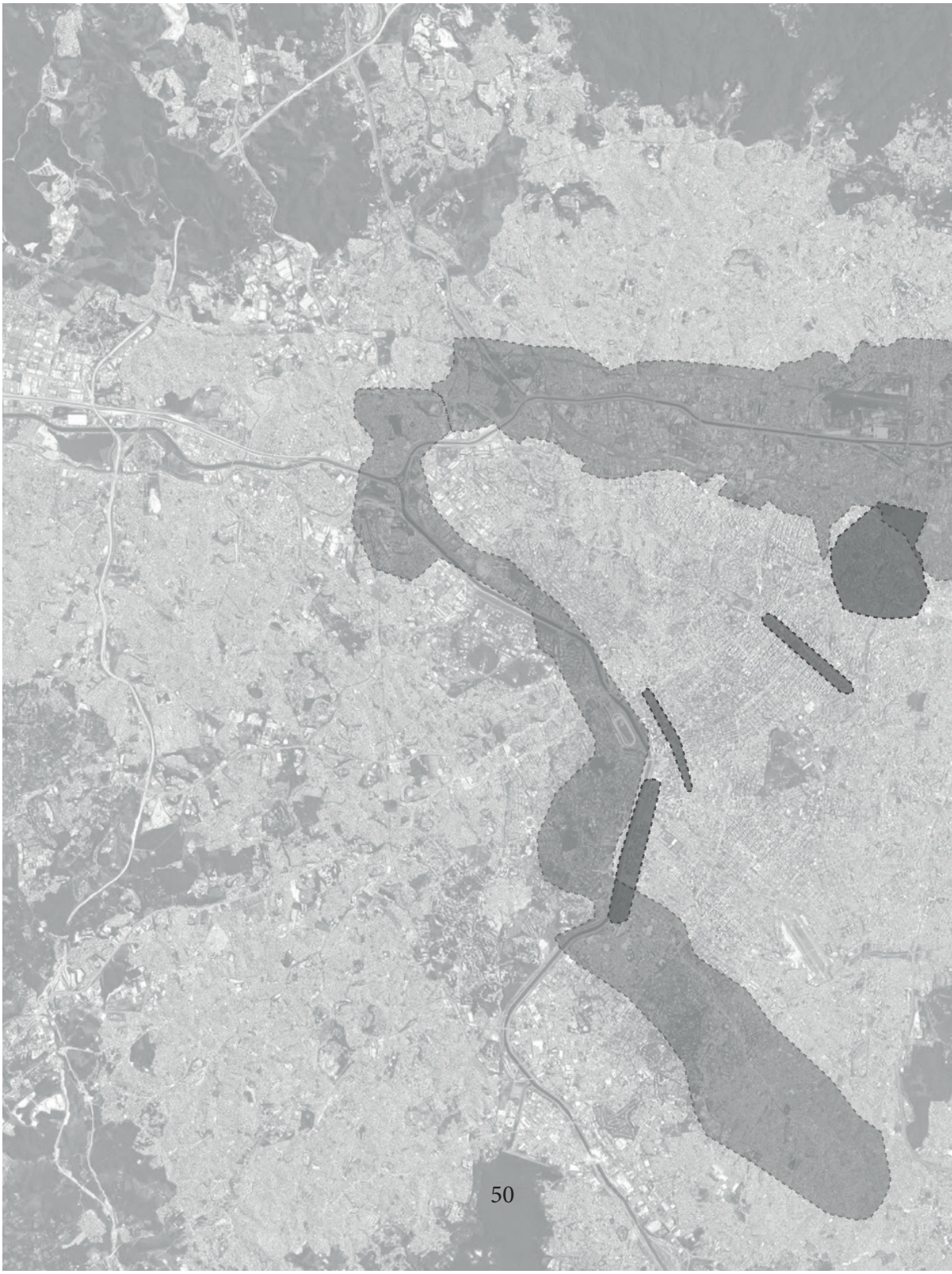
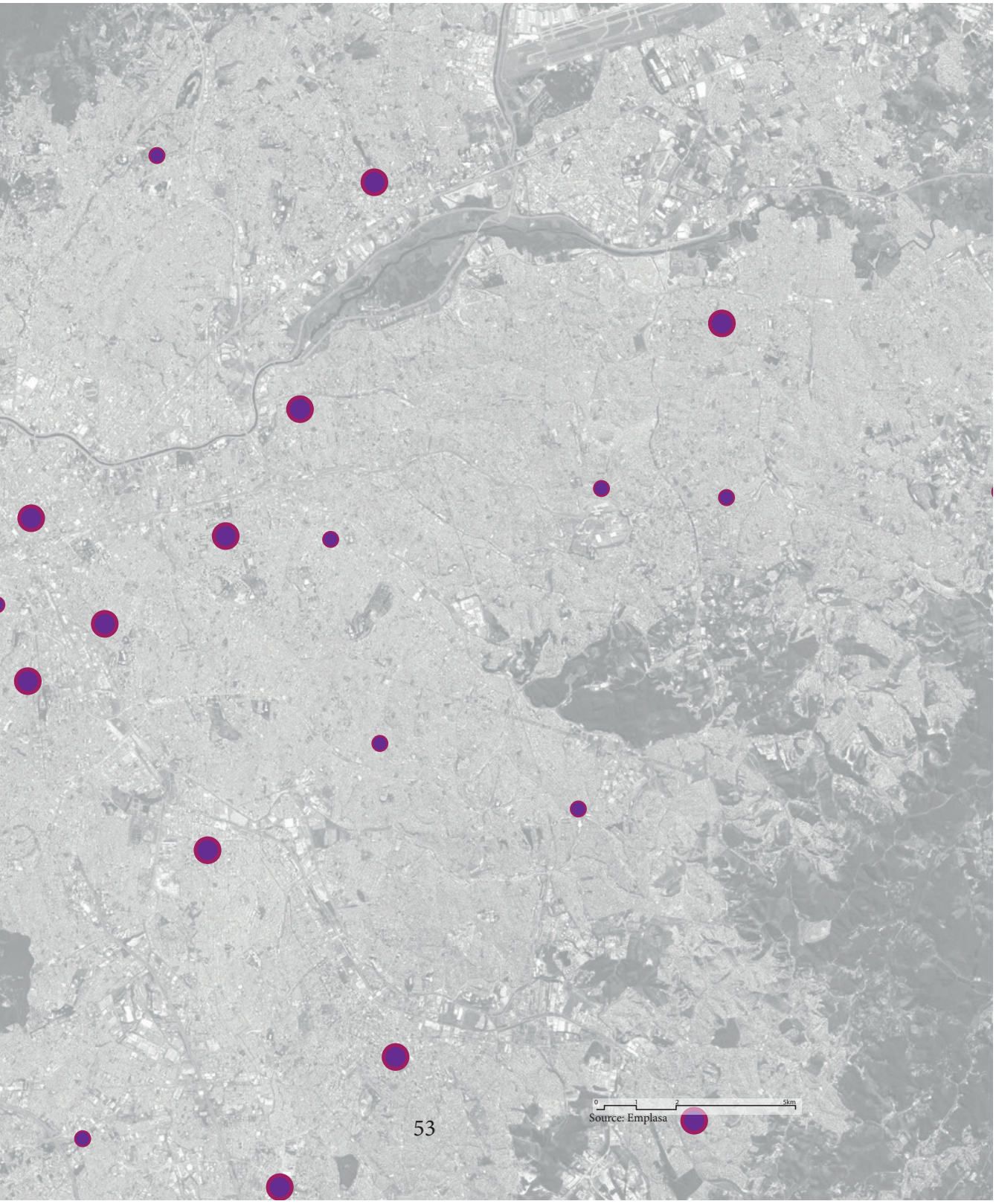
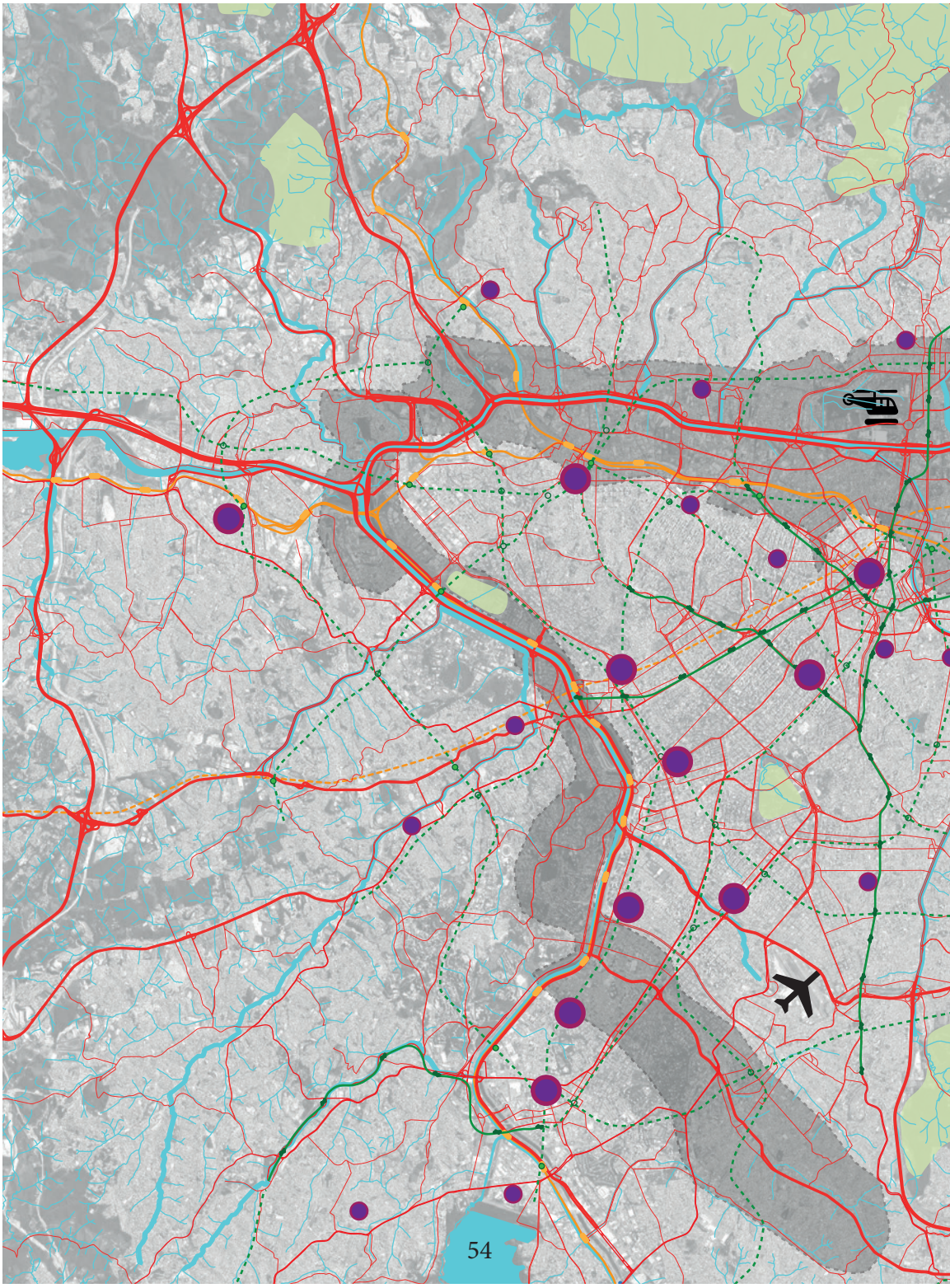


MAIN CENTRAL AREAS & PRIORITY ZONE OF URBAN DEVELOPMENT

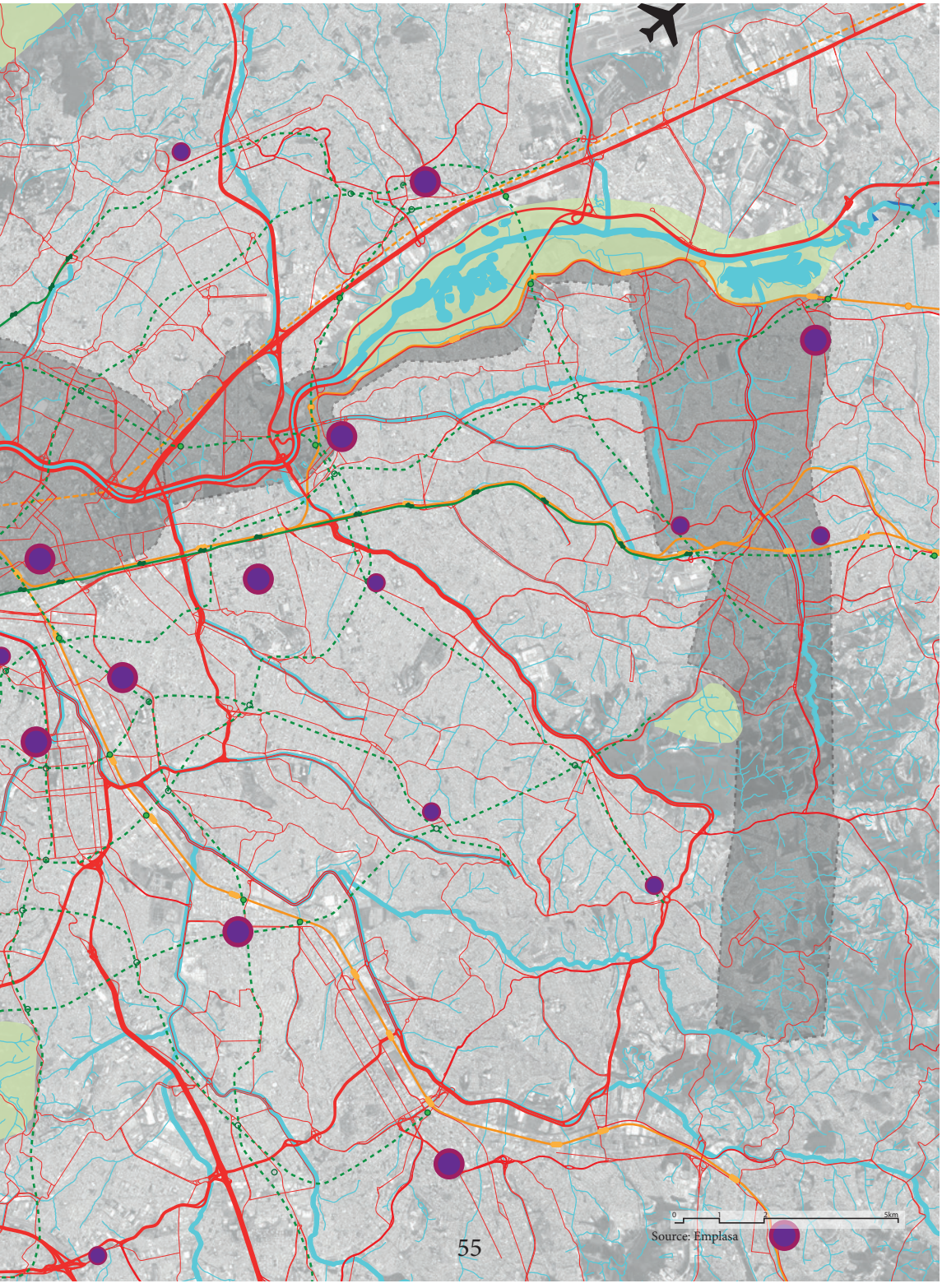
Source: Emplasa

(PREDICTED) URBAN CENTRALITIES





INFRASTRUCTURES & DEVELOPMENT ZONE



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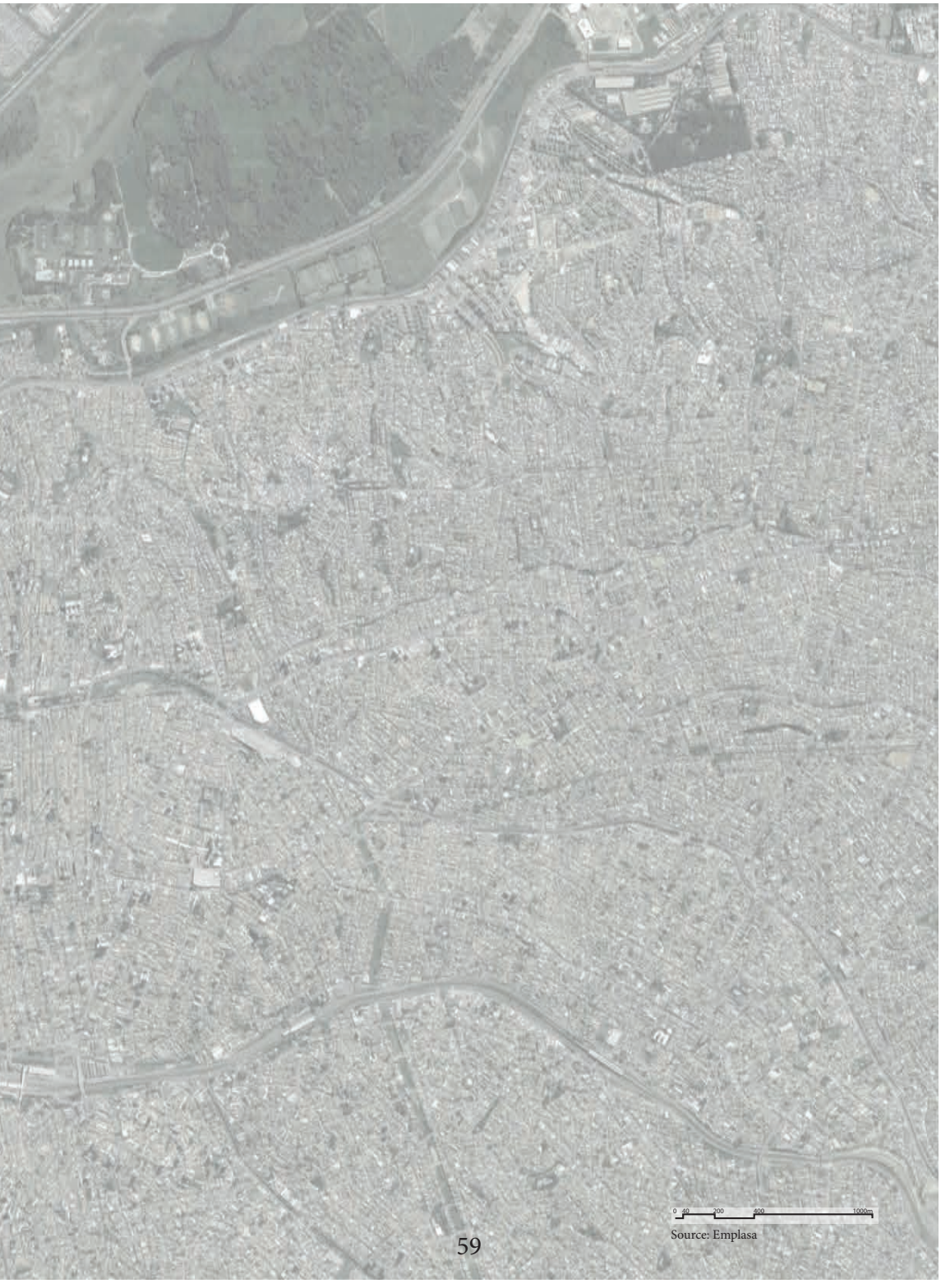
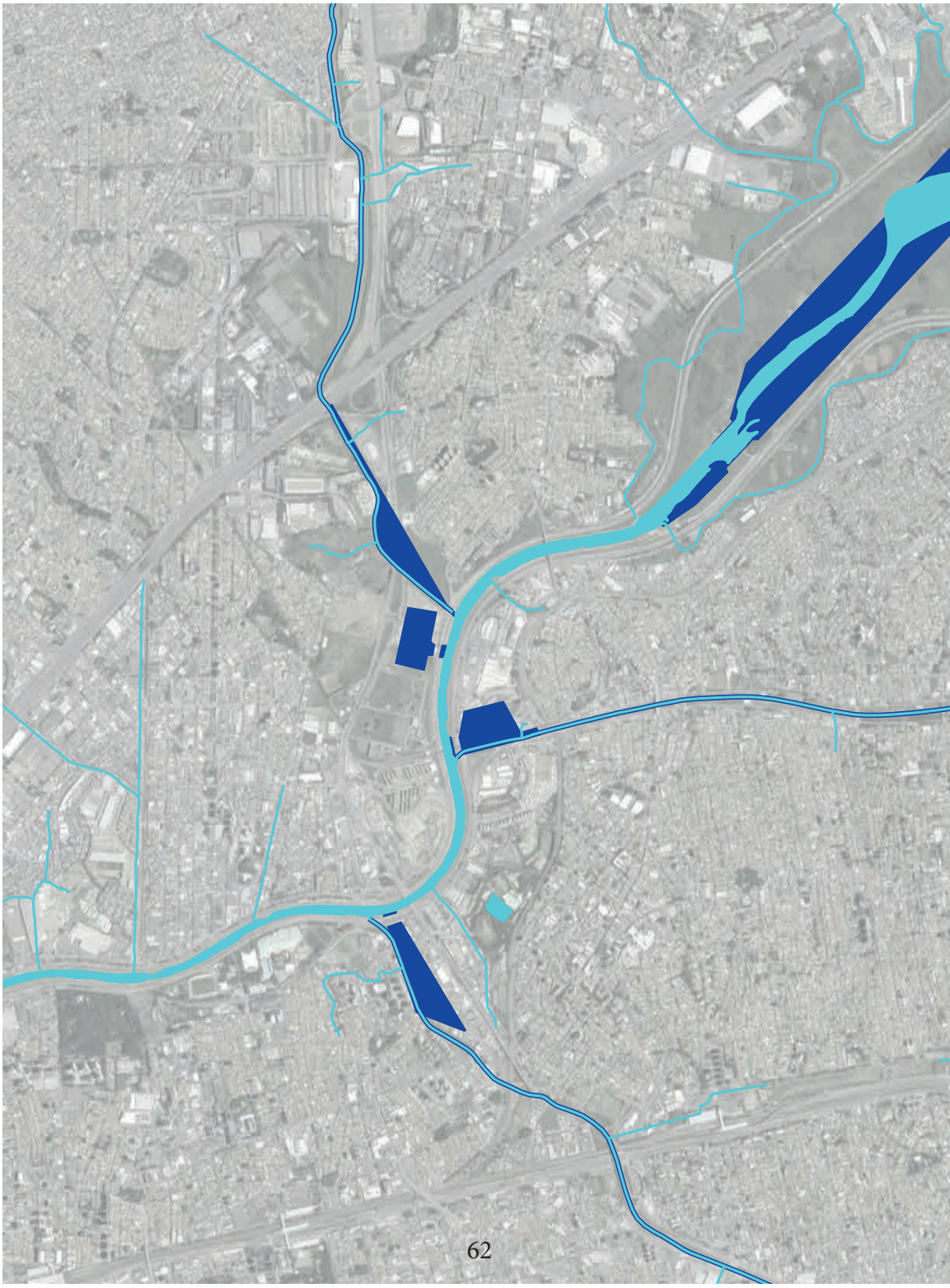


Source: Emplasa

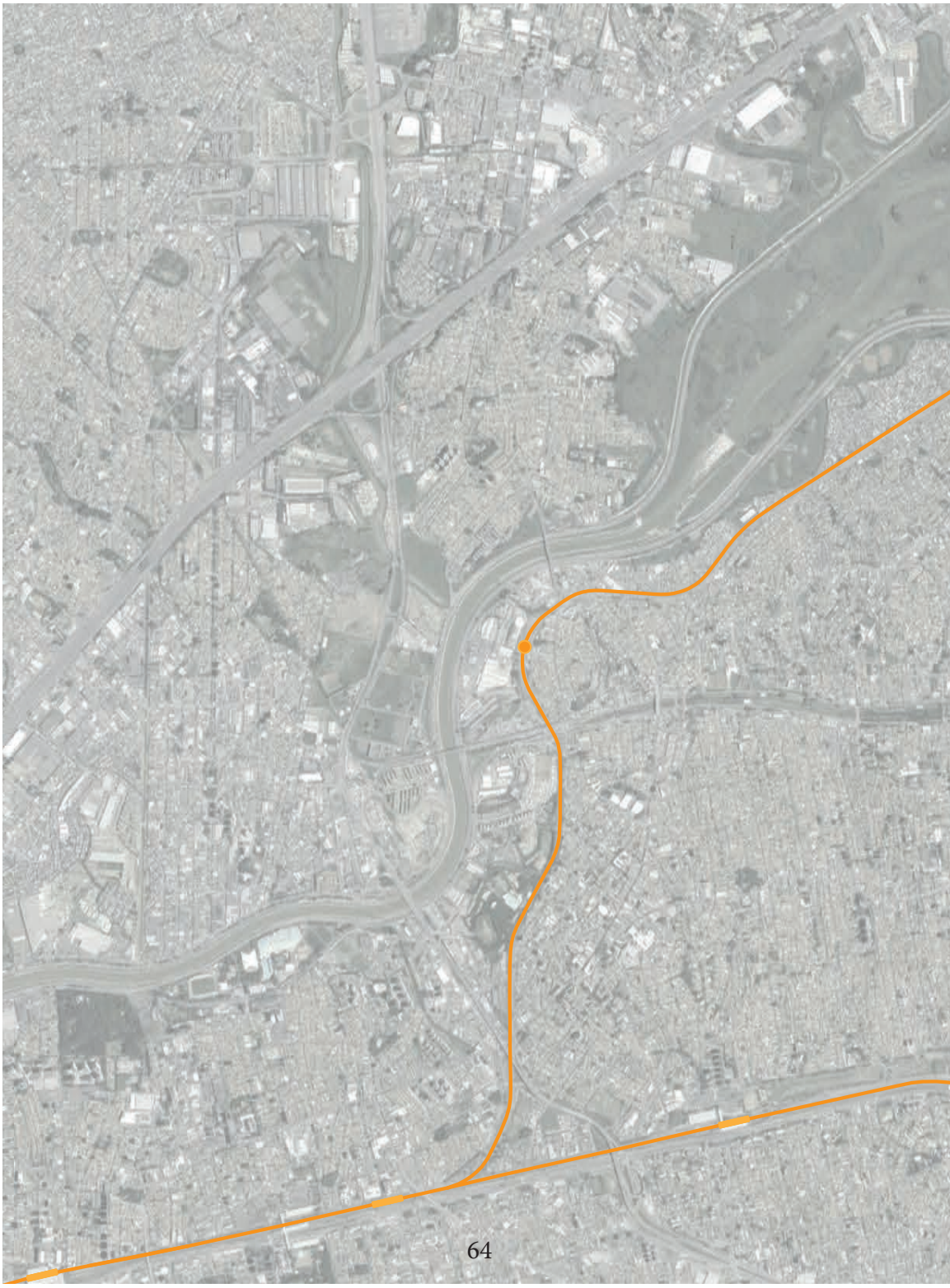
WATERWAY NETWORK

Source: Emplasa

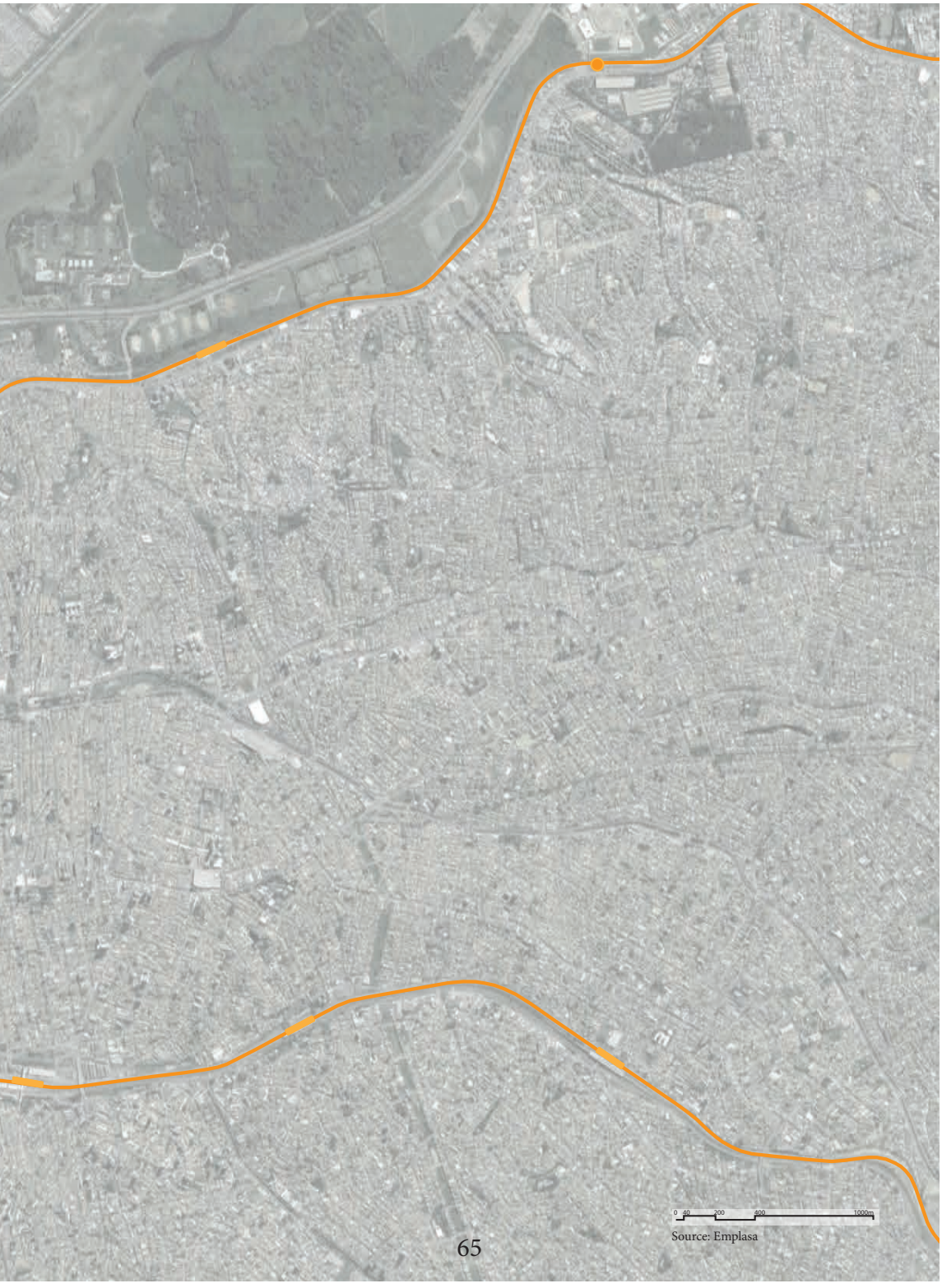


METROPOLITAN WATERWAY RING (PLANNING)

Source: Emplasa



RAILWAY NETWORK



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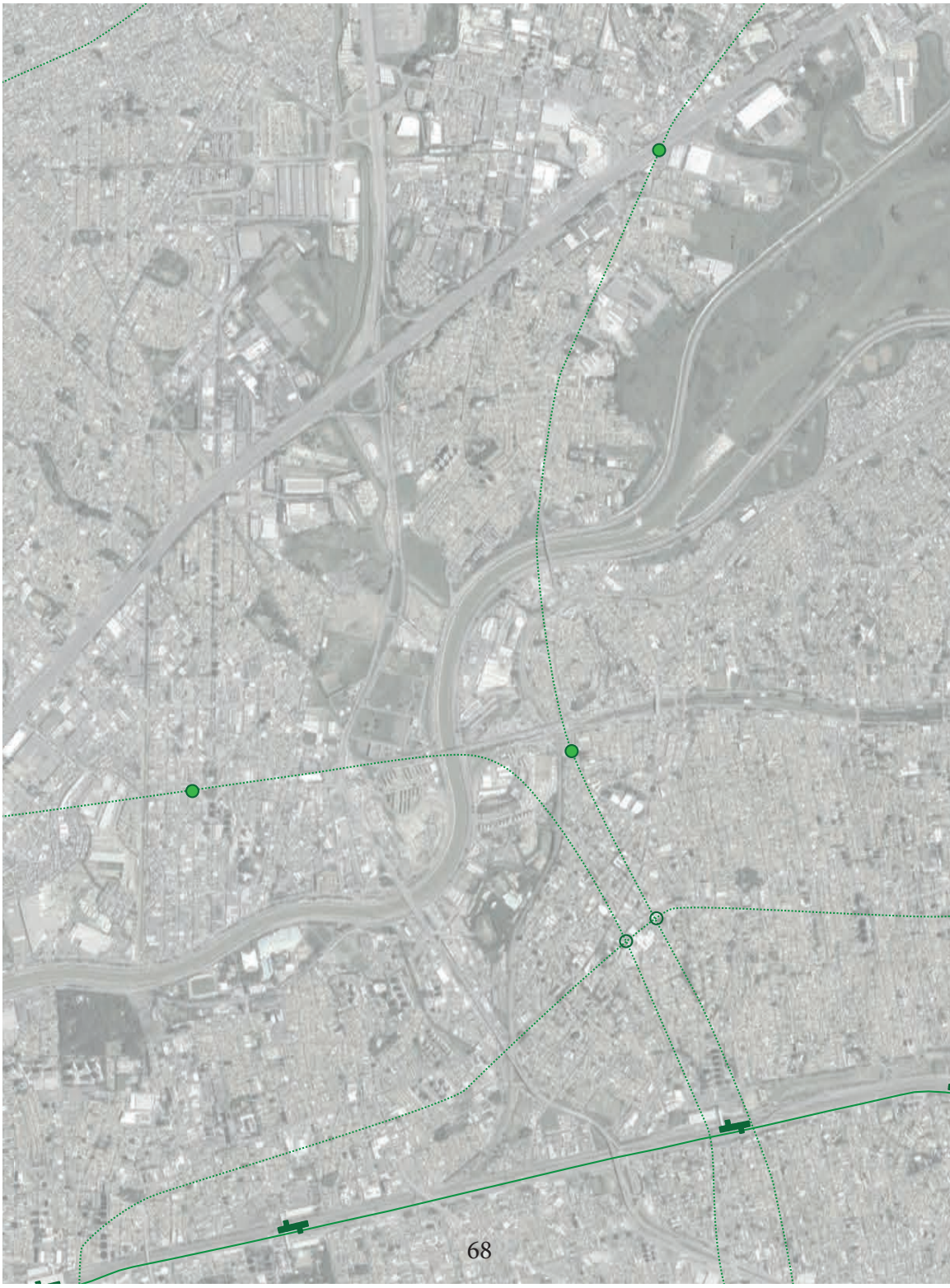
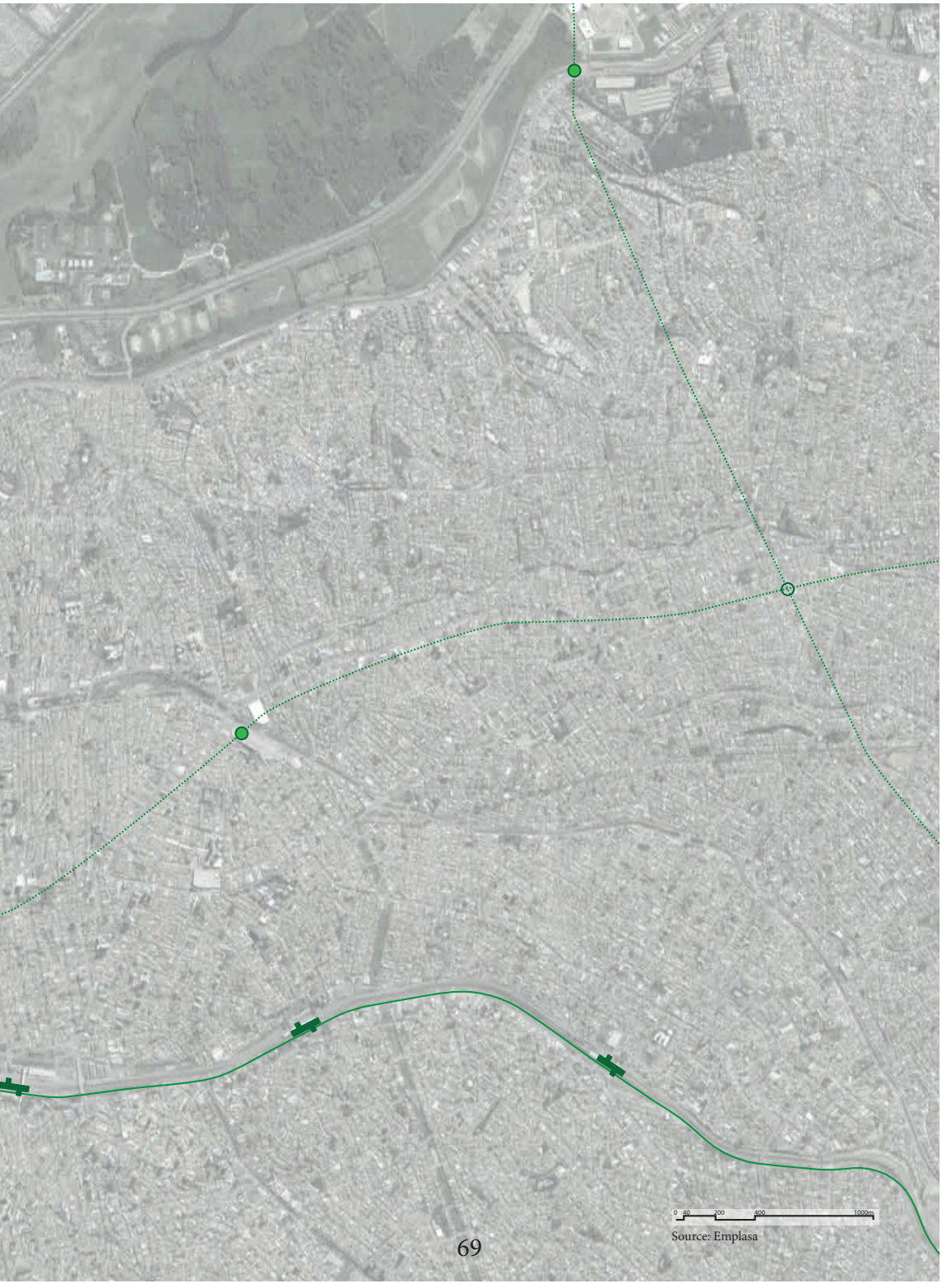
ROAD NETWORK & BUS RAPID TRANSPORT (PLANNING)

Source: Emplasa



METRO NETWORK (INCL. PLANNING)



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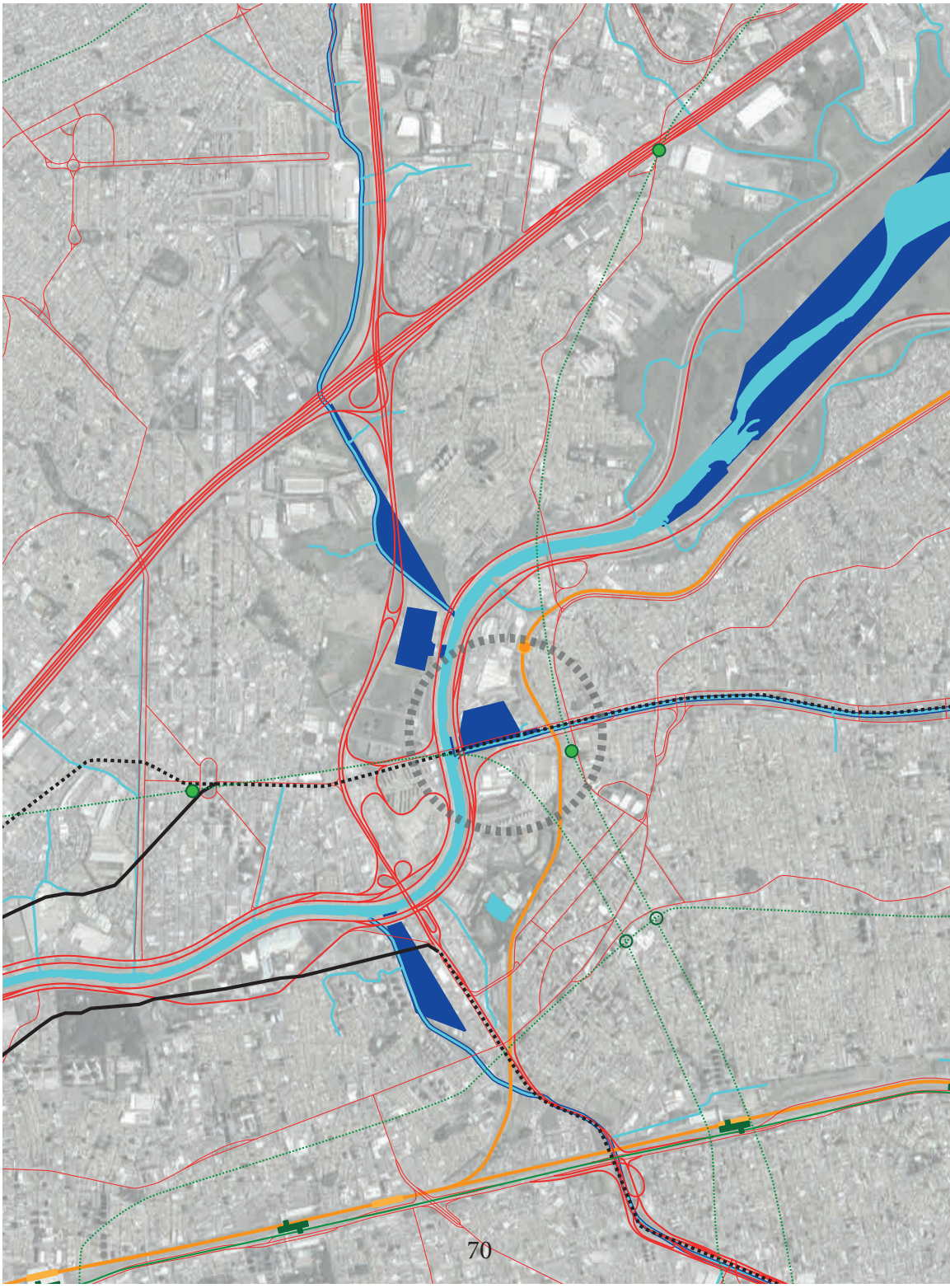


INFRASTRUCTURES

Source: Emplasa

AREA OF FOCUS
Source: Emplasa

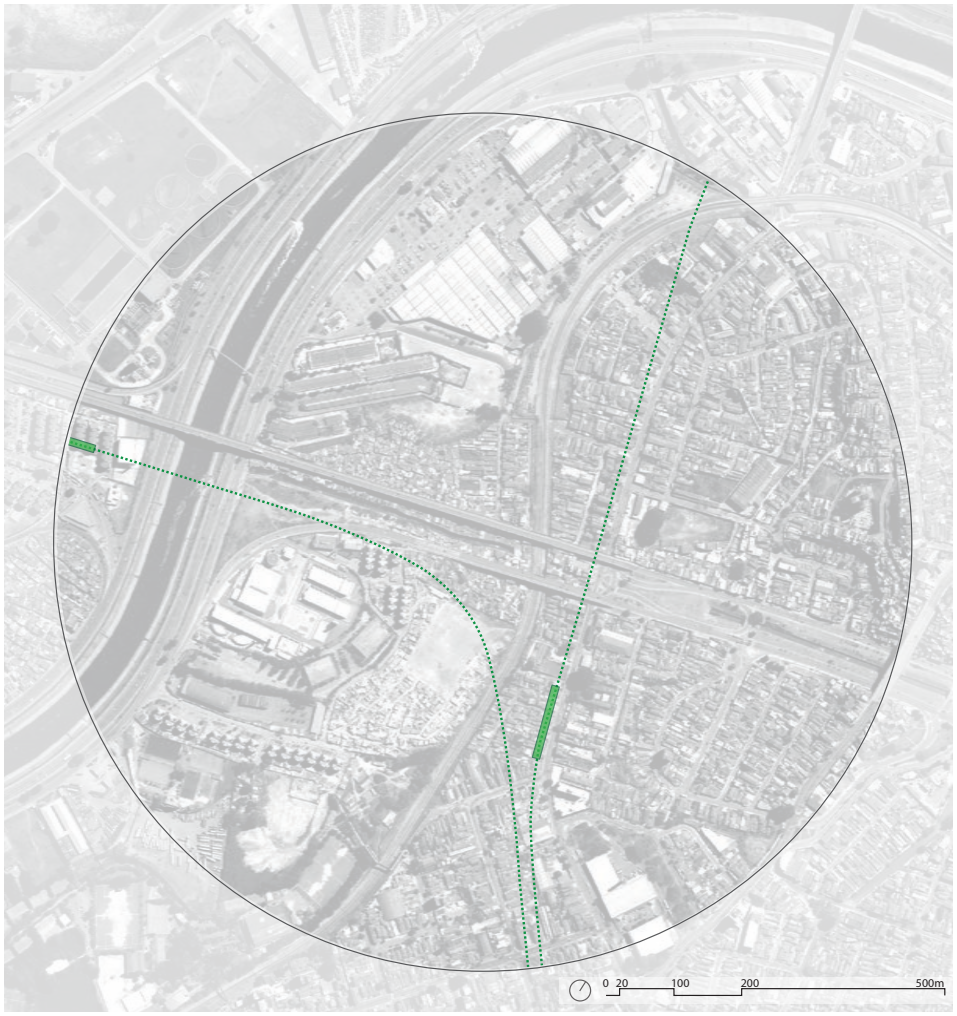
WATERWAY NETWORK & METROPOLITAN WATERWAY RING (PLANNING)
Source: Emplasa

GREEN AREAS
Source: Emplasa

RAILWAY NETWORK (PLANNING)
Source: Emplasa

MAIN ROAD NETWORK

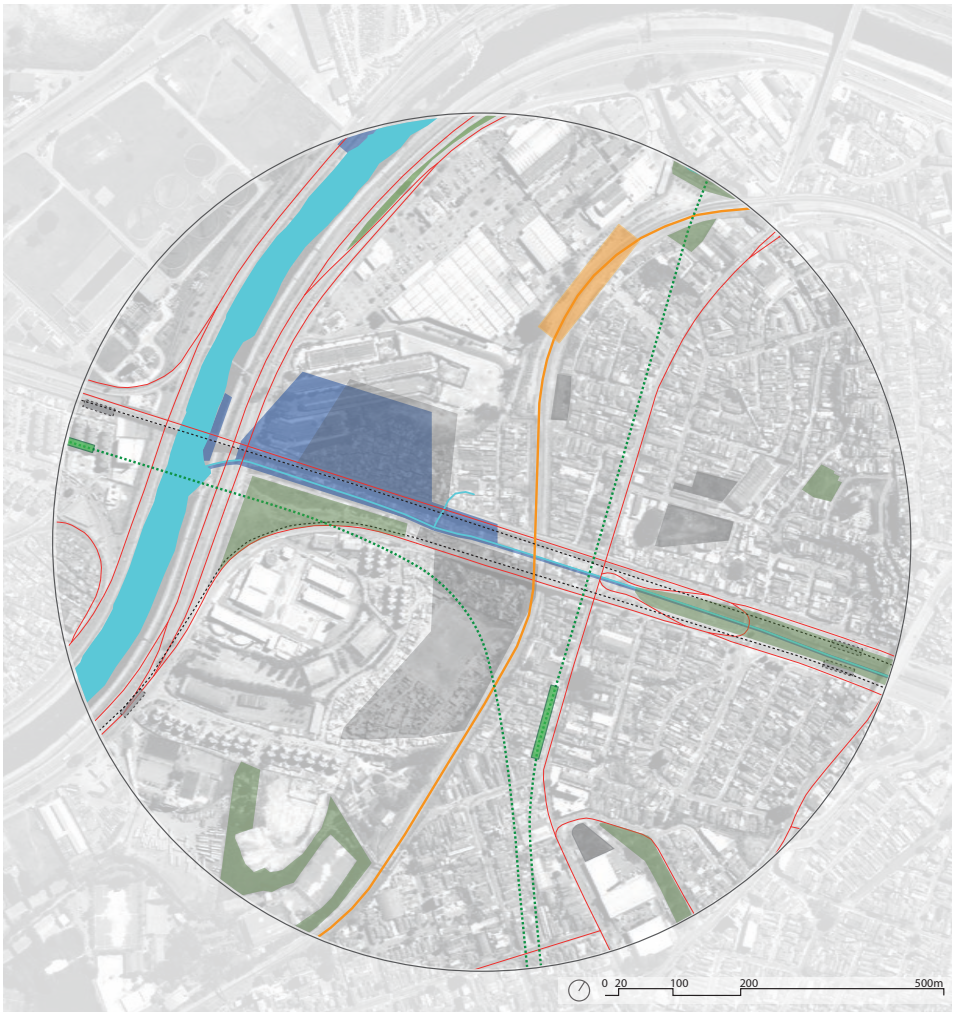
Source: Emplasa



METRO NETWORK (PLANNING)
Source: Emplasa

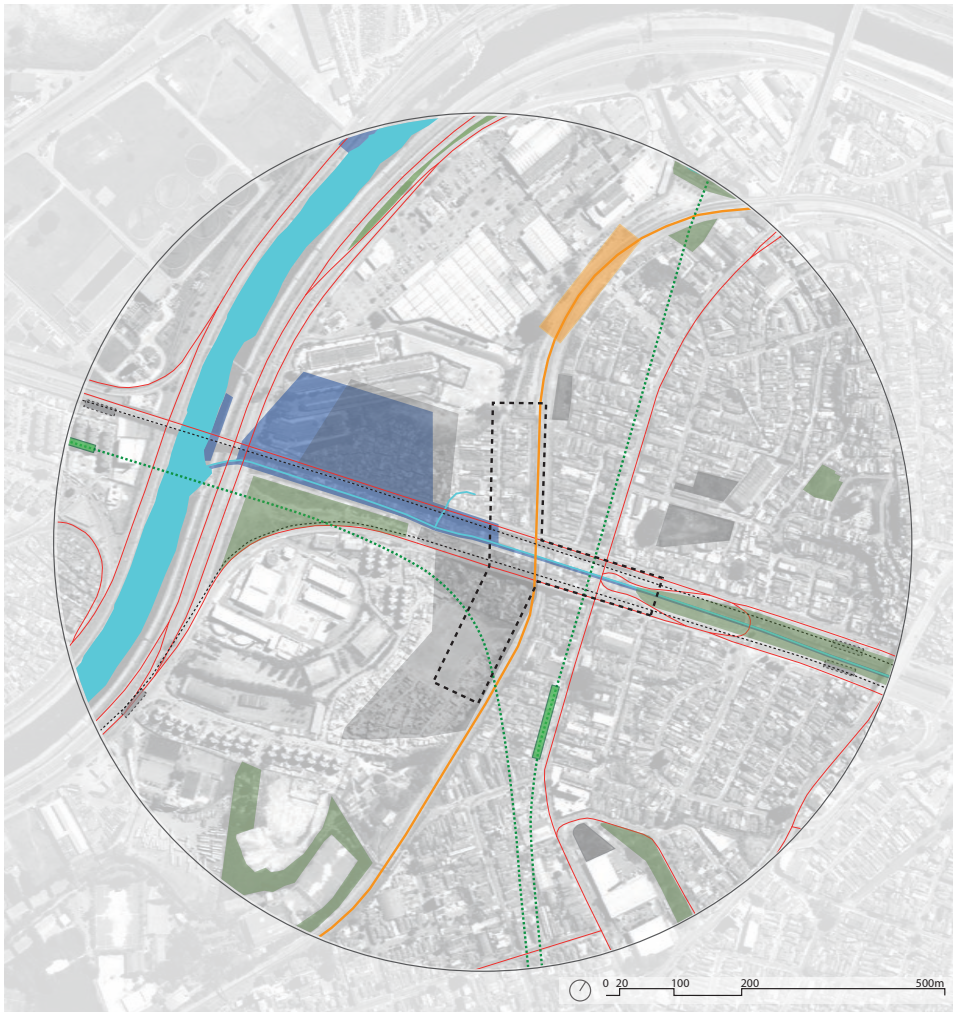
BUS RAPID TRANSPORT (PLANNING)
Source: Emplasa

OPEN AREAS
Source: Emplasa



INFRASTRUCTURES

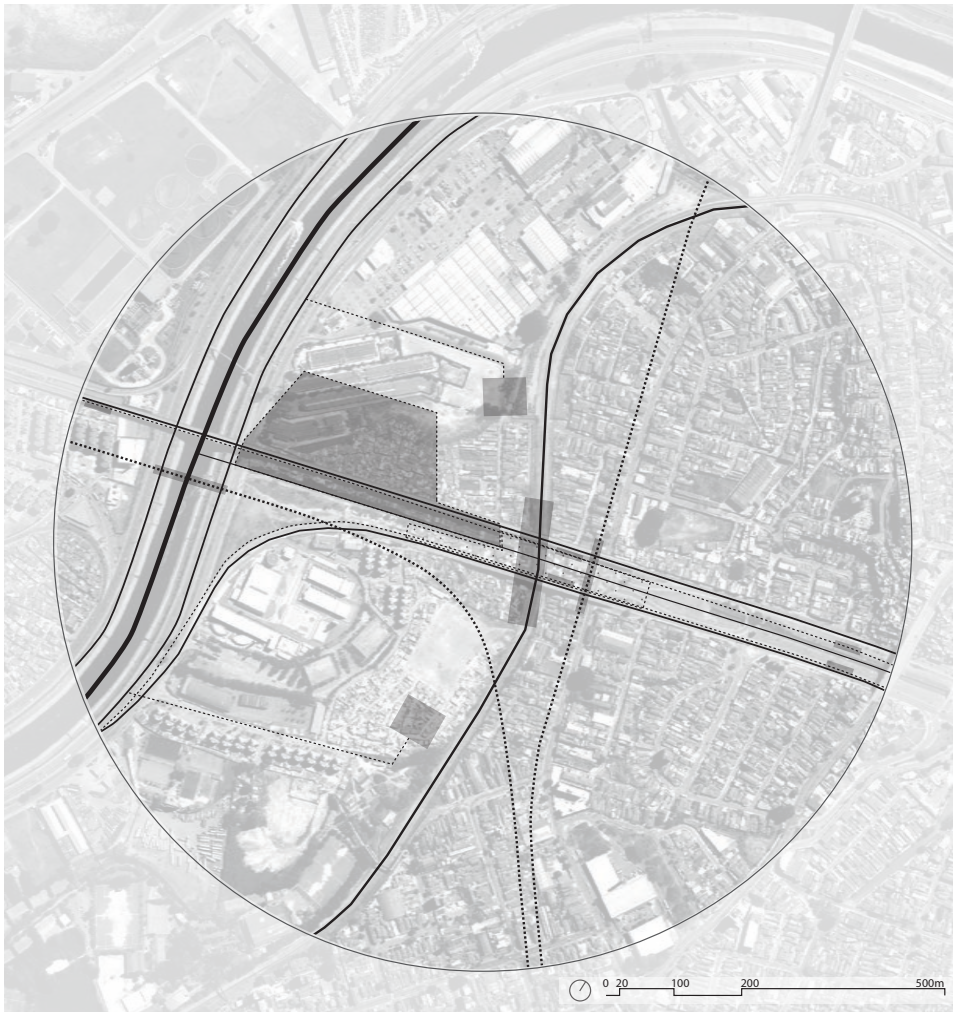
Source: Emplasa



INTERMODAL NODE OF MOBILITY

Source: Emplasa

EXISTING INFRASTRUCTURES
Source: Emplasa



NEW INFRASTRUCTURES
Source: Emplasa

#3
Physical landscape

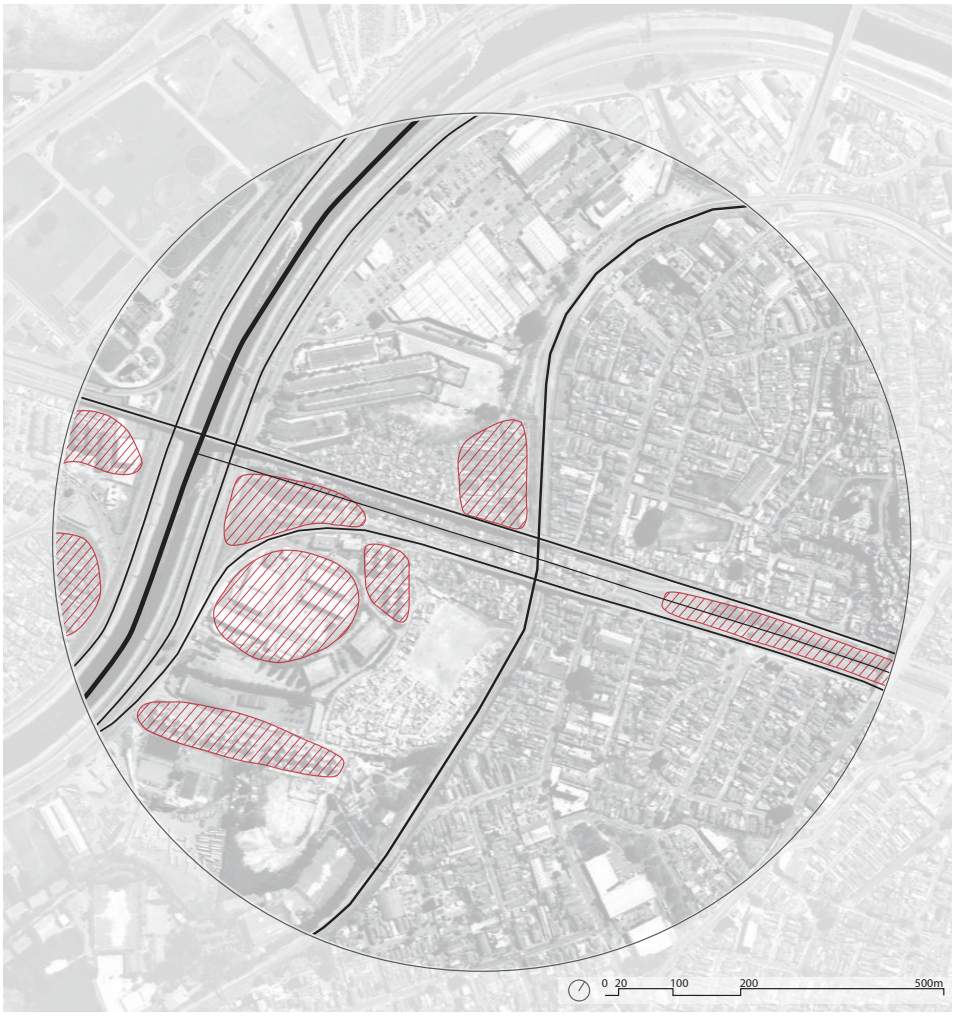
Fig. 4.1: Meeting of Tiête river and Tamanduateí river, 1996.
Source: A construção do caminho (2006) original image by Nelson Kon (1996)

3.1 Introduction

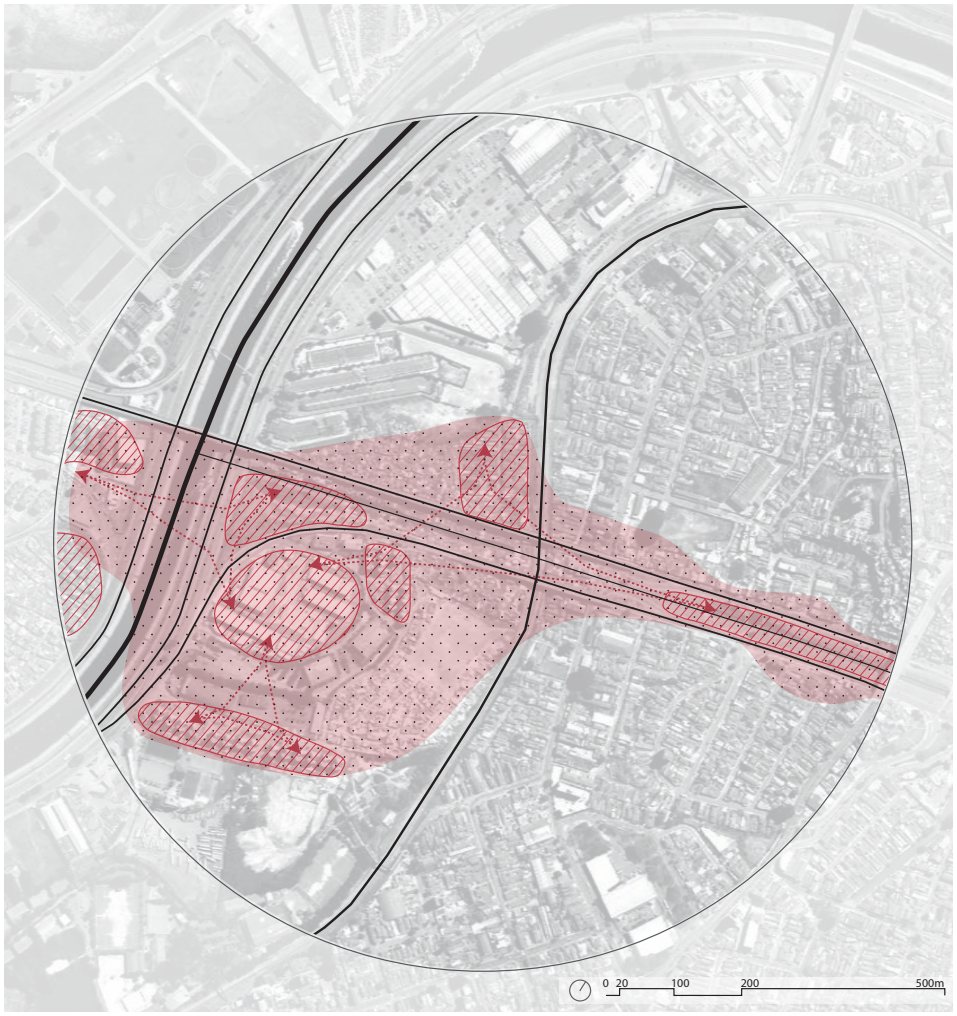
Almost 20% of the territory of the municipality of São Paulo is occupied by 'informal settlements' or favelas. (UN report on informal urbanization 2006) The vast majority of these neighborhoods are located in the peripheries of the metropolitan region, far away from the formally developed central areas of the city. A large amount of the inhabitants of these peripheries work in these central areas, which results in long daily commuting hours. The informal areas are often described as disconnected or poorly connected with the formal city, but in many cases this is just partially true. Of course these regions are spatially dispersed from the city center. The access to health, education and transportation generally is poor. There is a lack of accessible public services and public spaces. But otherwise, especially in terms of economy, the formal and the informal are largely dependent on each others economical structure. '…Many of the so-called backward sectors are actually servicing the advanced economic sectors and their high-income employees.' (Sassen) 2010) One can actually not speak of separate structures but of highly integrated structures.
When focusing more in detail on these dispersed informal regions one will discover a vibrant local economy. As Gabriel Duarte stresses: 'We are not talking about misery. About just sheds with no access to any economic development. We are seeing sheds that are located on areas not in use by real-estate developers, but areas close to places that offer economic possibilities for these inhabitants.' (Gabriel Duarte 2013) Therefore approaching these dispersed informal regions with large strategies of removal and displacement of inhabitants is undesirable and has proven to be ineffective and counterproductive.

It seems more relevant to try to understand the economical processes before implementing large spatial transformation. Without this understanding of the economical process, one can't think about the improvement for the population. The population needs support, and support means the capacity of having economy.

Another aspect that should be taken into account in this perspective is the transforming economic landscape of São Paulo and its metropolitan region. The city has long been dependent on its large industrial economy, and still largely is, but should transform itself towards a service-based economy, to stay competitive. This transition has large implications on the urban landscape of the city and offers another potential in moving towards a more inclusive and economically sustainable urban

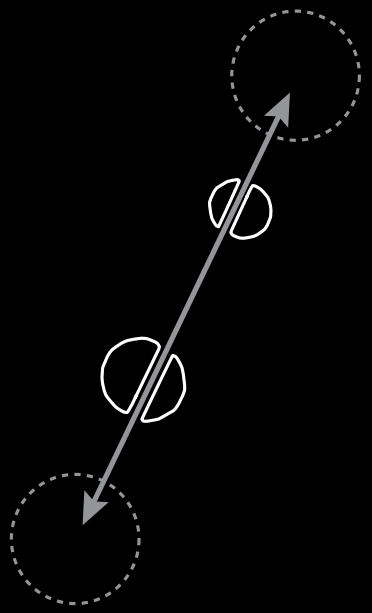


EXISTING INFRASTRUCTURES FORM STRONG PHYSICAL BOUNDARY WHICH RESULT IN DISCONNECTED ISLANDS
Source: Emplasa



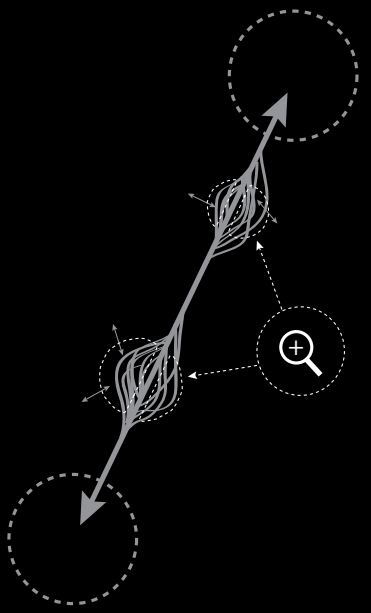
NEW IMPLEMENTATION OPENS UP PHYSICAL CONNECTIONS AND ENHANCES THE SPATIAL CONTINUITY OF THE AREA.
Source: Emplasa

Physical integration



TODAY'S ATTITUDE

Diagnosis



TOMORROW'S ATTITUDE

Potential

Image: archive of Oliver de Luccia

Oliver de Luccia
on proximite water as an urban development strategy

Your graduation project, and also your current PhD focuses on the hidroanel development, specifically in the eastern region (Zona Leste, ZL) of Sao Paulo. Why is this region so interesting to you?
Most people of Sao Paulo live in these regions, and most problems are to solve here. ZL is for the greatest part the result of the migration of Nordestinas, people from the northeast of Brazil who settled in Sao Paulo in the 1950s and 60s. The region is almost entirely auto-constructed, with no planning at all. It consists of what we call 'bairros dormitorios', sleeping parts of the city, where there are no facilities and all people travel daily to their work in the centre.

And the Hidroanel development?
Again a classical example for Sao Paulo. Typically the roads and avenues of Sao Paulo are constructed upon its rivers, or on the boarders of former rivers that are now fully canalized. Slow traffic and water are segregated from each other; the proximity of the water is lost. One of the goals of the Hidroanel development is to bring back this proximity of water and people. By regulating the city's water infrastructure on an intelligent way.

What kind of intelligent adaptations are we talking about?
As design we envision every crossing of rivers as a space where can regulate the different amount of water, with lakes and water basins, and 'sluizen' that regulate the different amounts of water. These places of water are a sort of 'joint' in the city, attracting other facilities. Pubic places in the city where the water is proximate.

Using the water network to create specific point of urban development?
We see the river as an important system for the city that lost its value, but can be reinstated to become again a backbone for the contemporary Sao Paulo. In this system the smallest rivers (corregos) are as important as Rio Tiete or Rio Pinheiros. Integrating micro stations of water treatment in the smaller river infrastructure helps us to think and design in a more decentralized way. A treatment station for every micro-basin makes these regions less dependent on the traditionally better developed centres of the city.

So directly incorporating small-scale solutions?
The Hidroanel project has a great focus on the transportation of waste, for recycling reasons. This starts at the small scale. That's why we imagine 'eco-points' as we call them, as places where pedestrians can bring and separate their garbage, close to their houses, and close to the water network, as this is almost everywhere. Over water we can than transport this to larger ports where the actual recycling is done.

This asks for a change of mentality of the users, the people of the city?
Yes, and therefore we also believe the small scale is very important to realise this. It makes it understandable, and it creates the feeling

that the network is a part of your daily life. This should lead to a change of mentality on every scale. But it's not the one or the other, the mentality of the users and the construction of the system go hand in hand.

Designing decentralization; also in the approach of planning?
This should go hand in hand. Now, for example, all the borders of the sub-municipalities are situated on the rivers. The river forms the border, so these sub-municipalities don't develop them at all, as they 'believe' the other municipality is responsible. Or development is done fragmented on just one margin of the rivers. This simple misplacement of municipality borders makes the process of the recuperation of the rivers, from a planning perspective, incredibly complex. And this is just one example.

Every system of Sao Paulo is developed from a centralized perspective. In some planning models a decentralized model is the ambition, bus in the end the development is primarily implemented in the centre or more developed regions, and then just stops. It never reaches these decentralized regions, which are in great need of proper infrastructure. In our studies we should integrate other strategies that promote decentralization as a new, more effective approach.

This also means integrating different systems with each other.
Certainly. We have to integrate our roads, railways and waterways within the same system. The potential is that they can offer a multitude of possibilities; multiple ways of use for different groups of users.
The bridge over Av. Nacoes Unidas, what became our postcard image, offers just one solution, for those who have a car; those who are rich. It's a monument of capitalism. Costing the municipality millions, but only in of use for less than 5% of the people. It does nothing for pedestrians, cyclists; you and me.

"Every system of Sao Paulo is developed from a centralized perspective, even when a decentralized model is the ambition, in the end the development is first implemented in the centre or more developed regions, and then just stops."

For all these ideas, designs and planning proposals we need a test site.
Yes, and here we return to the Arco do Tiete region and my interest in Penha, the gate to ZL. The Arco do Tiete is where development focuses now, and with the construction of the Eclusa da Penha, which officially started, this part of the river becomes navigable for large transport vessels. Here we can test several planning developments proposed in the Hidroanel project, and show the inhabitants the potential benefit of a river that not just functions as a sewage canal, but can have a multifunctional role for the city, a truly urban river.

#4
Environmental landscape

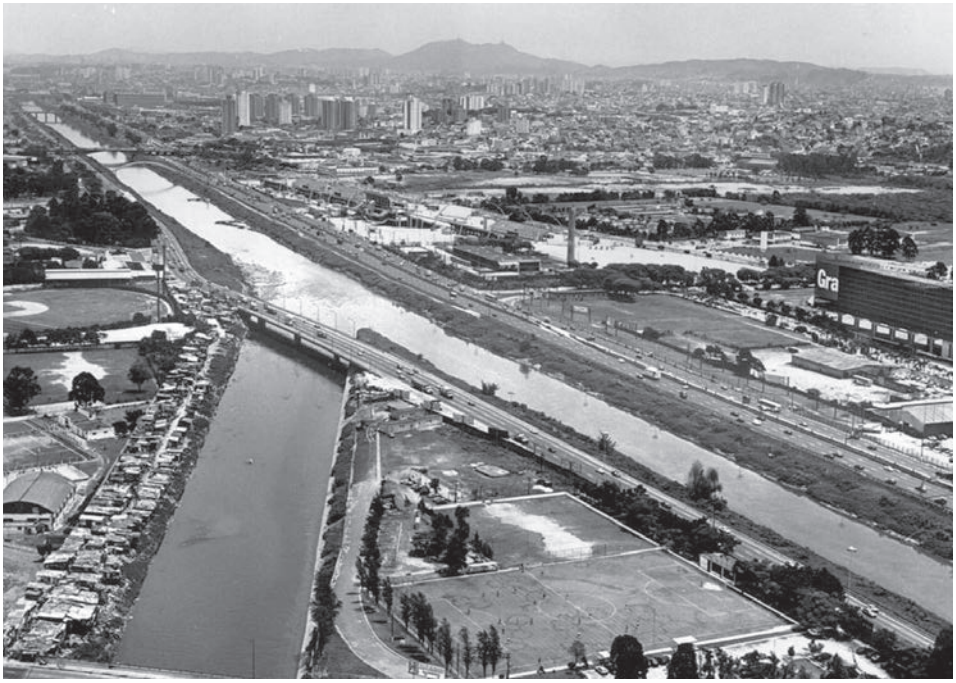


Fig. 4.1: Meeting of Tiête river and Tamanduateĺ river, 1996.
Source: A construção do caminho (2006) original image by Nelson Kon (1996)

4.1 Introduction

São Paulo is a city built upon part of the second largest water basin of the South American Continent, the Rio de la Plata basin. The main rivers along which the city expanded during the last four and a half centuries are the Tiête river, and the smaller Pinheiros and Tamanduateí river that, already in the city, flow into the Tiête river. The Tiête river flows to the north-west; so inland to first the Paraná river and finally to the Rio de la Plata bay of Buenos Aires and Montevideo where the river reaches the Atlantic. This potential of water infrastructure that could be utilized to explore the hinterlands of the continent was the main reason for the Portuguese colonists to establish the settlement of São Paulo in 1554.

During the development of the settlement towards the large metropolis of more than 20 million inhabitants that it is now, the geography of the water basin has continuously been important as a structuring element for the city and its infrastructure. In history the water as infrastructure and natural space and its marshes fulfilled a multiple of functions. Activities such as transport, fishing and trade and later industrial developments, but also smaller activities as laundry, markets and other community activities. This multiplicity of functions connected to the rivers and streams slowly decreased due to the pollution of the water and the canalization of the streams due to the excessive development of highways and roads on the margins of the river, especially during the 1950s and 60s. (Sertich 2010)

The rivers and streams became the backside of the city, and now only function as sewage canals. Due to the canalization and with that lack of capacity the marshals of the rivers suffer of large annual flooding during the seasons of heavy rainfall. The poorest population often illegally occupies these areas that are considered to be uninhabitable.

Until now natural resources such as open water have always been abundant for São Paulo, but due to its constant expansion the metropolis is now reaching its geographical borders. Water scarcity is becoming an issue. In this context Fernando de Mello Franco (Franco) 2010), urban planner and academic at the University of São Paulo, argues that the city should start to develop a new approach to the management of water resources. Integrating this environmental issue with other problematic issues the city suffers of, such as informal urbanization and infrastructural encroachment, which are all spatially connected.

4.2 (Goal) Landscape, Infrastructure and hybrid river spaces.

In this light it seems relevant to investigate not only different models of how to deal with the cities rivers and streams, but to integrate in this investigation a strategy that includes social and economical issues related

to this same hydrological network.

The goal of this chapter is to explore the possibility to integrate environmental aspects within the spatial development of São Paulo's infrastructure, and strategic solutions for sustaining the cities economic growth and transforming its urbanization model.

4.3 Why the focus on the water areas?

Simplified we define three reasons why focusing on the water areas is relevant to create a more sustainable and inclusive city.

(1) The margins of the water areas are the most fragile areas in terms of large urban social problematic. Favela's and water issues are strongly connected in São Paulo. The urban poor, 'the invaders' of land, look for areas that have no value for real-estate developers. Regulation defines these places as prohibited to build upon. Areas of high risk; slope areas or wetland areas. These areas are in almost every case connected to the streams and rivers that make up the geography of the urban landscape. It is therefore especially the urban poor that are spatially connected with the hydrological network of the city.
(2) Water is culturally approached as a problem. As something one has to turn away from, something that has to be put out of sight. This culture has

Fig. 4.2: Multiple use of water areas, laundry activity at the floodplain of Tamanduateí river, year: unknown. Source: A construção do caminho (2006) original image by unknown.

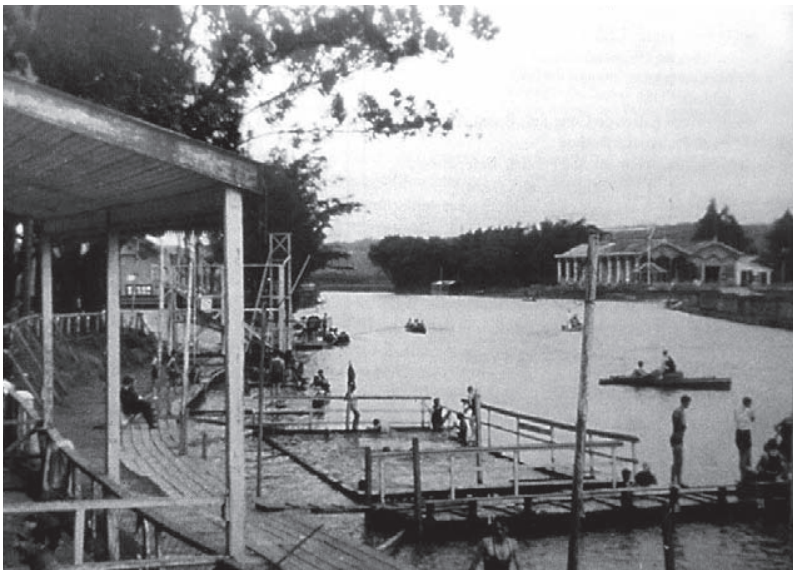


Fig. 4.3: Multiple use of water areas, recreational activity along Tiête river, year: unknown. Source: A construção do caminho (2006) original image by unknown.

to do with the environmental problems of flooding, of tropical diseases, and high pollution. This approach towards water is not desirable anymore. (3) Due to its specific placement upon a large water basin all the lower, and with that, flat areas of the city are or at least used to be connected to the hydrological network of the city. These are the areas where infrastructure has been developed, and the areas where new development and (re)development is most practically out of a geographical perspective. (Franco 2005) (Braga 2006)

4.4 Integrative concepts

In the introduction the observation is made that São Paulo's attitude towards its rivers and streams and the adjacent landscape is one of (1) rejection; the rivers and streams are not approached as landscape, but as, purely technical, infrastructure. And (2) mono-functional; river spaces are seen as back-side and the river only functions as a sewage canal. We will shortly explore these two concepts to explain how a different attitude can become a potential in integrating an environmental approach in the development of infrastructure.

4.4.1 Landscape and infrastructure

By analyzing the fragmented territory of São Paulo one can observe that in the development of its infrastructure and built environment the existing and changing landscape has never been taken into account. Stated very black and white, there is no, and has never been, a concept of landscape in São Paulo when developing infrastructure. The only concept

thriving the development of infrastructure was, and is, that of production. 'If there was any logic in the ordering that structured this development, it should initially be sought in the transformation of the natural environment through the successive technical interventions in the area aimed at supporting capitalist modes of production.' (Franco) 2010)

The process of industrialization in São Paulo began relatively late when compared to European and North American cities, only from the second half of the nineteenth century. Therefore one can state that just then this development of the urban area through multiple infrastructural projects, infrastructure as the structural logic, was at it highest. This 'logic' can be seen as a replication of a model structured by the practices prescribed by international capital.
The structural logic Mello Franco is talking about can be recognized in other parts of the world. Wherever a city is constructed primarily as a technical product. Especially after the industrialization process of cities, and as a reaction on many problematic this caused a concept of clean urbanism became important, naturally related to water management.
'The epoch of 'clean urbanism' began with the visual banishment of water. From that moment onwards, water became an absent presence in modern urbanism, an engineering trick - out of sight and, consequently, out of mind. Sanitized, canalized, covered, cleaned, piped - hidden. Urban water was absent.' (Shannon 2008)
In many cities this concept of visually banishing the water is reversed and water as an element of natural landscape is integrated within urban transformations. This concept of approaching landscape as a structuring element for urban transformation can also be seen as a concept of infrastructure, but now not an infrastructure of production, but an infrastructure of environment.

When projecting this idea on São Paulo, connecting the concept of landscape and infrastructure seems to offer a great potential. Especially because its infrastructure is developed on and along the cities once so important hydrological landscape. By including a concept of landscape in future transformations this can become a structuring element for the now so fragmented city.

We could say that the concept of landscape in São Paulo did not exist; it was seen as 'just' infrastructure. A tool utilized for the transformation of nature technically and artificially, with goals of production in mind. But if we include a different concept of landscape; and redefine it as a concept of cultural expression of what we define as a space for dwelling, a space for public interaction, a space for sustainable living in the city. This could now also be the role for infrastructure, defining the spaces of the city.

Articulation not only the spaces of production, but spaces for dwelling, public interaction and sustainable living.

4.4.2 Hybrid river spaces

The mono-functional nature of river spaces in the urban built environment of São Paulo has to do with questions of pollution, annual flooding of the marshes and other large issues that are often approached negatively. The established articulation is that these environmental problems are first to be solved before different uses can be thought of and/or introduced for these river spaces. This approach is understandable as we are definitely talking about significant problems that can only be transforms by long-term implementations. Otherwise this approach is not the desirable one, as it is in itself a passive approach and a strictly technical approach. It again constrains the river and its adjacent area to a strictly technical issue, an issue of 'just' infra-structure.
This work argues that such an approach of these spaces, especially when considering their important place in the urban built environment should be approached as spaces of integration. Therefore it is relevant to look at the concept of hybrid river spaces.

The hybridity of this concept should be understood as the river being artificial and natural at the same time. This is especially true for places where rivers that were once 'only' natural have now been cultivated or urbanized, i.e. the city. The work River.Space.Design (Prominski 2010) defines this duality of hybrid urban rivers. 'Urban rivers are spatially confined, artificially controlled hydraulic infrastructures. They are also important recreational spaces for city dwellers. Furthermore, they are linear ecosystems that link cities and regions to their entire catchment areas - the water from upstream regions flows through downstream regions and thus creates a feeling of community and a dependent relationship between riverside inhabitants, as changes in the upper reaches of a river always have consequences for the lower reaches.'

Although this hybridity between technical requirements, functional and social use, and ecological connection is not present in the current urban environment of São Paulo, it does effectively illustrate what its potential is above a merely technical approach. The linear network of connected rivers is present in the urban landscape and is a potential structuring element. When these river spaces are developed with a certain hybridity in mind they can be the element that can enhance the quality of the built environment of the city.

4.5 The concept of green-blue cities (green blue grids, green pathways.)

These two discussed concepts relate to a theme that is increasingly discussed in landscape and urban planning, namely green-blue cities, or otherwise described as urban green blue grids or green pathways.

It would be too much for this work to describe the whole spectrum of this theme but the main interesting element is that it combines the potential of a network of (former) natural landscape, i.e. a hydrological network, and utilizes this structuring element to bring together a multitude of benefits. The concept o Blue-green cities is too often explained as 'just' a concept that enables to implement adaptive measures to deal with flood events only. It is import to stress that it is especially the multitude of environmental, ecological, social-cultural and economic benefits the concept offers that makes it relevant.

The book Urban green blue grids for sustainable and dynamic cities describes the concept of green blue cities and its potential for soving a multitude of environmental related problems; climate adaptation, sustainable energy production, increase of biodiversity, decrease of heat stress, increase of air quality, food production and quality of life. (Hiltrud Pötz 2013)

The theme of green-blue cities is not new for brazil but it is gaining momentum according to Frischenbruden and Pellegrino (M.T.M. Frischenbruder 2006) 'This "blue" and "green" infrastructure is happening as a consequence of changes in the criteria used by public administration and private agents which previously saw each open creek, wetland or forest patch in the middle of or adjacent to an urban area as an empty space and a potential building or road construction site. This more environmentally concerned approach to planning and design… is becoming visible across the whole spectrum of Brazilian cities and regions, and is becoming part of the agendas of local communities and public administration.'
The concepts of green-blue cities, urban green-blue grids or greenways all have in common that linear hydrological and green networks become strategic tools available in transforming whole urban landscapes by just focusing on these corridors and their surrounding spaces. These linear spaces are often the most environmentally sensitive areas but can directly perform a multitude of functions. Becoming a structuring element in a fragmented urban built environment.
It allows landscape and urban planning approaches to think of landscape in a much more active way, as a dynamic element capable of changing the surrounding conditions.

4.6 Projects

To make the above more comprehensible we will discuss two reference projects in São Paulo that in different ways utilize a linear green and/or blue infrastructure to structure the urban environment and relate other aspects of sustainable city development to this network. Both projects strengthen the relationship of the city with its waters. Interesting is especially the way in which they integrate environmental, social and economical potentials within a spatial strategy.

4.6.1 Watery voids – MMBB[1]

This project was developed by the architectural and urban office MMBB for the International Architecture Biennale in Rotterdam of 2008. (IABR 2007) The aim was to impart multi-functional and cultural values to infrastructure systems. It flips the problematic relation between favelas and water issues in São Paulo towards a potential as they are transformed in an integrated way. The proposal restructures mono-functional giant flood basins, which are only in function during a short period each year, to functions as a network of public spaces.

Relating to the earlier explained concepts this projects aims to design infrastructure not as a technical artifact, but as an urban space. Integrated with the urban fabric and adapted to the city's local scale. It provides the most vulnerable spaces of the city, informal urbanizations, of infrastructure and public space.
The strategy is to work with existing networks, but transform them from 'just' functional to socially valuable networks. (MMBB 2008)

4.6.2 Hidroanel metropolitano[2]

The Grupo Metrópole Fluvial, a research group connected to the Faculty of Architecture and Urbanism at the University of São Paulo (FAU-USP) developed architectural and urban plan aspects for the Metropolitan Waterway Ring project in 2011.

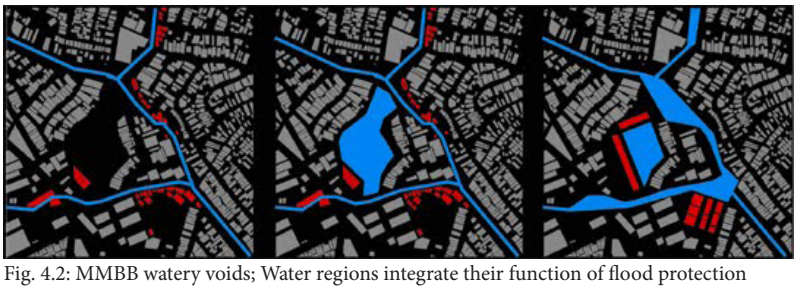


Fig. 4.2: MMBB watery voids; Water regions integrate their function of flood protection with housing and public services and activities. (1) dry situation, unused open space. (2) flood situation, open space used for flood protection. (3) open space integrated with public services, integrated with facilities for flood protection. Illegal settlements on river margins removed and replaced by adequate housing.
Source: thepolisblog.org (2009)

The main aspect of the proposal is to create a network of naviagable canals composed by the current Tiête and Pinheiros river, connected to the Billings and Taiaçupeba reservoirs and completed by an artificial canal that connects these reservoirs. The ring will form 170 km of urban waterways in and around the metropolitan area of São Paulo.

Of special interest for our discussion in this section is the interdisciplinary character of the plan. The architectural and urban project is based on the idea of water multiple uses, which is established by the National Politics for Water Resources, 'considering water as a public good and a limited natural resource that must be rationalized and diversified in a manner to allow its use by everyone.' (Grupo Metropole Fluvial - FAU USP 2012)

Following this concept water as means of cargo and passenger transport is combined with water and its margins as metropolitan public spaces for leisure, tourism but also dwelling and amenities. The financial feasibility of the project depends on the transportation of urban waste, by waterways, to central harbors where collection, treatment and recycling processes take place. This extra layer, in this case an environmental issue connected with an economic potential, shows how an integrated strategy can be beneficial when designing for the city's restructuring.

This interrelation of environmental-, social- and economic dimensions all developed along the river and its bordering regions exemplifies a different more integrated strategy of urban transformation for the São Paulo metropolis. (Grupo Metropole Fluvial - FAU USP 2012)

4.7 Conclusion

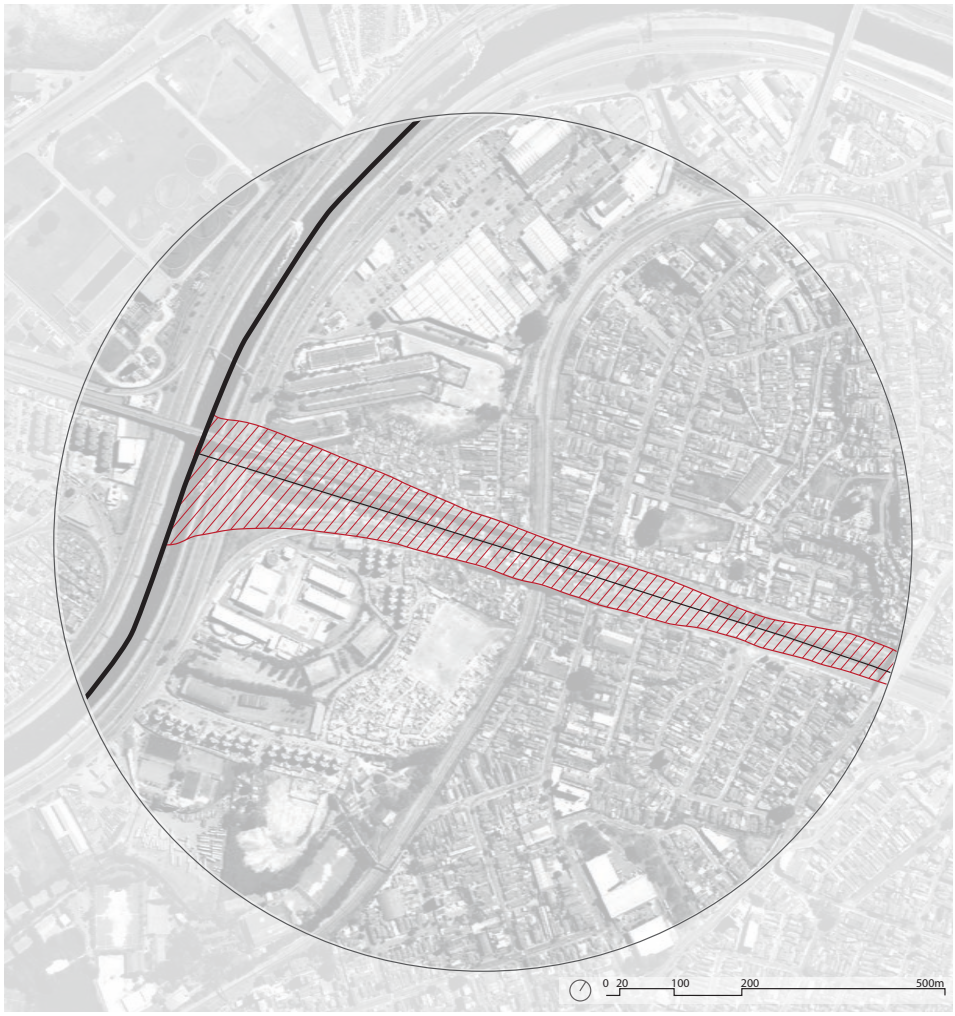
In this section we aimed to explain how entangled the environmental issues of the metropolitan region of São Paulo are with its physical infrastructure, as this physical infrastructure is developed upon the cities large water basin, its hydrological network. The (re) development of infrastructure therefore cannot be approached without addressing the environmental landscape of the city. The potential lies in searching for an integrated strategy of urban intervention that addresses both aspects.

In addition the margins of the environmentally sensitive areas, the water areas, are often also the most fragile areas in terms of large urban social problematic. The poorest population often illegally occupies these areas that are officially considered to be uninhabitable. These areas are in almost every case connected to the streams and rivers that make up the geography of the urban landscape. The environmental issue is consequently a social one.

Therefore it is thought that this development of the most environmentally sensitive areas can be part of a strategy that develops these regions in a green-blue network of sustainable living spaces in the urban landscape. These green-blue regions include a different way of water management. Defining the water infrastructure and its bordering areas as areas for multiple uses. Areas for flood protection, water treatment but also public spaces, transport and even dwelling spaces. With this these water borders become integrated spaces, important for the city.

The definition of this green-blue network as areas for multiple uses is supported by the National Politics for Water Resources. 'Considering water as a public good and a limited natural resource that must be rationalized and diversified in a manner to allow its use by everyone.' (Grupo Metropole Fluvial - FAU USP 2012). The waterway network integrates the use of water for transport with water management and sustainable urban transformations.

Because of their linearity and the natural connection, in terms of landscape, they possess, these areas could be seen as a network offering the potential of becoming structuring elements in a fragmented urban built environment. Due to the integration of social and environmental issues these are now not just elements of infrastructure to technically structure the city, but elements of landscape, articulating sustainable spaces of public use, contributing a more human and livable urban environment.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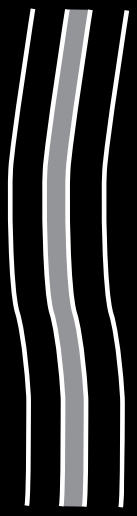
FUTURE ?

The current attitude:
sharp border; disconnected situation

Future attitude:
integrated

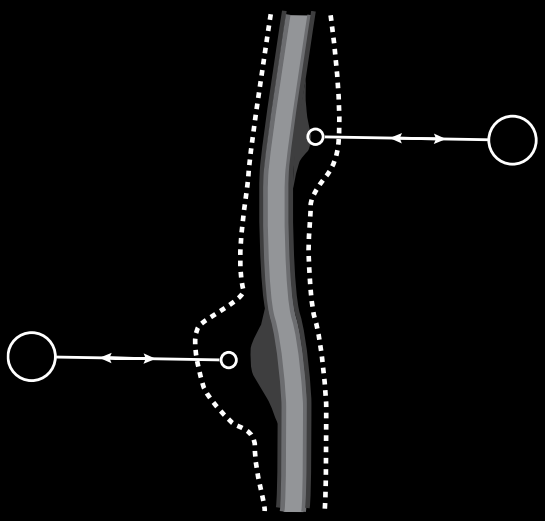
Environmental integration



TODAY'S ATTITUDE

Diagnosis

The detached urban regions are often located in environmentally critical regions where small creeks and larger rivers are polluted; 'only' serve as sewage canals and bordering areas suffer of annual flooding.



TOMORROW'S ATTITUDE

Potential

To integrate water and its bordering areas in the built environment with the aim to make it accessible for multiple uses. The transformation of water streams and their bordering critical environmental regions should contribute to issues of urban drainage, flood protection and water treatment, but simultaneously to the development of green public spaces, and community facilities.

Image: archive of Eduardo Pompeo Martins

Eduardo Pompeo Martins **on collective mobility infrastructure and the *Hidroanel* project**

The new strategic plan of the municipality is discussed at the moment and the main focus of collective mobility infrastructure is on bus transport. Why?
Fast lane especially for busses (bus rapid transport), or as we call them bus corridors, already exist in Sao Paulo, but we want to create more, because they are still very centralized. The construction of bus lanes can offer a good and quick solution for a very large amount of inhabitants of the city. This is one of the reasons why we focus on bus transport. Another is the costs, and the fact that Metro and Train transport are partly under the responsibility of the State.

And what strategy do you have in mind?
The BRT lanes that exist now in Sao Paulo are already a big step forward, but still there is a lot of potential. Current bus corridors are purely functional. In the new strategic plan we speak about urban corridors instead of bus corridors. We envision the bus stops within these urban corridors as becoming places that have a certain quality for the users. Spaces fit for pedestrians and slow traffic.

Like in Curitiba?
Yes. What is very interesting of the example of Curitiba is that it removes cars from the 'front' side of the avenue by only creating parking entrances at the backside of the avenue. Traffic at the front side therefore flows quickly. At these avenues the bus lanes form a buffer between car and pedestrian traffic. Pedestrian traffic is situated somewhat protected in the middle of the avenue. It is always interesting to separate pedestrians from fast and motorized traffic.

Another issue is the noise of traffic in Sao Paulo, which is very prominent. When I returned to Sao Paulo after being abroad for 6 months this became very apparent to me, the noise of the busses. There are plans to introduce electrical busses, although this stands at a very early stage.

Interesting thoughts on pedestrians, does planning for slow traffic have priority?
No, unfortunately not. To be honest it has little or no priority in the planning of municipality. As said our main focus is on extending the network of bus corridors, as this influences an enormous amount of people. But on the bright side, it is the first time that the strategic plan defines pedestrians and cyclists as traffic. So they are placed on the map.

You mentioned the responsibility of the state for other mobility systems. How does this influence planning?
It makes it very complicated. For many reasons; for example because

the collaboration between the different political parties that influence the different administrations is very low. The Partido da Social Democracia Brasileira (PSDB), the social democrats, have the majority in the state at the moment (Governo de Estado). The municipality just changed towards a majority of PT, the workers' party (Partido dos Trabalhadores).

What does this mean for infrastructure and mobility?
Very simplified we could say that for infrastructure it means that the PSDB have a more centralized focus, and we, the municipality with the strategic plan, would like to focus on a more decentralized strategy. Now we keep changing this strategy every 4 or 8 years, and so no continuity will be breed. There is almost no long-term vision that goes beyond these political parties.
So a lack of a long-term vision that can lead the way in the development of infrastructure. The difference of Pitu 2020 and Pitu 2025 is a striking example.
Pitu (plano integrado de transportes urbanos) formulates the strategy of the state for the urban transport. The metro network that was planned for 2020 was very decentralized and was in my opinion a great step forward for Sao Paulo. But the planning for 2025 shows a step back towards a more centralized vision. Focusing again on the areas that are already developed.

What do you see as the benefits of decentralization?
We, the SDMU, and the current municipality focus on decentralization because we believe it can lead to a more equal and inclusive Metropolitan area. Where jobs, urban facilities and services are not only present in the center, but easily accessible for all. A smart infrastructural network can foster this de-central development, but the implementation of such a strategy has a lot of challenges. Especially in this decentralized regions of Sao Paulo we experience a lack of skilled engineers, planners, and so on.

It seems as a dream like project, but...just look at other cities that regenerated their waterfronts, it has been done all over the world, so why not here in Sao Paulo?

Strangely the meetings where the strategic plan of the SDMU is discussed in public are all planned in the central area?
You are right. There are still a lot of steps to be made. But the meetings are held in places that are easily accessible by metro and bus. Furthermore we stream them live on the internet, and we are working on an extensive website where people can actively debate and propose new implementations for the strategic plan.

We are actively trying to implement a more participatory approach during the development of this strategic plan. The first step is to introduce a form of participation in the planning processes on a larger scale (as we do in the Plano Diretor.) But on a long term, this has to result in participation until the scale of the neighborhood, the Plano de bairros.

Interesting is that in many cases the Brazilian law is very progressive when it comes to participatory processes and including the

citizen in the making of policy. Is there a gap with reality?
Yes there is. As explained earlier, although the legislation is often really progressive or modern, the implementation is where the problems start. In a lot of cases the legislation remains purely theoretical and is not implemented, that is what we are working on every day, a more successful implementation. On the bright side, the statute at least results in an important dialogue about the role of participation, which is vital.

An architectural project that is, in the light of decentralization, often referred to is the Poupatempo Itaquera project constructed in the east of Sao Paulo. Would that be a good example of the decentralization strategy?
Functionally I would agree. Paulo Mendes da Rocha decided to directly connect this governmental building (where all citizens have to register for passports, licenses, etc.) to the itaquera train and metro station. In terms of accessibility this is a great strategy. But if we look to the spatial articulation of the building within the urban fabric, I think this is less successful. The spaces around the building appear somewhat as leftovers because of the massive scale difference, like oil and water.

Could the Hidroanel project be part of this long-term vision you speak about?
I believe so yes. It definitely is a project that is based on an overall vision or concept for the greater region of the Metropolis. It can therefore be guiding to develop solutions for other urban challenges. But because of its scale, it also suffers from the same difficulties as we just discussed. The Hidroanel planning as it is now effects 39 municipalities, clearly an organizational strategy.

But the project is designed with different segments.
Exactly, as Alexandre already had foreseen this problem. Therefore we can also approach the hidroanel a series of projects. It is designed in a smart way that makes this possible. The project originates form a phd thesis of Alexandre Delijacov, where it clearly is one project, although it is already divided in different segments. After this, two organisations showed interest in further developing the project in collaboration with Delijaicov and the Faculty of Architecture and Urbanism.

"Projects are never taken serious before they are actually constructed. At least in Brazil this is the case, as there are so many scattered ideas."

The first being Departamento Hidroviaria; their main goal is to use the rivers for transport, mainly industrial transport. The second is Emplasa, Their interest is to (re) connect the river with the city and use its borders for urban development. The research group of Professor Delijacov combined these two elements in one design proposal. Of course ideally the whole plan will be executed, but I, (maybe Delijacov does not) believe very much that, also if there is only a part of this design implemented, this already will lead to a success for the project.

When explaining the ideas of the Hidroanel project to other people, they often react in disbelief. How to make them believe?
Part of the Hidroanel project is exactly this, to help people believe that it is possible to

change the contemporary situation of 'their' rivers. The hidroanel project visualizes what the rivers could become for the city. One could say that this seems very as a dream like project, but this is in my opinion a problem of imagination. Just look at other cities that regenerated their waterfronts, it has been done all over the world, so why not here in Sao Paulo?

So how to clean the rivers?
That is definitely an important part of this project, but we can work on different segments at the same time. There already exists a program to clean the rivers, Sabesp, but there are several problems.
The work of Sabesp is very centrally, so a lot of small rivers (corregos), which are also very polluted, are not included in the filtration and purification. The hidroanel project therefore proposes smaller cleaning points at every main corrego. Next to that the infrastructure of hidroanel should create different tubes for every type of water. Rainwater and sewage should be disconnected, those are at the moment all directly connected to the river. Another problem is the relatively small amount of water in rio tiete and rio pinheiros, this makes cleaning process more complicate.

And then start constructing?
No, it is important to directly start constructing the whole picture. As you said it is important to create a change of mentality. Projects are never taken serious before they are actually constructed. At least in Brazil this is the case, as there are so many scattered ideas. For the mentality to really change, first the project has to be constructed. A real constructed project can point out the way we should develop, and may even be used as blueprint for regulation.

How can we prevent this new construction to be only for the rich again?
It is indeed a regularly seen phenomenon that the poor are excluded by such new construction. Only pushed further out of the city. The borders of the river and small streams (corregos) are often the regions where the poorest dwell. In some cases we will have to remove these favelas of irregular occupations because they lead to hazardous and even deadly situations. But always by creating alternative dwelling in the same region, so that these people do not become more excluded.
In other cases we can think of upgrading programs or gentrification of neighborhoods. Again, inclusion will be the main goal.

And with new constructed projects?
With the new construction on the river borders the municipality has to anticipate on the problematic you sketch. A massive amount of housing that should be constructed. But with smart strategies, for example housing typologies that don't incorporate two parking places per dwelling, the richest Paulistano will not be interested. We should aim to create a different urban typology than we now do in the rich regions, to attract and to serve a different class of inhabitants. In developing this different urban typologies, connected with urban facilities an services, urban planners and architects have an important role.

#5
Economic landscape

Fig. 4.1: Meeting of Tiête river and Tamanduateĺ river, 1996.
Source: A construção do caminho (2006) original image by Nelson Kon (1996)

5.1 Introduction

Almost 20% of the territory of the municipality of São Paulo is occupied by 'informal settlements' or favelas. (UN report on informal urbanization 2006) The vast majority of these neighborhoods are located in the peripheries of the metropolitan region, far away from the formally developed central areas of the city. A large amount of the inhabitants of these peripheries work in these central areas, which results in long daily commuting hours. The informal areas are often described as disconnected or poorly connected with the formal city, but in many cases this is just partially true. Of course these regions are spatially dispersed from the city center. The access to health, education and transportation generally is poor. There is a lack of accessible public services and public spaces. But otherwise, especially in terms of economy, the formal and the informal are largely dependent on each others economical structure. '…Many of the so-called backward sectors are actually servicing the advanced economic sectors and their high-income employees.' (Sassen) 2010) One can actually not speak of separate structures but of highly integrated structures.
When focusing more in detail on these dispersed informal regions one will discover a vibrant local economy. As Gabriel Duarte stresses: 'We are not talking about misery. About just sheds with no access to any economic development. We are seeing sheds that are located on areas not in use by real-estate developers, but areas close to places that offer economic possibilities for these inhabitants.' (Gabriel Duarte 2013) Therefore approaching these dispersed informal regions with large strategies of removal and displacement of inhabitants is undesirable and has proven to be ineffective and counterproductive.

It seems more relevant to try to understand the economical processes before implementing large spatial transformation. Without this understanding of the economical process, one can't think about the improvement for the population. The population needs support, and support means the capacity of having economy.

Another aspect that should be taken into account in this perspective is the transforming economic landscape of São Paulo and its metropolitan region. The city has long been dependent on its large industrial economy, and still largely is, but should transform itself towards a service-based economy, to stay competitive. This transition has large implications on the urban landscape of the city and offers another potential in moving towards a more inclusive and economically sustainable urban environment.

5.2 Goal

In this section the relation between existing informal and formal economical structures is discussed. The goal is to define the importance of existing local economic structures and explore how these structures can be enhanced by new spatial strategies without removing or severely harming them. A spatial strategy should integrate aspects of economy. Secondly the changing economic landscape of São Paulo has to be included in this future strategy to make it realistic and especially resilient. The transformation from an industrial economy to a largely service based economy marks a great change for the urban built environment of the city.

5.3 Why the periphery? Decentralization & new urban centers

The (economically) most developed regions are interconnected with the large infrastructural network of the city. This network is developed from a very centralized perspective and especially attends those areas that are already developed. Strongly simplified one can conclude that the current infrastructural structure of the city is partly responsible for large inequalities between the center and the peripheries of the metropolis. With the aim to better include these currently excluded areas of the city this work focuses on the development of these dispersed areas.

This work speculates on the support of dispersed regions that show the potential of becoming an emerging region. Support by the development of infrastructure, what can form a backbone for this emerging regions and its increase of economic activities. An emerging region is not planned, rather one can anticipate on a potential region that is auspicious. The implementation of a smart urban strategy therefore should be approached as an effective anticipation on an economically emerging node. This does not implicate that a comprehensive vision for the city is not desirable, rather the contrary. The current city of São Paulo is made of inarticulate parts. This fragmentation does not just reflect upon the space of the city, but also on its economy and the community of the city. This is especially true for the periphery of the city. As many urban planners observe the city, they argue that while citizens are building a new city in the peripheries, large infrastructure and public works are carried out without a truly coherent and comprehensive urban vision attached to them. (Rocco 2012) A vision for the city is necessary to guide the development of a city and the construction of a less fragmented citizenship and economy. This is especially valuable for the currently underdeveloped peripheral regions.

In São Paulo a large amount of different researches developed an array of proposals for new urban planning with new urban centers. This work is based primarily on researches that promote the support of dispersed

regions by new development of infrastructure. Klara Kaiser Mori did extensive researches on the use of the Metro network and the existing railway network to improve the connectivity of the dispersed regions of the city. (Mori 1997) This work bases a large part of its strategy on the assumptions of Kaiser on how the expansion of the metro and railway network should interchange with urban development. This is further elaborated by (Gondo 2013) (Kiyoto 2013). Interesting research on the use of the waterways of São Paulo and its metropolitan region is done by (Delijaicov 1998). The work of the Hidroanel Research Group further elaborates this (Martins 2012) (Luccia 2012). This work uses the majority of these researches in the framework of urban planning and development of dispersed city regions. New emerging urban centers are not approached as a substitution of existing centralities of the city, but rather as alternatives. The development of these alternative centers should result in job opportunities, urban facilities, services, spatial qualities etc. The goal of this urban development lies in a more sustainable and inclusive city, where opportunities and access to the city is more evenly distributed over the territory of the built environment.

5.4 The region of Tiquatira; local economic potential

In the description of the spatial aspects of the specific region this work elaborates on the different infrastructural networks that define the region and its place within the macro-metropolitan urban landscape. This place has strong implications for its economic development. As highlighted before, the region has the potential as an emerging sub-centrality, which can be an alternative for several regional, now centralized, economic activities. Simultaneously new implementations in the region should enhance the existing local economic structure and include a strategy for the re-use of valuable existing elements.

In this section we confine ourselves to discussing the existing local economic landscape of the region of the urban implementation, and its potential for the development of this region. Hereinafter five economic subsectors are defined that are characteristic for the region and that have a potential for future urban development of the region.

(1) Maintenance, repair and conversion of automobiles (no production)
A very characteristic economic activity for this area is shops, garages and small and medium workshops for the repair and conversion of automobiles. The metropolitan region of São Paulo is famous for its large factories for the production of automobiles, but these are located in the satellite cities of the metropolis. In the 'in-between' urban area of Tiquatira and Penha the local businesses focus is mainly on maintenance. This is probably due to the historical highway that connected São Paulo to

Rio de Janeiro and that passes through the region. This highway became less important when a new replacing highway was constructed to the north of the region, but the economic activity is still present.

(2) Recycling industry

Noteworthy is the informal sector of collection and transportation of waste materials. A part of the inhabitants of the area collects waste in areas that are not covered by municipal services, not surprisingly, the informal neighborhoods with bad infrastructure. This waste is transported and sold to decentralized collection points. This network is cut off from the formal network of garbage collection what offers the inhabitants to make a living out of it but otherwise has large consequences for the environmental quality of the urban environment.

(3) Small spaces of (community) agriculture.

The region possesses several voids or open spaces that can be defined as urban wasteland. One type is land that belongs to private real estate developers, waiting for development, but currently used by the local community for various purposes such as parking places and in this case remarkable small lots for agriculture. A second type of land that is in this case used in a similar is the green strip which is enclosed by the regional highways. This area, which belongs to the municipality, is highly unused, but in some cases occupied by community and again in use for small agricultural purposes.

(4) Construction material.

A relatively large amount of businesses that manufacture and especially process and store construction materials are present in this region. Most businesses are intermediate warehouses where different types of material are stored. Some areas are quite strictly organized but several businesses are organized quite dynamic and are of small scale. There therefore have an informal character.

(5)Small retail, restaurants, small services, etc.

The region has a high density of economic activity on street level. Most of these economic activities offer services to local inhabitants. This is a very diverse collection of services. Varying from hairdressers, washing and tailoring, small groceries, print and Internet shops to bars, restaurants and shops that sell small groceries and a range of other products that are utilized on a day-to-day basis. In some cases these services are linked, resulting in larger businesses that also attend a larger group of users. Because of the strong connection with the streetscape this type of economic activity interdependent on the spatial structure of the built environment.

5.5 Two concepts/important aspects

The first part of this chapter introduces two important aspects that have

to be taken into account when trying to better understand the economic structures of informal areas.

5.5.1 The connection between formal and informal economy.

It is important to develop a deep understanding of the relation between the formal and the informal city. In developing urban transformations these are to often approached as separate worlds. 'The informal city is not a shadow world; it is an integral part of the economic and social organization of the city. We have to look at it with complementary definitions: Bottom-up and top-down, micro and macro, informal and formal.' (Hehl 2011)

Many former urban strategies focused on implementing new structures without taking into account the existing value that is present in the so-called informal city. Guidelines for different strategies now articulate a different way of addressing informal settlements. 'Classifying settlements through…physical and socio-economic conditions is an essential first step for upgrading. Resettling slum residents far from their homes and existing income opportunities may cause disruption costs to be too high. Upgrading existing settlements should be the priority except for dwellings located in hazardous zones and in places strategic to the city's urban plan.' (Vaggione 2013)

This work therefore argues that the connection between the informal and formal city, especially economically, should be mapped before a transformation is implemented.

Of course the informal regions suffer of uncontrolled growth and a lack of public space and public facilities, but developing solutions for these problematic generically and without taking into account the local economic aspects has proven to be ineffective. 'To understand that the informal and formal are part of the same economical matrix seems relevant.' (Marc Angelil 2011) A different strategy of urban transformation should address this relation and focus on the enhancement of local economic structures and the possibility of re-using elements when transforming the urban built environment. It is not enough to equip people with amenities, such as public facilities, if they are not provided with tools too that possess the potential of becoming self-sufficient. This autonomy can be found in the capacity of having economy, providing structural improvement.

5.5.2 The shift from industrial economy towards a service based economy. Transition.

The second aspect is the transformation of the cities industry based

economy towards a service-based economy. A multitude of studies on how this will affect the urban built environment has been conducted. Especially interesting is to think what potential, in this transition, the relation between industry and service has to offer and the role of the specific place in the city has.

'The knowledge economy is seen as new and non-material, whence it is easy to assume that its existence is predicated on the overcoming of the older material economies of a place, a city, a region. The contemporary understanding of the knowledge economy is that it is about abstract knowledge and the talent of the so-called 'creative classes' and 'symbolic knowledge workers'. I find we have overvalued this class of workers, and that one consequence is a devaluing of material economies, notably manufacturing, and of workers who deal with materials.' (Sassen) 2010)

The importance Sassen assigns to what she defines, as urban manufacturing, is interesting as it strongly relates to the place of manufacturing, the 'economic' history of the city. And although a service-based economy will replace the industry based economy, this service-based economy will still be determined partially by its place within the city. Especially in cities where inequalities are extreme, such as São Paulo, the link between the formal economy, of knowledge and service, and the informal economy, of urban manufacturing, is very present. This link will only become stronger when the transition to a more service-based economy will follow through. This observation is especially interesting to see the potential benefit that informal and formal economic sectors have to offer to each other. Consequently this provides economic opportunity to the urban poor in these informal regions to slowly move up the social ladder.

The fact that São Paulo is moving away from its industrial economy, towards a service economy, offers new opportunity for spatial urban transformations. The development of a large ring road and a large ring railway, running around the metropolitan region of São Paulo, means that this will become the new magnet for large industrial development. (Franco 2011) The former industrial areas closer to the city will become vacant for new, innovative uses. These areas, often along existing infrastructure can now transform into mixed use areas of dwelling, service and production.
As Franco highlights the transformation of the landscape just for means of industry works very well for the industrial city. 'Considering the magnitude of the demands generated by an accelerated urbanization, it was the investment in infrastructure that, ...structured São Paulo. Support to the modernization offered by these technical systems justifies the fact

that about 20 million people live in a city seen as fragmented, chaotic and disorderly, or about 10% of the population, co-participant in the production level of 16% GDP, is concentrated in very small share of 0,09% of the entire national territory.' (Franco 2011) With this Franco means to illustrate that without a doubt there have been and still are forces that structure the city of São Paulo because otherwise such an economic benefit would not be possible. Franco adds to this observation that this strategy of transforming the urban landscape 'just' for means of economy has proven to possess multiple drawbacks for social and environmental aspects. To conclude: this strategy of transformations doesn't function anymore for the contemporary city.

5.6 Conclusion; towards a strategy of processes

When taking into account the two concepts we discussed above one can conclude that a different strategy for urban interventions is desirable. A first step towards a different strategy is to define that the informal city and the formal city are part of the same economical matrix. Therefore every strategy of urban transformation should address this economic relation and focus on the enhancement of local economic structures and the possibility of re-using elements when transforming the urban built environment. This starts with understanding these processes and formulating successful adaptations that will make these processes stronger, more resilient and autonomous on the long term. A strategy of intervention that shifts the focus to urban processes and less towards 'the' final project. The economic landscape of the city of São Paulo is not in need of beautiful strategies, based on shapes and forms, but strong strategies, based on program and use. A strategy of growth that combines existing commerce with economic opportunity and social (housing, protection of public space) and environmental (green infrastructure, water treatment) aspects.

At once this strategy should realize the potential that the transition of the cities industry based economy towards a service-based economy has to offer. This service economy is determined by its place in the city.

In history, forces that structured the territory of the city were based 'only' on an economic scheme of production. This resulted in a fragmented city landscape where opportunities are distributed extremely unequally. Now these industrial regions within the territory of the city are becoming vacant. Due to the economic transition and the construction of a large metropolitan ring road that attracts industries to the outer ring of the metropolitan region. These former industrial areas closer to the city will become vacant for new, innovative uses. These areas, often along existing infrastructure can now transform into mixed use areas of dwelling,

service and production. Fitting to the emerging service based economy, and simultaneously as a support structure for the development of the urban territory. Promoting spatial inclusion. Connecting the existing and the new, transforming the fragmented territory towards a coherent urban built environment.

EXISTING AND PROPOSED INFRASTRUCTURES
Source: Emplasa

BUILT URBAN FABRIC
Source: Emplasa

PROGRAM 2010
Source: Emplasa, Infolocal, Prefeitura de São Paulo

RECENT SITUATION – 2010

The area is occupied by an informal settlement. The inhabiting community dwells in different types and forms of informal constructions. The community structure is engaged with bordering communities and structures of (informal) economic activity.
Important element is the football pitch, the only space that is not squatted and which forms a central public community space. Part of the dwelling shacks are constructed on hazardous areas on, under or next to hard infrastructural structures.
Strips of social housing facilities buffer between the informal settlement and the public school and culture centre. These strips of land are again squatted by shacks and irregular constructions.

PROGRAM 2013

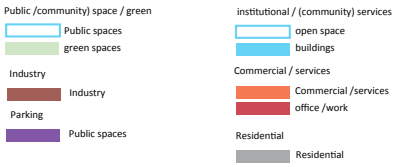
Source: Emplasa, Infolocal, Prefeitura de São Paulo

CURRENT SITUATION - 2013

The residential area (informal: favela) is removed and the public community space disappeared. Part of the residential area (informal: loteamentos) is preserved but still difficult to access from the adjacent neighborhoods. The public school and culture center has its entrance located towards the highway and isolated from the bordering communities; as are the facilities for social housing. A pedestrian connection is recently implemented, unfortunately on a far from strategic location. The area suffers of ecological problems due to a polluted stream and annual flooding.

PHASE 01 – PROVISIONAL PLANNING

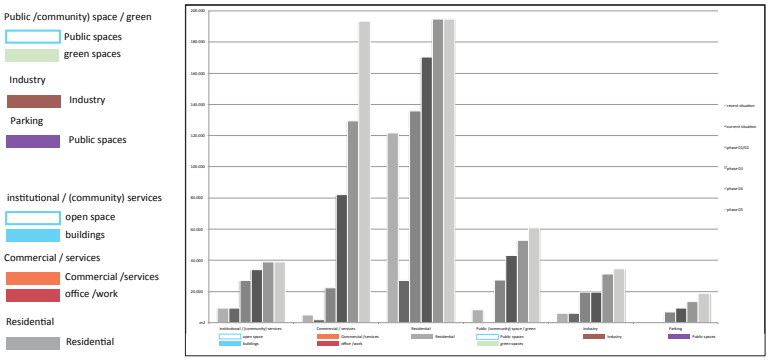
The region, defined as a potential area of development, is at a strategic intersection of hard infrastructures. Infrastructures that will have to be expanded (waterway, railway) intensified (railway, bus) implemented (metro, waterway). This work proposes to implement



PROGRAM PHASE 2（2015）
Source: Emplasa, Infolocal, Prefeitura de São Paulo

PHASE 02 – INTEGRATION

Hard infrastructures will always be accompanied by soft infrastructures. To make them complementary rather than contradictionary, planning this integration is vital for the anticipated urban implementations to become successful.
The isolated public school and culture centre and the social housing facilities should be integrated with new developments and the bordering communities that depend on these facilities. Accessibility of the region is essential. The new urban scheme should re-introduce dwelling capacity to provide housing for the removed communities and include important public community space (sport fields). These spaces should connect to public services that now so eminently lack in this region.
Parking and areas that integrate non-local developments as a result of an increase of infrastructure and connectivity are anticipated.
Industry is closely integrated in the area as it broadens the potential of the region. Existing left over space is used for ecological recovery and re-introducing a green landscape.

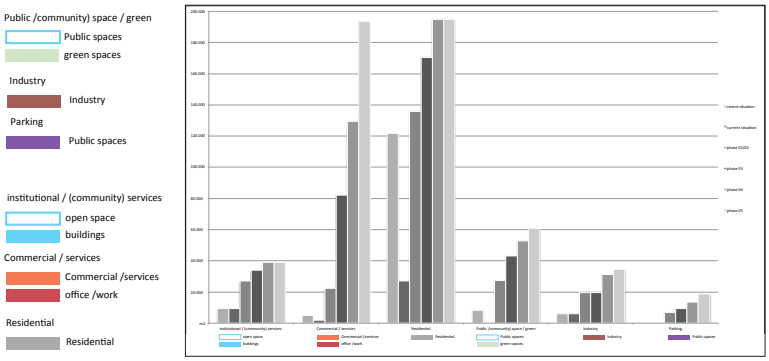


PROGRAM PHASE 3（2015-2018）

Source: Emplasa, Infolocal, Prefeitura de São Paulo

PHASE 03 – ATTRACTION

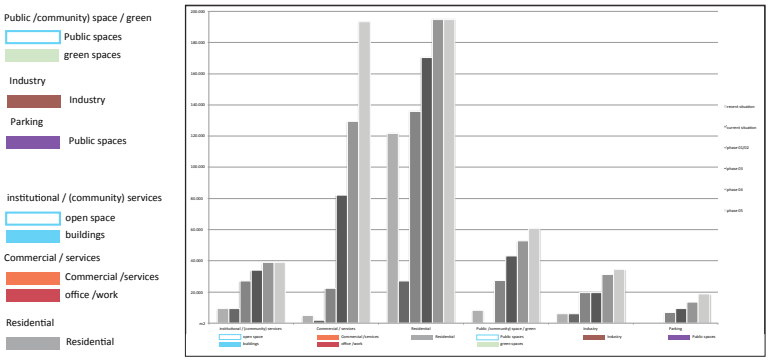
Local dynamics were once present in this region, as was industry and small commercial activities. This is thought to evolve, especially when the area is intensively connected with its bordering communities and already inhabits an important public service and a preserved area of dwelling. To foster this development a mixed-use typology is proposed, of dwelling with small commercial functions and businesses placed on street level and street corners, traditionally the center of gravity in the public life of Brazilians. The non-local infrastructural implementations will increase the flow of people significantly and offer new possibilities for business and economic development. Therefore this area is expected to densify. Facilities related to this business catalyze this economic development. The areas of integration between existing morphology and new urban implementations will add qualitative public and green space.



PROGRAM PHASE 4（2018-2022）
Source: Emplasa, Infolocal, Prefeitura de São Paulo

PHASE 04 – AN EMERGING NODE

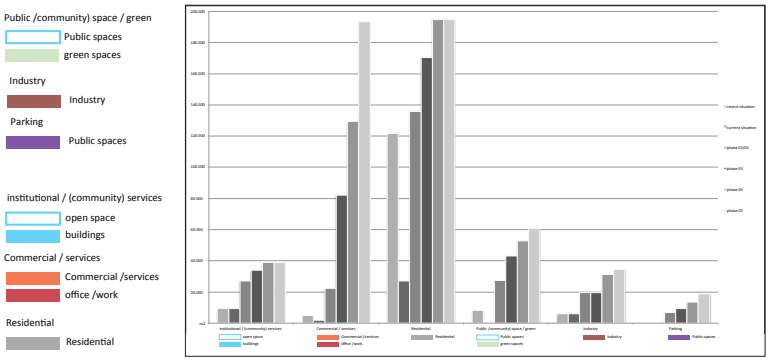
The rise of economic activity will foster the urban public street. The important public corridors will continue horizontally and increasingly extend vertically now as the buildings increase in height. Along the mixed-use public street the blurred boundary between public and private, characteristic for Brazilian lifestyle, will take place. The mobility infrastructures will slowly inhabit office and business areas that benefit from a highly connective area. In the more backside areas public community space is combined with public services and increasingly densified dwelling. The harbor goes beyond its initial function of and offers public spaces, green areas and leisure activity. Infrastructural facilities are present and easily extendable.



PROGRAM PHASE 5（2022-2030）
Source: Emplasa, Infolocal, Prefeitura de São Paulo

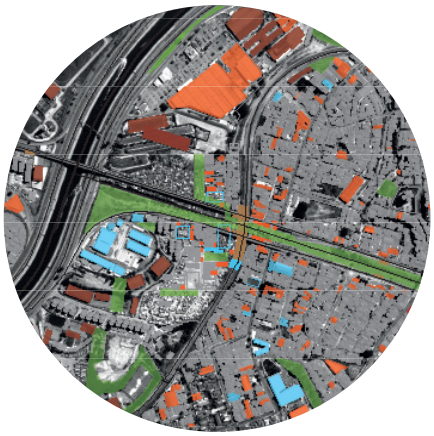
PHASE 05 – BEYOND REGIONAL BORDERS

Connecting with its surrounding regions of : Cabucu da cima – parque metropolitano Tiete – Zona leste – parque lineair de tiquatira – aeroporto International de Guarulhos – bairro traditional de penha - etc.

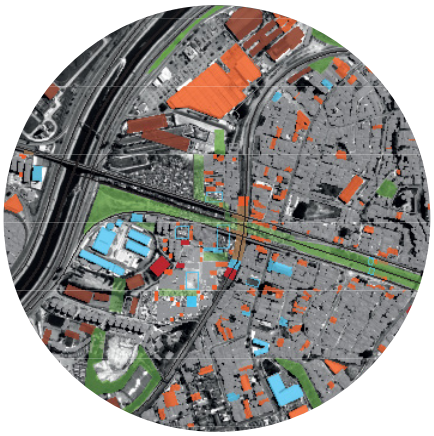


RECENT (2010)

CURRENT / PHASE 1 (NOW-2015)

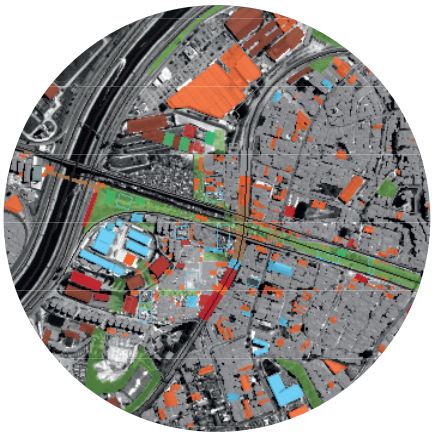


PHASE 2 (2015)



PHASE 3 (2015-2018)

PHASE 4 (2018-2022)



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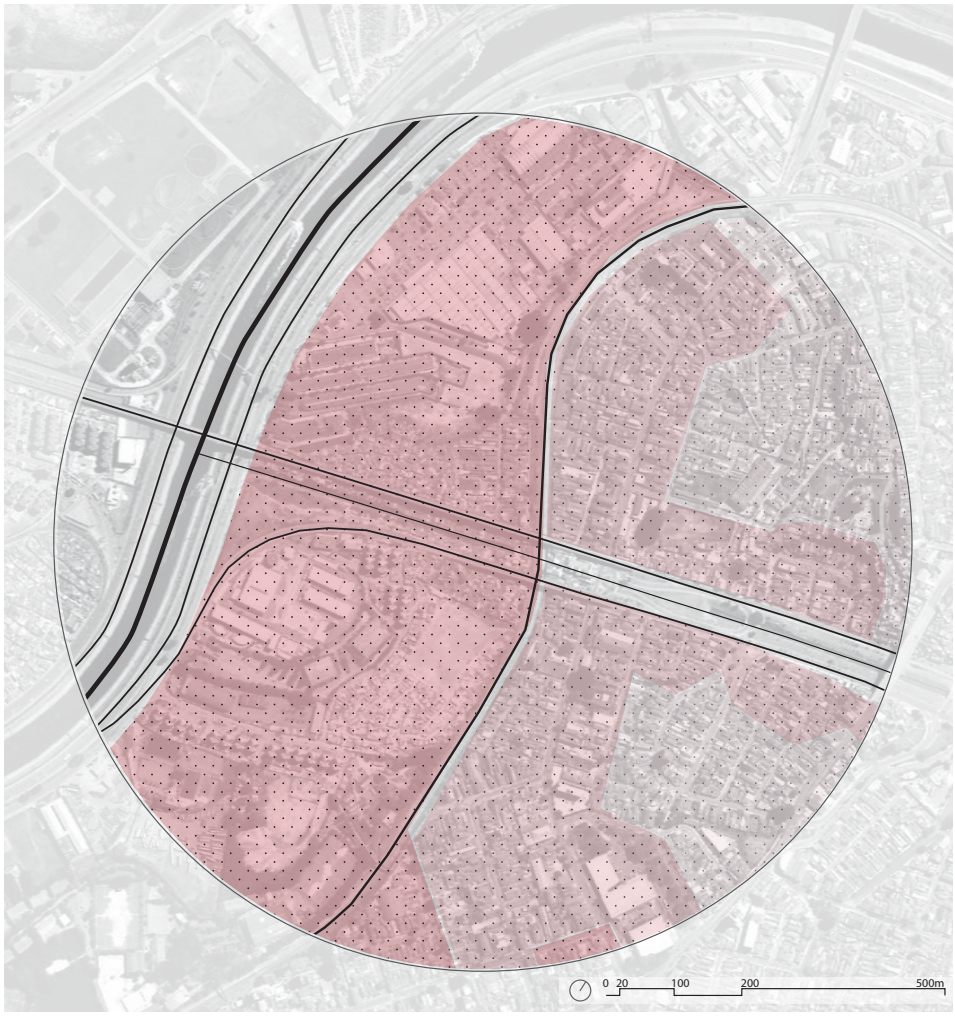
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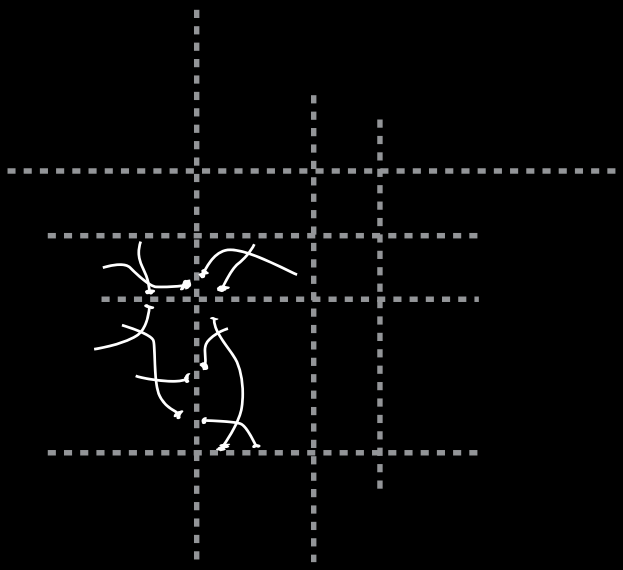
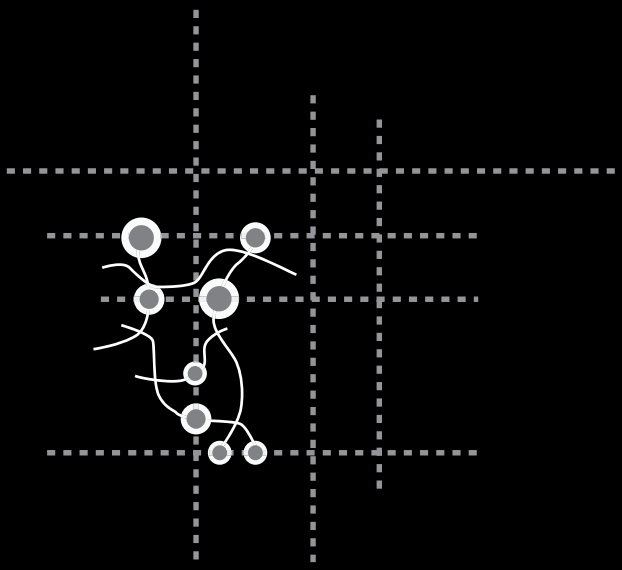
Economic integration



TODAY'S ATTITUDE

Diagnosis

New implementations do not recognize the existing relation between the built urban fabric and economic structures and destroy or severely harm these existing economic structures on which local communities largely depend.



TOMORROW'S ATTITUDE

Potential

To not only bring new economical opportunities to these dispersed regions but to assess the value of important existing economical structures and enhance these to make them more fitting to the economy of the metropolis as a whole.

Lucas (left) and Moreno in discussion at a meeting of 23sul arquitetura

Lucas Girard and Moreno Zaidan Garcia **on infrastructure and public buildings**

You're a young office, a collective of architects whom all just graduated less than five years ago. But you already work on large public and infrastructural related projects, how come?
We already started our office during university. Therefore we had the opportunity to gain a lot of experience, even before graduation. Here we started with smaller projects as private dwellings and a lot of competitions. Only the last two years we started larger projects, as the three public schools we are planning now, and the Metro and Bus Terminal of Morumbi.

Do you specifically focus on public buildings?
What is interesting about public buildings is that Sao Paulo is in desperate need of public facilities and services. Especially the more decentralized regions. But a lot of architects are tired of constructing these buildings, because of the impossible demands of the administration and the lack of actual execution.

Secondly in Sao Paulo there is an enormous preoccupation of guarding the space that is yours. We rather prefer the space to be unused, fenced off, without quality but secured, than open to all. This makes creating 'public' buildings an almost impossible task. We experience this in the construction of the public schools where we have to fight for every m2, because we want to create a square for the community that also functions when the school is closed.

How does this reflect on the infrastructural projects you are working on?
Bus stations are of great value for Sao Paulo and its people. An informal value as a market, people selling food, music, small electronics, and so on. This fuels the public life of such a place, although it also has gates, and closes at night.
In our project for …. We tried to keep as much space as possible physically and visually open for the public. We proposed a light construction, a covering construction with the least possible intervention on the ground floor, as the informal public life already creates a great amount of 'pollution'.

The location of the Morumbi metro and bus station lead to a polemic discussion could you as architects and urban planners influence this implementation?
No. The collaboration of architects and urban planners is integrated really late in the process, way to late to influence the location. We constantly try to advice the administration or company to include 'the whole team' directly as a lot of implementations we see now and in the past unfortunately have negative impact on the physical structure of their neighbourhood.

In the Morumbi planning the same thing happened as at the Higienopolis station; inhabitants of the neighbourhood were afraid that a metro station would attract too

much people in their vicinity, and demanded a different location. Ridiculously the government approved, and the 'construction for the greater good,' is moved to a less strategic place.

And so bus and metro station are constructed in two different places now, creating a complicated pedestrian connection for the users?
This was due to disagreements and lack of communication between the Government (metro) and municipality (bus). Both also having to agree with the private companies that actually own the transportation modes.

"We should implement infrastructure with a long-term vision in mind. The past has shown that doing the minimum only costs more. We now just react on problems...this costs us more money, more time, and more frustration."

Back to our previous discussion, why aren't urban planners consulted ahead in the process?
There are many different reasons we feel. A first is that primary planning is extremely fragmentised as the ruling political party almost only influences it. They form a quick opinion without consulting experts and advisors. There should be an overall regulating and responsible commission that has the know how to create a realistic vision for the long term. The people with know how exist, the politicians just don't empower them.

But the most difficult step is implementation?
Yes, but this is directly created by this situation in which we are in now. Because there is a lot of fragmented planning, there is no implementation. For example the investment in infrastructure should increase drastically to create a modern mobility system that can cope with the amount of users. Now we just construct the minimum amount of metro stations, and even these constructions delay. A new metro station in Sao Paulo has a very great impact on the region. All busses will alter their direction; streets will get stuck with traffic. So we should not only focus on the metro, but also redefine the infrastructural situation around it. Now in many cases a bus station is designed together with the metro implementation, but studies show that if more metro stations are constructed, this will be less necessary, saving a lot of money on the long term.

We should implement infrastructure with a long-term vision in mind. Can we change this planning culture?
Of course this seems difficult. But the past has shown that doing the minimum only cost more. We now just react on problems, when it is already to late. This costs us more money, more time, and more frustration. So it is clearly the only way to go, to think about intelligent and durable solutions for the urban environment of our future.

Copyright of Marcos Kiyoto

Marcos Kiyoto **on decentralized metro development**

For your PhD you extensively researched de metro network of Sao Paulo. You developed an alternative that proposes a more decentralized and homogeneous metro network for the future. Which regions should definitely be included within new metro development?
In about 90% of all the planning proposals that I studied, two traditional gates in between the periphery and the centre are included. From the west and the north this is Lapa, and as a gate from the east this is Penha. Both already are connected to one metro line, but these joints are vital in future metro development.

So these joints or nodes are included in both centralized and decentralized versions?
Yes, but how they are included differs very much. In the last part of my thesis I proposed a design for one new metro line passing from west to east, but through the north of Sao Paulo. In a centralized version these lines will always pass through the centre, like a flower.

Why do you feel it is so important to emphasize on a decentralized network?
There are many benefits, but most important is to envision what kind of city we want in the future?
The planning proposals for different 'metro networks of the future' are driven by different attitudes towards what kind of urban development should 'push' Sao Paulo further. I believe the right attitude is trying to create a more equal city, with a more homogeneous mobility network that increases the accessibility for all.

What would be the other attitude?
A part of the rich elite seems to have the strategy to just maintain the social gap between the poor and the rich. Act only when it seems ineluctable, extremely stated, when the poor start revolting.
Relating this to the development of the metro network I see an important discussion within SPTrans on which attitude is the best towards public transport development, pro active or passive.

The last one being executed the last 30 years?
Yes, the the current metro network was already planned in 1985. We still have a very 'curing' approach; new implementations are only executed in areas where the situation of mobility is most critical. But always articulated from the centre. Why not start with construction in the east or north region?

And create new centres in these areas?
Extreme amounts of people live in these areas. And the only way they can travel is through the centre. It is not about creating a new centre that substitutes the existing, it's about creating alternatives. Different spaces in the city that offer different qualities but also overlap in the services and facilities they offer. Cities are about diversity, diversity by choice, not by exclusion.

Your proposal strictly focuses on the metro network, what are your thoughts about

the connection between different modes of mobility?
Vital of course, this is why I emphasize so much on creating alternatives. We should combine the public mobility systems to create quick and sustainable alternatives for individual motorized transport. Cars totally dominate the urban landscape of Sao Paulo.

In the end I did not include this in my thesis, but I looked at some metro stations in more detail to point out some interesting problems of implementation. One of the most important is the lack of approaching a station as a transfer or connecting area. No space for busses to stop, for cars to drop of people, for bicycles to park, etc.

You speak about the smaller scale now, the close environment of a metro station. Why is it that this implementation often creates such a friction in this environment?
At first, because the examples I address above. Only the metro station is developed, not the relation with the city. Second problem is that a metro station in Sao Paulo is a different thing than metro in Europe or New York for example. It creates a great impact because there are so little lines, and little stations. So they attract a great amount of people. This is in itself not a problem, but the new stations are designed on a minimum capacity. The new Paulista station of Line 4 just opened about a year ago, and already needs a transformation because it has only two entrances and is overcrowded.
The good, for Sao Paulo, examples of metro stations all stem from the 70's. The 'old' lines, with stations as Sao Bento, Santa Cruz, and Paraiso, that have stations with multiple entrances and are constructed as spatial concepts for the city, not as technical solutions.

Another interesting difference with stations in New York and Europe is that a metro entrance is always a stand-alone element, never part of the ground floor of a building. Why not integrate this?
Interesting observation, I think I know one example that does work like this at Sao Bento station. Them main problem is that the metro is build on land owned by the state, and it is very difficult to construct buildings with a commercial purpose on this land by Brazilian law.

Does your thesis and design elaborate on these regulations?
No not directly. I emphasize more on the large scale; lets say metropolitan scale, of the metro network. Hoping to create an alternative that points out the potential of a more homogeneous public transport system. I do relate this to existing regulations of the government and negative processes, that current metro developments cause, of for example dwellers being pushed out of their houses by rising land prices.

And the design shows the light at the end of the tunnel?
The design makes some options I researched concrete. It's a small experiment to zoom in on a small part of the metro network, still remaining on the large scale. Why? Because the construction or planning of the main structure of Sao Paulo is far from finalized. Or dramatically stated, still has to start. Thinking too big is not the problem we face. It is what we need, but than tied to a long term vision and implementation.

"It's not about creating a *new* centre that substitutes the existing, it's about creating alternatives."

#6
Social landscape

Fig. 4.1: Meeting of Tiête river and Tamanduateí river, 1996.
Source: A construção do caminho (2006) original image by Nelson Kon (1996)

6.1 Introduction

A large part of the peripheral areas of São Paulo are originally built totally outside planning and regulation; and are often referred to as the 'informal city'. (Ananya Roy 2004). City planning has long rejected this 'informal city' and therefore its inhabitants were not accepted as legal inhabitants of the city. This is apparent in the lack of public services and public spaces in these regions and the poor access to health, education and transportation. On the other hand this resulted in the construction of other structures and networks by the inhabitants of these informal regions that possess important community elements. This is especially true for socio-economic structures. When the attitude of city planning slowly shifted towards recognition of the problems of the 'informal city' and started to develop urban interventions for these regions this not directly resulted in improvements.
Many interventions displaced inhabitants, and destroyed the existing social value of the built environment without offering alternatives for effective social inclusion of these regions within 'formal city' structures. 'A first step to the inclusion of these regions is to accept them. To drop existing clichés on what informal city is, accepting it just as a form of city.' (J Beardsley 2008)

In this context it seems relevant to develop an understanding of the social complexity of a specific place in the city and its specific community. Therefore in this section we define a strategy of participation as an indispensible tool in gaining continuous social-knowledge, and relating this to other (i.e. economic, ecological and spatial) values. This knowledge can hereafter be applied to at first recognize the potential of existing social structures and secondly implement urban interventions that re-use and enhance these existing social structures. For these urban interventions infrastructure is used as a structuring element, a backbone for the development of a more socially sustainable city.

6.2 Goal

The goal of this section is to describe why a participative approach within the development of new urban strategies and interventions for the dispersed regions of the metropolis of São Paulo is indispensible. Not only out of a 'fundamental right of the people' perspective but also because it significantly elevates the level of success of these interventions.
Secondly a very brief illustration of the current status of the implementation of participatory planning in the municipality of São Paulo is provided. As well as some characteristic interventions done in informal regions are discussed. Based on this discussion we aim to formulate what the task is that architects/urban designers can best take up in the process of community participation.

6.3 Why participation?

In this section we link a participatory approach to social sustainability. This is done because the concept of social sustainability is guided by several ideas that define participation as fundamental. Three ideas are explained hereunder.

(1) Right to the city

In developing and changing the built environment there does not exist a division between the planners and designers who build, change and intervene, and the inhabitants who live and experience this built environment. Those who live in the built environment actively shape and constantly change their environment. They are their environment, or as Lefebre argues: 'Space is socially constructed' (Lefebre 1991)
This relates to a fundamental right to the city, first articulated by Henri Lefebre and later elaborated by David Harvey. Arguing that "the right to city is not only the right to inhabit the city, it is the right to shape living environments to one's needs and wishes." (Harvey 2008) Fundamentally planners and designers are 'just' participants in this process rather that the opposite. Their role could maybe be best described as to create an overview, based on knowledge, about where to invest in the common interest of all involved stakeholders. A participatory approach is an effective approach in extracting this knowledge from all stakeholders, importantly also those who are often unheard, and therefore especially interesting when aiming to create a more equal and inclusive built environment.

'The right to the city, in its relation to participative design and participative planning should not be interpreted as everyone's right to change the city according to everyone's desire. Rather it is a right to actively participate in a negotiation process. A collective process (project or design).' (Hehl 2011) It is not about everybody realizing his individual right to the city, being an impossible goal. Rather it is about the city as a collective product of all citizens, about negotiating the city in a kind of collective way. Therefore it seems relevant that independent projects refer to the overarching structure.

(2) Empowering the less developed

This research explores the potential of the equal distribution of infrastructural investments in order to promote development in dispersed regions; in regions where opportunities for development are not abundant. This approach should result in a more equal and inclusive city or urban environment.
When planning and designing for these interventions in less developed

regions, we therefore aim to build 'for the benefit of nonelite groups'. (FAINSTEIN 2000) Fainstein argues that this requires empowering those who are excluded not just from the discussion, but also from structural positions that allow them genuine influence. This inclusion of 'those who are excluded ' heavily relies on a successful strategy of participatory planning. This inclusion is a very relevant theme when planning for and intervening in the urban landscape of São Paulo. The mains argument for this is that the process of empowering the excluded, through participation, has a long history in Brazil and São Paulo, on which we will elaborate later onwards.

(3) Understanding social complexity (stakeholders)
Participation is too often approached as an element in planning and design that makes the process too complicated, impracticable and ineffective. In reality participation, included in an urban strategy should be approached as a valuable and useful tool to understand parts of the complexity of the city. Cities are increasingly complex, especially the rapidly growing and evolving areas we defined as the informal city. 'We must consider human and social capital of inhabitants as potentials for revitalization in situations of rapid change.' (Lehtonen 2011) Participation with local actors here is utilized to read within the complexity of the urban environment and gain a clear understanding of place, socially.

6.4 A brief investigation in interventions made in informal regions of São Paulo.

It would be impossible for this modest work of graduation to create a complete and integral overview of all the different strategies for spatial interventions made in the informal regions of São Paulo. Rather this brief investigation of just a few interventions is used to exemplify two different approaches to implement design projects and their characteristics.

The two different approaches that we will address are relevant because they at first sight appear to be in contradiction, but this does not necessarily has to be the case. A growing amount of projects that are referred to as 'bottom-up', 'small-scale', 'community based', 'micro planned', and so on, are realized in São Paulo. These projects are for the greatest part implemented in the informally constructed urban peripheries of São Paulo.
The emphasis on bottom-up solutions seems to gain on strength during the last decade. It comes after a period wherein large scale, totalitarian and somewhat generic designs, mainly focused on dwelling, predominated the landscape of urban interventions in the informally constructed peripheries of São Paulo. Although these 'top-down' projects address to the, often critical, need for housing they rarely managed to

include the complex social and economic structures of the informal city.

6.4.1 Top down

Best example is maybe the Cingapura social housing project that was implemented by the Maluf administration between 1993 and 1996. These buildings were modeled after high-density housing projects in Singapore and were placed on lots disconnected from the informal neighborhoods. The buildings were stamped parallel to one another, without considering neither their orientation nor offering qualitative public and semi-public spaces. (Marc Angélil 2011). This lack of integration and integrative quality is unfortunately an aspect in many social housing projects realized afterwards.

Another development that is worth mentioning is the CEU projects (Centro Educacional Unificado), proposed by the University of São Paulo in collaboration with the municipality between 2000 and 2004. (prefeitura 2012) This concept is based on a redeveloped city model of 1920 where public services, as a collective group of buildings, were used to structure the city on the urban level. One such a collective group is called a CEU, and consists of educational and cultural facilities that foster its near environment. The projects were implemented in peripheral informal regions of São Paulo. In contrast to the Cingapura project, although again planned from top-down, the CEU planning effectively understood the role it played within the urban context. Its first implementation was therefore successful, but unfortunately it was 'copied' unsuccessfully afterwards. This was especially due to several political externalities. The new city council integrated the development of the CEU's within their altered urban planning strategy without all its previous requirements and specificities. This resulted in new CEU's, implemented in other regions without adapting the projects to the specific context, and often disintegrating the implementations of their social surroundings.

6.4.2 Bottom up

Tiquatira em Construção, a project that constructs public space and community services around an abandoned football pitch (Andréa Medeiros Helou 2012) and BioUrban, a 'social' project concerning art in public space (Anderson 2008) are two recent examples that generated a large amount of attention. These are just two of the several hundreds of initiatives that have been implemented in recent years and that have an arguably positive impact on the living environment of the communities involved.

Publications such as Hand made urbanism (Ute E. Weiland 2013), and Microplanning, urban creative practices (Rosa 2011) collect a range

of exemplifying projects executed in São Paulo that act in informal neighborhoods. The publications especially emphasize on the importance of such initiatives in developing the social value of urban space and the inclusion of a participatory approach within urban planning and design. These publications define an emerging role for small-scale bottom-up initiatives in urban planning and urban design. Consequently relating to a global trend in which similar projects and developments, especially in the global south, are approached as a different and new way to deal with informal neighborhoods.

6.4.3 Discussion

The interest in the urban and architectural discourse seems to shift towards small-scale bottom-up initiatives, often driven by communities that start to take an active role in the structuring of their living environment. One can also state that these projects are a reaction, a respond to the lack of participation in existing planning and design. The projects outlined in the section generate attention as forms of community planning that intervene in existing informal neighborhoods. They often introduce a different approach towards planning, one that includes participation. These projects arguably have a better 'feel' with the local socio-economic situation.

We mention here the book Small Change of Nabeel Hamdi, which sets out a way of thinking on cities that gives precedence to small-scale, incremental change over large-scale projects, top-down interventions. Hamdi argues that the 'trickle-down' effect of large-scale projects (top-down) is often highly overestimated and that instead the 'trickle-up' effect of community organized systems contributes to the biggest changes in urban areas. (Hamdi 2004)

On the other hand many of these projects continue to raise questions. The presentation of this mirco-scale projects, as 'the new solution' sometimes seems to create a certain 'idealistic feel'. (Hehl 2011) And often lacks to address what these projects can mean in the underlying discussion of a structural response towards a far larger and more complex situation. (The social, economic and spatial structure of these informal urban regions.) How can these bottom-up projects exceed their scale and become important for macro-scale urban planning? In responding to this question a top-down strategy of implementation seems continuously relevant. The broader view of top-down projects has a lot to offer in proceeding towards a structural and long-term response. What becomes apparent in the top-down projects discussed is that these too often don't include the understanding of place. This absence of understanding results in implementations that harm social structures instead of enhancing them.

Many top-down projects are not receptive to existing social structures or changing processes in communities on a local scale. It therefore seems relevant for top-down strategies to focus more on ways of structuring, and less on creating projects that have the 'over defining' character.

6.5 The current state of participatory planning in São Paulo and its development through history

São Paulo has had long to do with rapid urbanization of the city, and especially its peripheries. This process of urbanization struck the city in a time wherein the government had little or no policy or strategy to at least address urban planning in some sort of way. The question of how newcomers should be accommodated in the city was simply ignored.

Throughout the last decennia the city developed a very progressive legislation to address its informal neighborhoods more effectively. Interestingly, this shift from ignorance towards a progressive approach is for a large part due to a 'long social struggle' of a large group of community organizations. Now the government of Brazil and the local administration of São Paulo in Brazil accept the rights of inhabitants of the informal city and promote policies of participative planning.

This 'long social struggle' eventually managed to convince the top-down planning authorities to recognize them and integrate participatory methods in the legal frameworks of Brazil's public policies and took place in a large scale during the 1970s and 1980s. '…the growing opposition by several social movement groups during this period of late dictatorial leadership finally resulted in the inclusion of representatives of these social movement groups in the decision making process.' (Roberto Rocco 2013) This acceptance of social 'activist' groups by the political ruling resulted in all sort of organizations that involved themselves in the development of the informal regions of the city. 'From spatial, social and legal segregation a new type of social-political realm emerged in São Paulo. This resulted in all sorts of organizations…concerned with housing, infrastructure, services...' (Roberto Rocco 2013) Especially interesting is that these organizations emerged out of the local, community scale level.

6.5.1 The Brazilian constitution of 1988

The acceptance of informal regions as part of the city was officially established in the Brazilian constitution of 1988. In this constitution the 'social role of the city' and the 'public function of private property' should be marked as the most important elements. Based on this constitution administrative and planning structures have been developed over several decades to face the challenges posed by informal urban growth. The

constitution of 1988 later developed into the Statute of the City, which was officially established in 2001. (Marc Angélil 2011)

6.5.2 The city statute and participative master planning

Increasingly important within this planning structures became the participative strategies and their place, by law, as being an integrated part of, top-down, urban master plans. 'The Statute of the City (Brazil, law 10257,2001) established standards for urban land use in Brazilian cities, aiming at the public welfare as well as the environmental balance. According to this law, urban master plans should constitute municipal planning processes along with participative strategies…The development of Participative Master Plans established a new paradigm in the discussion of urban planning issues among the different segments of society.' (Joel Avruch Goldenfum 2008)

What is interesting to remark is, in light of the previous discussion on bottom-up and top-down strategies is an aspect of the Statute highlighted by (CALDEIRA 2005) in an extensive set-out on the city Statute. A section 'promises to develop and implement urban policies only with the intermediation of popular participation. This means that the production of urban space is not solely a matter of the State but citizens are called to actively participate and influence policy-making.' Interesting is the emphasis by a document of governmental planning, a clear top-down strategy, on the importance of bottom-up integration in the strategy. Including participation is the key-role in this integrated strategy.

6.5.3 The development of the current strategic plan

In spite of their very progressive nature, these procedures of participatory planning too often remain as formal regulation instead of implementation, due to several political complications. One of these is the financial (and political) power of private developers that 'scaled out' the social movements and even governments which results is implementations in the built environment being subject to 'only' the dictation of the large scale private investors.

Although it remains difficult for the municipality to prevent to be 'scaled out' financially by private developers it doesn't free them of the task of implementing the articulated policies of the city statute. Fortunately recent developments in the municipality of São Paulo mark an increase of importance recognized by this municipality in practically implementing the planning procedures of the city statute. Leading element in this shift is a drastic revision of the existing strategic plan which is a central element of the city statute and functions to 'normalize municipal goals in time and space, by a set of distinctive strategies including regional integration,

urban mobility, economic development, infrastructure and sanitation Improvement, social and environmental development and dwelling policies.' (Joel Avruch Goldenfum 2008)

The strategic plan is being developed throughout a period of two years and this development is dependent on the active participation by inhabitants of the municipality. In public hearings the strategy of the municipality, divided per subtheme, is setout and inhabitants can react and propose alternatives. At first the development focuses on formulation a new strategy for the scale of the municipality as a whole. Based on this strategy, the process continues with follow-up sessions, wherein specified plans will be developed focused on regional strategies, specific regulations on the use and occupation of land, goals for the development of public services and eventually strategy acting at the neighborhood scale. (SP 2013) To increase participation and transparent decision making the municipality has launched an interactive website on the planning of the urban environment. Here visitors can address urban issues and propose spatial interventions marked on collaborative maps. This includes online access to the extensive documentation that exists on the strategic plan until now.

6.6 Conclusion; building a social network

For the planning and execution of urban interventions in the dispersed regions of São Paulo, with the aim to promote a more socially sustainable urban environment, including strategies of participation is indispensible. This is argued out of two fundamental principles; (1) the right to the city, in which all inhabitants have the right to use and actively shape their living environment and secondly the (2) empowerment of the less empowered, meaning not only empowering inhabitants of the city by including them within the 'formal city' but in addition including them in the process of decision making.

A third argument in favor of a participatory approach is not made out of a 'fundamental right of the people' perspective but based on the thought that a process of participation significantly elevates the level of success of these urban interventions. Participation as a tool: to (3) gain knowledge in the complex social structures of the city. Participation should be further developed by making available new tools of communication between planners and communities; ways in which communities can engage in planning by own ways of representation.

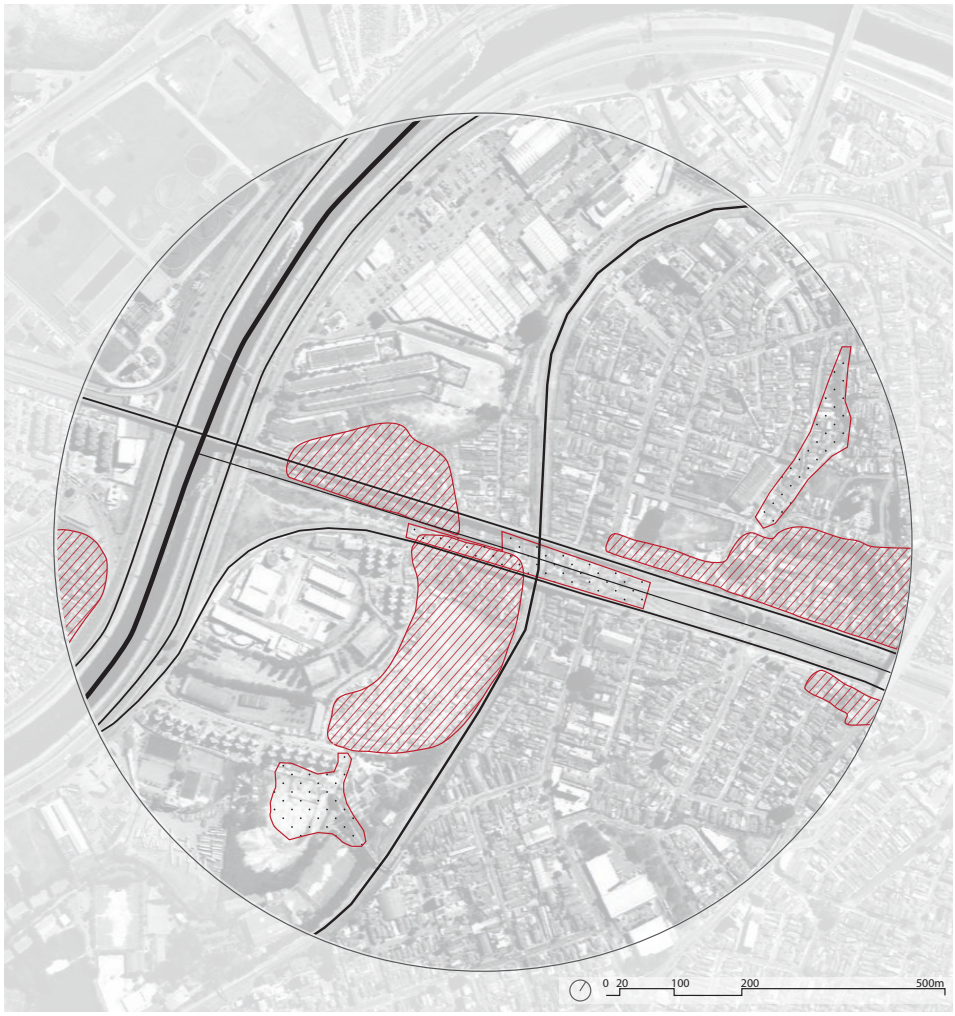
By integrating communities through participation, architects and planners can develop a thorough understanding of the social issues and networks within these regions, and discover the opportunities that are

available to solve social issues within these precarious regions. Our role as professional is to establish the synergy for possible change to work on.

Here a synergy between all urban actors is intended. Not just including the local community, but directly politicians, developers, institutions and sources of financing. In this process of synergy between actors it is very positive that the municipality of São Paulo is developing certain frameworks for the inclusion of existing social networks within new planning developments. Frameworks based on progressive legislation and concepts of participation in decision-making. Because of this 'political will' to implement change, the role of architects and planners seems to slowly shift from 'activists' advocating for the right of communities and opposing to top-down planning, to 'integrativists' that develop smart interventions that promote integration between existing and new social structures but simultaneously relates to the framework that is developed by top-down planning.

Of course Architecture and Urban design should not just adopt one strategy, rather develop a multiple. The negotiation between the different strategies will mutually empower them. A negotiation process, that is best done in the city itself, by citizens, through participation.

Architecture and Urban design will have to define every new implementation in the city as such that it is receptive. An implementation receptive to the top-down, macro-scale, alterations or adaptations in planning. And simultaneously receptive to bottom up, micro scale, influences.
The participation of all actors in this, not just as 'tools' but as active actors, is vital for a successful process. In this way design can become socially significant again. A key asset for developing the social value of the city. And design can become politically relevant. A 'tool' through which planning policies can continuously be discussed, negotiated, developed and contextualized to the environment.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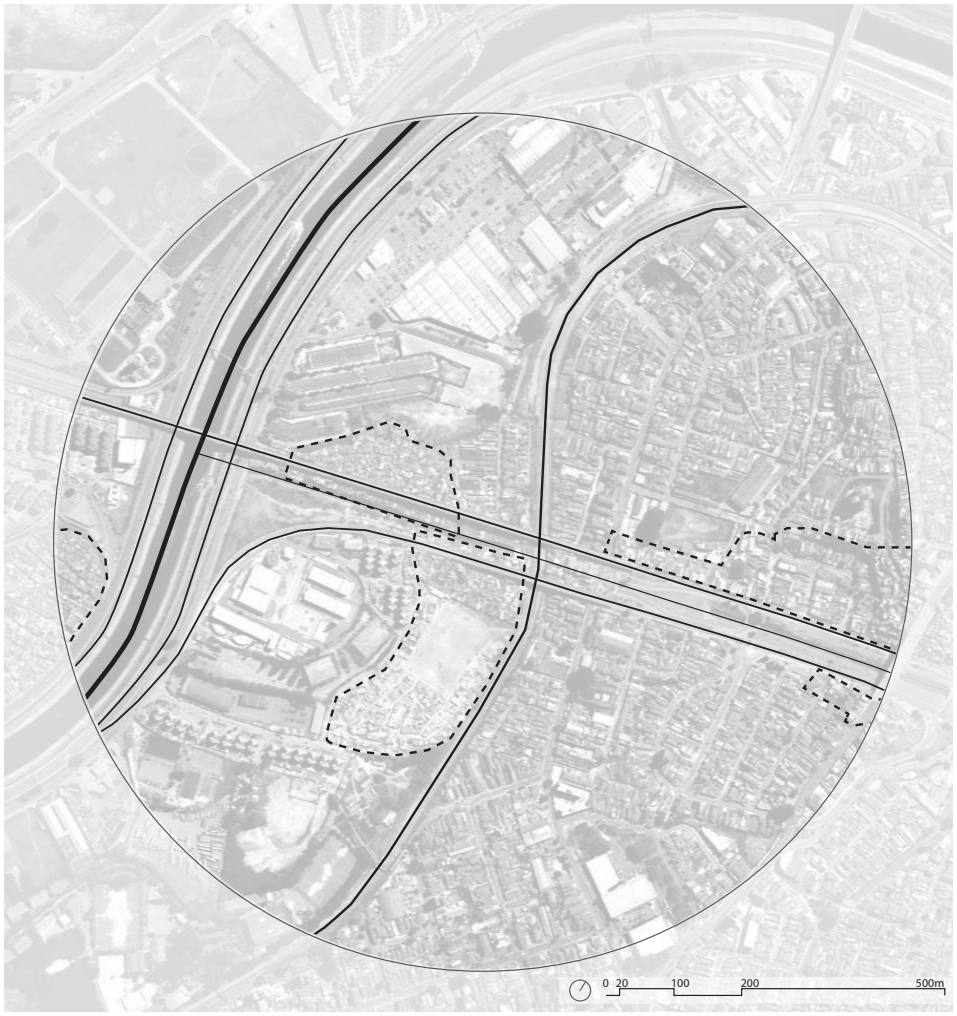
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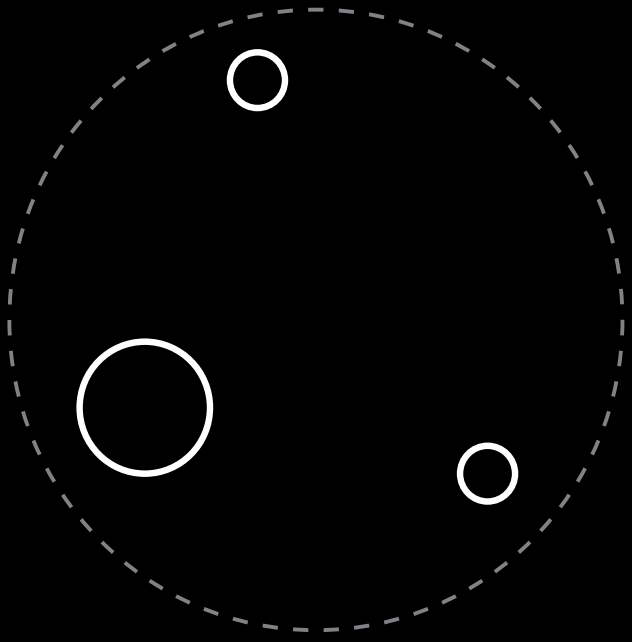
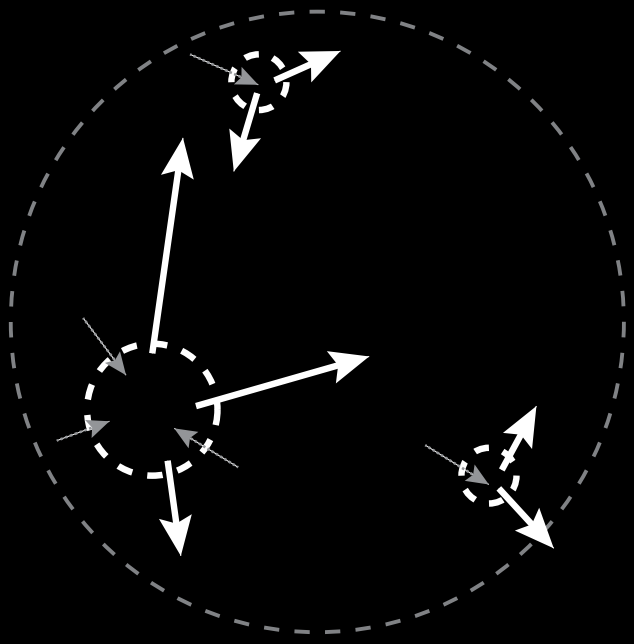
Social integration



TODAY'S ATTITUDE

<u>Diagnosis</u>
New implementations do not recognize the existing relation between the built urban fabric and economic structures and destroy or severely harm these existing economic structures on which local communities largely depend.



TOMORROW'S ATTITUDE

Potential

To not only bring new economical opportunities to these dispersed regions but to assess the value of important existing economical structures and enhance these to make them more fitting to the economy of the metropolis as a whole.

Founders of Una Arquitetos, Fabio 2nd left.

Fábio Valentim **on the urban planning approach and the *Parque Dom Pedro II* project**

Your office is based in Sao Paulo, and already works and constructs within this metropolitan area for about 20 years. Do you believe that Sao Paulo, and Brazil, are in an important moment of change right now?
Every moment is one of change, but what right now is really interesting is that extreme growth of population has come to an end. This means we can stop expanding our grounds and focus on putting the different pieces of the city together. It is important to (re) connect parts to create a more balanced city.

Where should the focus be?
The periphery is the most interesting part. Big challenges that are related to urban development in Sao Paulo are very present in these areas. For example infrastructure is in a permanent conflict; at this moment the planning of mobility focuses really on the metropolitan scale, moving people from the east zone towards the centre. This leads to careless implementation of projects, which results in serious problems for the local dynamics. These metropolitan scale implementations disorganise and dislocate the local dynamic.

How prevent this dislocation?
The periphery is almost always auto constructed. This detailed and complex urban structure leaves little room for enlarging the existing infrastructure, constructing new and separate spaces for slow traffic, giving space to the river and create spaces for public encounter. So the easy way is just not to construct these elements. But it is vital for the region to integrate these elements in urban development planning.

Integrated with infrastructure?
Yes, that is what we try to show in our urban plan for Parque Dom Pedro. I feel this disintegrated results also relate to the lack of an infrastructural planning culture we have in Sao Paulo. Why do we construct a bridge without a pedestrian way, or a train track without the possibility to cross it?

For example, zona leste, the eastern region you are focussing on. The space you show is almost completely enclosed by infrastructures; river, road, railway, and therefore totally detached of its surroundings, although it has great potential being so close to all these infrastructure, but the existing network only serves the metropolitan scale. I could imagine establishing a connection to the other side of the river, cabuçu da cima, to the parque Tiête and the university campus of USP leste. You can use this case to exemplify the problematic of the city. We think to much in the problem of the train, the car, the pedestrian, and forget about integration.

Is that what the Parque Dom Pedro project is, a case to exemplify the problematic of Sao Paulo?
To some extent it is, because I believe the city will need several of these projects to show the municipality and show its inhabitants what is possible with intelligent planning. But

primarily it's designed to be executed, because it offers great potential for this area of the city that is of great importance, connecting the traditional centre with the east.

You propose a transportation 'hub', connecting bus, metro and railway lines that distribute a large area of the metropolis. An infrastructural implementation serving the metropolitan scale?
Currently this area is totally dominated by metropolitan infrastructure that creates a totally dispersed area that is only by name a park, but has no quality at all and is inaccessible. On a metropolitan scale the connections between various modes of mobility, between the different terminals are impossible. The area has several mobility stations; including train, metro and the biggest bus terminal of South America, which are poorly connected to each other. The first proposal we do is to integrate these three terminals into one accessible terminal.

What does this mean for the local space and dynamics?
In the current situation the infrastructures totally deconstruct the spaces that used to be very important for public life. The local environment is made up of various dispersed spaces that are unused and seriously lack quality.
By bringing together the three terminals in a compact integrated solution, the area is 'unlocked'. More spaces are available for public use, and the urban proposal includes pedestrian and cycling infrastructure. Connections are made to the eastern area and various facilities and services are places to foster these public areas. This mix of functions is very important. It creates an argument not only for the municipality, but also for private investors to be will to invest in the development.

This time the municipality took the initiative for the development of this proposal?
Yes, the municipality, which is very interesting, initiated it, especially because it is a project against the stream, against the 'regular' projects constructed by the private investors and financial market.
It makes me feel positive, because there have been made an extreme amount of proposals for the PDPII, as it is such a strategic area, but never in such a collaborative approach with the municipality and several private investors. I believe this is the way to do it, although also in this case we really needed to convince the municipality to take into account the greater area around PDPII, and not just solve one little problem by creating another.

Such a collaborative urban development is rare in Sao Paulo.
Yes, unfortunately it is. Most private investors are only interested in creating there own spaces and buildings and do not look around. This results in a scattered urban landscape. Municipality and also architects and urban planners too easily agree with this. It is so much easier for constructors, real estate developers, etc. to develop projects that don't take into account in any way the area around the project. The challenge for us architects is to show that this approach generates so much more quality that it's worth to invest in. To prove that it is as a fact a better approach for designing the city.

"The city will need several of these projects to show the municipality and show its inhabitants what is possible with intelligent planning."

At the moment it is still not sure that construction will go through, is it?
Right, but I'm confident. I believe if it does, we can really demonstrate a different way of approaching challenges of our urban landscape. The importance of these projects is also to demonstrate that it is possible to create an integrated space that is structured in a way that is positive for the metropolitan disclosure of the city, but also offers quality on the local scale. Sao Paulo needs a lot of these kinds of projects to secure its future.

Referring back to your comment on the lack of infrastructural planning culture in Brazil, what can the role of the Hidroanel project be in developing this planning culture?
It already has an important role, although it's in a planning phase that is far from finalized. The Hidroanel project is a unique project for Brazil and Sao Paulo because we don't have the historical experience of such a large scale planning. It therefore opens up a new possibility for a metropolitan region that never had an overall vision for infrastructural and urban development.
It can be guiding the development of new projects in the category of PDPII in various areas along the rivers. Clearly we are talking about a very long process that will change over time, but to think of how this concept can transform our living environment is very interesting.

But we also have the Rodoanel and Ferroanel planning as guidelines?
Yes of course these large scale developments exist. And they are also useful in their own way for the development of the metropolitan region. But if we take the Rodoanel as an example; some sections are already implemented, and they disrupt the region they cut through. Again we have this problematic of the large scale not taking into account the local dynamics. Herein the Hidroanel planning differs, as it carefully defines the importance of the development of its borders. Converting it to one of the greatest qualities of the project.

The PDPII project also restructures the water infrastructure of the area, how exactly?
Because the area copes with massive floods annually we propose a public square that can in the case of heavy rainfall became a water collection basin. This will probably take place several times in a year, especially in the rain season. The rainwater is than filtered in an wetland, which also functions as a park.

A public space that works as a water basin; again driven by the idea that different functions should be combined?
We tried to integrate this idea in different concepts. A very mono functional use of the region results in empty and unsafe places at night. The eastern region that borders the park has a very
low valorisation of land, because it is considered as unsafe to live. By creating used and diverse spaces in the park this proposal is important for its borders without literally regenerating them. Becoming accessible, the existing population can regenerate the area 'itself'.

To what extend can people actively use the park you designed? For example the wetland area?
The wetland area is an integrated space, as it is utilized for filtering rainwater, but also accessible by wooden pathways for pedestrians. In the development of an overall concept for the public space we analysed a lot of the historical proposals for the PDPII that show very picturesque like parks. Parks designed for beautiful sights instead of active use. Our opinion was that the focus for designing public space should be to create areas that are open for adaptations of their user, less formal structures.

#7
Conclusion:

Tomorrow's attitude towards the (re) development of infrastructure

7.1 Tomorrow's attitude

The aim of this work was to explore the potential of infrastructure to form a backbone for systematic urban transformations in São Paulo. This hypothesis is driven by observation that there exists an essential link between the city's physical infrastructures with its social-, environmental-, and economical dimensions. All these dimensions are spatially entangled and by their conflicts they all make up a part of the systematic problems that the metropolis faces. For a systematic solution their specific interrelations should be researched. And due to their strong spatial entanglement we argue that part of the solution will have to be articulated spatially.

It is clearly evident that today's attitude towards the (re) development of infrastructure is incapable of sufficiently reacting on the problematic with which it is entangled. We argued that the current infrastructural network of the city is developed out of a purely technical perspective, aiming only to thrive the production of the city. This one-dimensional goal results in an increasing imbalanced urban built environment.

Therefore it is central to our conclusion that the (re) development of infrastructure should be approached differently. Tomorrow's attitude towards the (re) development of infrastructure should be integrated and integrative.

7.1.1 Integrated Infrastructure

Infrastructure is the structure to which many urban processes are tied. Starting at the macro level, up until the micro level, and vice versa. (Re) developing parts of this structure offers the possibility to take into account all these urban processes and enhance their interrelation. Current (re) development especially does not take into account the micro scale, and its complex processes, effectively. The infrastructure is determined on the macro-level and destroys valuable local scale networks.

With integrated infrastructure we refer to mobility environments, connected to this infrastructure, that relate to multiple urban scales and simultaneously to multiple urban issues. We argue an integrated approach should, above its goal of connectivity on the metropolitan scale, enhance the local potential of infrastructure by zooming in to the bordering areas of the infrastructural network.

To effectively integrate infrastructure within the urban built environment urban transformations of mobility environments should be seen as context-specific projects situated within overarching urban strategies. Effective integration is continuously shifting between local specificity and

metropolitan systematics.

Future urban transformations can enhance the local potential of infrastructure by enlarging the boundary of current interventions. It is these borders areas where the macro-level can negotiate with the micro-level. When developing urban transformations one should have a vast understanding of the urban processes (i.e. social, political, environmental, economical) that are present in this border area. This understanding is a first step for effective implementations. Infrastructure is here approached as a disruptive or fragmenting element, but as a neutralizing element; one where all members of society are subject to; all members should be able to benefit from, share and use.

7.1.2 Integrative Infrastructure

We argued that infrastructure should take into account all (urban) parameters involved and not just one. With these parameters we refer to the different urban issues defined as environmental, social and economical that make up the model of a sustainable and inclusive city rather than a productive city.
For a mobility environment to be able to take up these processes effectively we believe the way of thinking about the transformation of these regions (i.e. the design) should shift. It should shift from approaching it as a project to approaching it as a process or collection of processes.
Most processes involved in this transformation of the urban landscape are dynamic, but the (re) development of infrastructure as it is today is one that is static and one-dimensional. To clarify this 'clash' we include the definition of the 'engineering of certainty' described by (Stephan Graham 2001) as the state in which you can always predict what is coming. This is how a purely technical infrastructure articulates itself in the urban environment. But whenever we include a variable of nature, such as environmental variables (but also social and economical), we include open-ended conditions. Infrastructure, although physically static, should become receptive for these open-ended parameters. Integrative infrastructure is a resilient structure as a framework, able to respond to dynamic urban processes.

7.1.3 Dispersed regions - Developing the periphery

Our view on the matter includes a view on the development of dispersed regions of the São Paulo metropolis. We argue that especially in these areas, where environmental-, social-, and economical values are in dispute, an integrated and integrative approach can be a key element into developing a more sustainable (human and livable) and inclusive urban environment.

7.2 Including values

To transform the urban landscape of São Paulo from a mere productive city, to a sustainable, and inclusive city we articulated three dimensions that should be addressed properly and in balance by the development of infrastructure. Here we define how these issues relate to the spatial.

7.2.1 Environmental

We see an important role for the borders of environmental areas, the hydrological networks of São Paulo, to be developed as areas for multiple uses. Areas for flood protection, water treatment but also as public spaces, routes for transport and even dwelling spaces. With this these water borders become spaces of integration, important for the city. And due to their linearity and the natural connection, in terms of landscape, they possess, these areas could be seen as a network offering the potential of becoming structuring elements in a fragmented urban built environment.

7.2.2 Social

The most significant issue is to socially include inhabitants of dispersed regions, often dominated by informal urbanization, and formerly excluded by the 'formal city', within the city's structure. The success of this social inclusion is at first not determined by its spatial representation; rather it finds its origin in the political status of these inhabitants. This status changed extensively in São Paulo throughout the decennia. Now their 'right to the city' is acknowledged and the principle of 'empowerment of the less empowered' by including them in the decision making process is politically established.

This process of political inclusion must reflect itself a different way of producing space, which relates to the spatial dimension. The increasingly participative approach that is expressed by current progressive legislation forces to actively engage all actors in the process. Therefore by including participative processes in the production of spaces, design can become socially relevant again. Participation will become an increasingly important 'design tool' through which planning policies can continuously be discussed, negotiated, developed and contextualized to the environment.

7.2.3 Economical

In systematically transforming the urban landscape of São Paulo it is important to define that the informal city and the formal city are part of the same economical matrix. Therefore every strategy of urban

transformation should address this economic relation and focus on the enhancement of local economic structures and the possibility of re-using elements when transforming the urban built environment. This starts with understanding these processes and formulating successful adaptations that will make these processes stronger, more resilient and autonomous on the long term. A strategy of intervention that shifts the focus towards urban processes and less towards 'the' final project. The economic landscape of the city of São Paulo is not in need of beautiful strategies, based on shapes and forms, but strong strategies, based on program and use. A strategy of growth that combines existing commerce with economic opportunity and social (housing, protection of public space) and environmental (green infrastructure, water treatment) aspects.

7.3 The role that design can take up

We already touched upon the role that design can take up in this changing approach towards infrastructure, but it seems relevant to set out what should be the point of departure of such a spatial strategy.

In relation to an integrated and integrative infrastructure, we argue that the design for any mobility environment should be based on an attitude of acceptance. Meaning that such an intermediate space should effectively 'mediate' between dynamic urban processes and its static structuring elements. These structuring elements should not determine urban space as 'demanding elements' but offer a resilient and flexible framework in which urban processes can relate and evolve. Such space should simultaneously 'mediate' top-down macro scale systematics with urban values articulated by 'the local community scale'. Design here is not the plain provision of solutions on every level, but the synergy between these solutions that offers an additional value for the livability of the urban environment as an integrated whole. And by its intervention enhancing physical and visual relations in now too often fragmented mobility environments.

Any spatial design for a mobility environment should revert the current attitude of developing merely spaces for production towards the production of sustainable and inclusive spaces. This will mean design that challenges this purely technical and physical attitude, and advance it to a level where environmental, social and economic issues are addressed in a spatially integrated way. This starts with developing an understanding, and articulating this towards other actors, of urban values related to these issues and their complex interrelation in the urban environment. Based on this understanding urban and architectural design should in its proposals be able to effectively interfere with physical elements, or

otherwise consciously omit such an intervention.

4 Reflection

TO BE INCLUDED


Image: Escola da Cidade

Alexandre Delijaicov **on the importance of urban water and the *Hidroanel* project**

The awnsers that are presented in this interview are extracted from several discussions and interviews I had with Prof. Alexandre Delijaicov in 2012 and 2013.

You are head of the Grupo Metropole Fluvial, which is a research group of FAU USP that researches the possibilities to re-activate the rivers of Sao Paulo city and state. With your research you show the potential of reinstating this water infrastructure as one of the main supportive structures for a large scope of activities. Such as for example transport of goods but also leisure and public space for Sao Paulo's citizens. The rivers used to perform this role for Sao Paulo in the past?
For some centuries the people who settled here and established the city of Sao Paulo, as we know it now, depended on its rivers to explore the territory and transport their goods. It is only about one century ago that 'the city' decided that the rivers, which in the first place were the reason of settlement within this region, now were to be seen as obstacles for growth and expansion.

So when did the city government decide to expand over this river boundaries?
The beginning of the story is that at the time, around 1920, that Sao Paulo decided to 'bury' and canalize its rivers, the state was in a great depth and needed capital. Next to this there were a lot of problems with the river area attracting mosquitos and spreading diseases. The state used these arguments to sell these areas and construct the 'new' city on top of this old Sao Paulo that existed due to its rivers, due to the water.

But there were two proposals of how to use these areas?
Correct, the first one was a project called the Santos Cannels, by Fransisco Santurino de Brito, proposed in 1922. The aim was to preserve the banks of the rivers, at that time still possible, and make them into the primary public spaces of Sao Paulo. He explained the importance of guaranteeing the wider floodplains of the Tiete River and simultaneously integrate these areas within the future city.
Furthermore he proposed a lake at every junction of two rivers, forming a buffer area for changing water capacity and accompanied by a park and public functions.

Contrary to this plan was the proposal of Fransisco Prestes Maia, called Plano de Avenidas; Plan of Avenues. He said what developers wanted to hear and advocated the development of Sao Paulo through a plan of radial concentric avenues. Referring to famous European cities as Moscow, Paris and Vienna having similar solutions. The mistake he made is that these cities had a 'ring road' as an alternative for a 'ring railway' and 'ring waterway'. In Sao Paulo the ring road became dominate, a solution with no alternatives.

And the second was implemented?
In 1938 Prestes Maia became mayor of Sao Paulo and started implementing his ideas.

Because the new roads needs large amounts of space the plan proposed to use the creek valleys, rivers, and stream areas to build this avenues. This concept was adopted in the decades after Prestes Maia as the main strategy for development of the city's infrastructure. Every river slowly turned into road.

And flooding's became problematic for Sao Paulo?
Exactly. Flooding's are a product of our own urbanization. If we give way to the river on a smart way water does not have to cause these problems, it can offer solutions. That is the central idea of the Hidroanel project.

Bringing back the rivers in their original state?
Not necessarily their original shape, but their original function. The backbones of this city are its urban rivers. If we really want to solve this river' problems, we must solve our transport problems first. The government of city and state, often due to demand of private investors and contractors, still focuses on creating more roads and more avenues. This has to change.

The Hidroanel project is in ideology way more than re-activating the rivers of the city for the use of transport of goods and waste, introducing different activities related to water, public use of water, the proximity of people to water, and so on. In its principle it is important to realize that we are dependent on automobiles and private transportation, but we don't have to. That instead of sterilizing our streets with the car culture we should transform our streets in something alive, something public. That urban development should create spaces where we meet and gain trust in each other instead of hiding away in our cars, locked inside with fear.

A change of mentality, can you accomplish this with urban development?
It's about creating incentives for people to develop themselves and their living environment. About offering alternatives within the urban landscape that people live in, which is now often auto-constructed and has no backbone of public facilities, open spaces, etc. When we constructed the CEU's (public centers that function as schools and cultural centers in distant peripheral areas of Sao Paulo) this was also thought of as pinpoints in these neighborhoods that could foster further development. I believe offering a strong underlying structure is the way. The rivers of Sao Paulo can form this underlying structure for the development of the metropolis of the future.

You propose a change of mentality, how realistic do you think citizens of Sao Paulo experience this possibility?
Fortunately the primary work of art that was constructed by mankind is the city. It was we, people, whom constructed the city. It was we whom polluted these rivers. And it's an open and undisclosed work of art that changes every day. It is essential to stress that its up to us to conceive the space we want to live in. And up to us to change these spaces we live in. Clearly this is possible, we just need to change our approach.

"The rivers of Sao Paulo can form a backbone or underlying structure for the development of the metropolis of the future."

Image: Roberto Rocco

Mariana Fix
on social movements and global capital

Unfortunately I was unable to individually interview Mariana about her work and her thoughts on the 'the right to the city' concept in Brazil and how this relates to social movements and is influenced by global capital. However I was present at two discussions (one in Delft, one in Sao Paulo) with citizens and university students where Mariana lectured and afterwards took part in the debate. This discussions offered interesting information that is worthwhile publishing a short summary of in this publication.

Arco do Futuro – Fernando Haddad

The Arco do Futuro is a large-scale urban development vision for the 'future of Sao Paulo' presented by the recently elected mayor Fernando Haddad (PT). The vision was one of the main focal points of his successful campaign. The Arco proposes to focus new urban development along the city's main infrastructural axis's, as an arch around the traditional center. With this strategy Sao Paulo's workers, who for a great part live in the east, north and south will have better access to the west and the center, the main business regions. The development will also stimulate the settlement of business in the north and east, closer to what are now 'bairros dormitorios', neighborhoods purely for dwellers.

Mariana Fix explains that it is one of the most ambitious urban development visions the city has ever had in its history. It is positive that the focus is on existing problematic of Sao Paulo; extreme commuting hours for citizens, daily traffic congestion, mono-functional neighborhoods, and so on.
But what is interesting, and subject of debate, is the image that is used for the promotion of the Arco. It is presented as a one man plan of Fernando Haddad, the images and visualizations recall developments of the 1990's and 2000's in Faria Lima and Berrini, which are dominated by large private investors and global capital. According to Fix we should question if the Arco will really become for the city what it is pretending to be. Namely an 'open system' of development by collaboration between public and private investment. Will this new development really lead to a more equal city, a more social city, as Haddad explains and defends it, or will the power of capital overthrow this ideal and create yet another development focused only on itself, the rich?

The role of design

One could state that although the image presenting the vision recalls images of previous urban developments along Pinheiros River as Faria Lima and Berrini, it doesn't subsequently mean this development will lead to a similar result. But it certainly does lead to the question of what the role of design is in such image-ification? Fix points out that we seem to be in need of a different image that reflects the social message of a proposal. If this vision is really advocating a more equal and more social city than how can we 'physically' express this 'different' strategy?

The role of design in this is to visualize the social inclusion in these projects. In some small-scale projects this is articulated successfully but the question remains how to make this more visual to the public, and on a way larger scale. Fix argues that too often social inclusion is argued as a spin-off after an 'economically wise' and 'technically feasible' implementation. The articulation of this social factor should be at the core of the implementation.
The role of design is to visualize this, and foster the debate about which direction the development of a city should take. Will we remain creating dreams we have of a New York or Paris like world, or produce images that reflect the social city we have in mind, and that can foster the debate on how we want this city to look like.

"If this urban vision is really advocating a more equal and more social city than how can we 'physically' express this 'different' strategy?"

The right to the city and increasing globalisation
David Harvey describes the right to the city as and active and collaborative right for citizens: "The right to the city is…far more than a right of individual access to the resources that the city embodies: it is a right to change ourselves by changing the city more after our heart's desire."
Mariana Fix explains that Brazil is one of the few countries that embedded the principals of 'the right to the city' within its City Statute of 2001. This legislation was established after decades of 'struggle' by alliances of housing movements, professionals, squatters, NGOs and academics. Simply said, social movements led to legislation that advocates "democratic city management and the recognition of the "social function" of urban property and the city. "Social function" refers to the prioritization of use value over exchange value — collective interest over individual ownership rights — while democratic city management involves a path to plan, produce, operate and govern cities subject to social control and participation of civil society."
What Fix points out is that the social movements used to gain power and recognition, in legislation, due to their 'struggle' but are again dictated by large investors as 'global capital' moved to a larger, global, scale. The social movements and with that a more equal and social city is 'scaled out' by capital.

Coming to the role of architects and designers she explains that they used to have a role in mediating between large investors, government and local users, i.e. citizens, in working towards urban developments that advocated a socially equal city. Now the citizens, architects and planners, but also the government itself, are overpowered completely by the large investors, the global capital. The scale at which they act makes the implementation of urban projects that develop the 'social function' of the city subject to their dictation and only their decision.

In relation to this problematic of scaling out local movements David Harvey argues that in order for movements to effectively claim the right to shape cities and resist dispossession these days, they must converge in "a global struggle, predominantly with finance capital, for that is the scale at which urbanization processes now work.

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