SÃO PAULO
REPAIR AND CONSOLIDATE.
RE-THINKING SOCIAL HOUSING THROUGH ASSEMBLAGES

A RELATIONAL APPROACH OF LIVING TOGETHER

Beatrijs Kostelijk

Research and Design Booklet:
Global Housing Graduation Studio: São Paulo, Repair and Consolidate.

TU Delft, The Netherlands
2023

GLOBAL HOUSING
GRADUATION STUDIO

TU Delft Department of Architecture
BK Bouwkunde

Architecture
& Dwelling

Colophon

Author
Beatrijs Kostelijk

Research and Design mentors
Harald Mooij
Nelson Mota

Building Technology mentor
Stephan Verkuijlen

Delegate Examiners
Frederika Welle Donker

Master of Architecture, Urbanism & Building Sciences
Global Housing Graduation Studio: São Paulo, Repair and Consolidate.
Delft University of Technology
Delft, The Netherlands

P5 report
2023

Parque Novo Santo Amaro V. By Hector Vigliecca & associados. Photograph taken by Winnie Goldsteen

MY GRATTITUDE

For my design mentor **Harald,**
who has encouraged me to pursue a philosophical approach to my graduation project and has pushed me to keep on critically questioning my research and design decisions by providing me with thoughts, ideas and stories that have hugely inspire me and impacted the quality of my project. For being very supportive of me throughout this year all the while still always taking my project seriously.

For my research mentor **Nelson,**
who understood my theoritical interest in relation to the design brief from the very beginning and provided plenty of cheerleading along the way on my path of assemblage thinking. For being very consistent in his feeback, asking the right critical questions and being a huge inspiration, which all have elevated the quality of this project.

For **Josephine**,
who always knows the right things to say. For listening to my troubles and helping me with my presentation skills.

For **Zino**,
who has been a consistent factor in turbulent times. For his honesty and integrity.

For **Thomas**,
For helping me with model making.

For my **family**,
who were a huge support for me. For listening to my concerns, being unconditionally there for me and helping me with model making.

For my peers **Angelina, Colin, Gen, Huub, Mees, Ola, Robbert, Sanette, and Winnie**.
who motivated, supported, comforted, and inspired me throughout this graduation year. For the amazing field trip, the good conversations all the amazing moments we had together.

TABLE OF CONTENT

PART I: Conceptual Framework 3
- background 4
- problem statement 6
- theoretical framework 10
- research question 12
- methodology and methods 14
- assemblage thinking 16

Part II: research and project site analysis 19
- comparative analysis 20
- zeis areas 28
- site analysis 30
- poject site 42
- assemblage map 55
- typological analysis 56
- ethnographic research 62
- current development strategy 65
- urbanization plan 66

PART III: Design Proposal 75
- design brief 77
- design hypothesis 78
- program of requirements 82
- income groups 84
- typological strategy 86
- urban strategy 114
- cluster strategy 126

PART IV: building technology 131
- matter and materiality 132
- material assemblage 145
- development process 150
- managerial strategy 152
- building technology 180
- climate management 196
- impressions 202

PART III: Conclusion 209
- a reflection 212
- list of references 216

PART I: CONCEPTUAL FRAMEWORK

BACKGROUND

RAPID URBANISATION AND HOUSING CRISIS

Contemporary society has been marked by a rapid process of urbanization. By 2050 it is projected that more than two-thirds of the world's population will live in urban areas.[1] However, the process of urbanization unfolds differently in various parts of the world. The nature of human life moving to the cities in the global north is already largely regularized, with policies and infrastructure already well established. In other parts of the world, the process of urbanization often happens uncontrollably, resulting in a lack of adequate housing and people being forced to build their own squatter settlements. This especially holds true for cities in the global south, which not only have to deal with rapid urbanization but also with the complex situation of globalization within which it has to operate.

One of the countries that has experienced rapid urbanization is Brazil, of which over 80% of its population now lives in cities.[2] At present, more than 12.4 million people live in São Paulo, a number that has doubled since the 1980s and which is still going up, making it the biggest municipality in Brazil and one of the most populated cities in the world.[3] This process of rapid urbanization has several interrelated consequences, such as the growth of slums, insufficient infrastructure, gang violence, and environmental issues.[4]

The rapid growth of the city and its adjustment to urban living has left many of Brazil's poorest behind. Although Brazil is not a poor country social inequality is obvious, as its society has one of the most inequitable distributions of wealth in the world.[5] In the city of São Paulo, approximately 10% of the population currently lives in some sort of urban precarity, usually associated with various informal living forms, such as cortiços, favelas, or other irregular settlements.[6] Not only do inadequate living conditions oftentimes trigger the emergence of social, economic, and environmental challenges to those who live there, but also to the whole fabric of the city and its metropolitan extensions.[7]

1. UN World Urbanization Prospects

2. *Urbanization in Brazil: building inclusive & sustainable cities.* (2021). UN Habitat for a Better Urban Future. Retrieved November 15, 2022, from https://unhabitat.org/brazil

3. Statista. (2022, July 27). *Largest cities in Brazil by population 2021.* https://www.statista. com/statistics/259227/largest-cities-in-brazil

4. Project, B. (2020, July 10). *Crossing Streets: Social Divides and Urbanization in Brazil.* The Borgen Project. https://borgenproject.org/crossing-streets-social-divides-urbanization-brazil/

5. Brazil itself ranks in the top ten most unequal countries in the world today by income distribution, having a Gini coefficient of 0.53, with São Paulo being no exception to this (World Bank, 2017).

6. Marques, E., & Saraiva, C. (2017). Urban integration or reconfigured inequalities? Analyzing housing precarity in São Paulo, Brazil. *Habitat International*, 69, pp. 18–26.

7. Pimentel Walker, A., & Arquero de Alarcón, M. (2018). The Competing Social and Environmental Functions of Private Urban Land: The Case of an Informal Land Occupation in

Fig. 1 Famous picture by photographer Tuca Vieira of segregation and inequality through the fortified enclave in a favela in Paraisópolis, São Paulo, 2004 . Source: https://www.theguardian.com/cities/2017/nov/29/sao-paulo-injustice-tuca-vieira-inequality-photograph-paraisopolis, 2017).

PROBLEM STATEMENT

BINARY OPPOSITIONS

As more than 1.2 million of São Paulo's residents live in inadequate accommodation and a rough 30 thousand citizens live on the streets, the problem is that of inadequate housing.[8] São Paulo has been largely constructed by its residents, who build not only their own houses but also whole neighbourhoods. These auto-constructed homes largely remain legally, materially, or spatially insecure.[9] Teresa Caldeira calls this process 'peripheral urbanization' and describes modes of the production of space that among other things '*create highly unequal and heterogeneous cities*.'[10]

A socially segregated society is amongst other things regulated through space. A clear phenomenon that has emerged as a new model for spatial segregation is the fortified enclave, as a way to deal with the fear of violence and to avoid being confronted with the injustice of the country's huge inequality.[11] The many material and immaterial boundaries that characterize the city promote strong polarities, such as poor/rich, open/closed, safe/unsafe, modernity/tradition, public/private, and center/margin. Segregation isn't only present between the rich and the poor. Several projects have been developed in São Paulo since the 90's to solve the housing shortage. Some of them have tried to mitigate the harsh transitions and polarities that so strongly characterize the city, such as Héctor Vigliecca's projects that deal with the notion of the Third Territory as an attempt to consolidate the urban fabric and fight segregation. Unfortunately, despite all good intentions, in most of his projects, residents have added fences to keep people from the neighbouring favelas out, creating solid boundaries and unequal situations even within the same social groups.[12]

In response to the precarious living situations of the urban poor, the city has defined Special Zones of Social Interest (ZEIS) as part of the legal framework The Municipal Strategic Plan (PDE) for the support of sustainable urban development. The ZEIS areas are divided into five categories. In the Grajaú district, which is located in the southern periphery of São Paulo, several territories have been demarcated as ZEIS 1 and ZEIS 4 (ZEIS 1, for occupied land, and ZEIS 4 for vacant land or properties in headwater or environmental protection areas).[13]

8. *The Inequitable Production of Space in São Paulo: Housing Crisis, Social Segregation and Transformative Actions.* (2020, August 16). Global Horizons. https://globalhorizons-journal.wordpress.com/portfolio/the-inequitable-production-of-space-in-sao-paulo-housing-crisis-social-segregation-and-transformative-actions/

9. Bhan, G. (2019). Notes on a Southern urban practice. *Environment and Urbanization*, 31(2), pp. 639–654.

10. Caldeira, T. P. (2016). Peripheral urbanization: Autoconstruction, transversal logics, and politics in cities of the global south. *Environment and Planning D: Society and Space*, 35(1), pp. 3–20.

11. Caldeira, T. P. R. (1998). Fortified Enclaves. *Cities and Citizenship*, pp. 114–138.

12. Serapião, F. (2016). Linking the Formal and Informal: Favela Urbanisation and Social Housing in São Paulo. *Architectural Design*, 86(3), pp. 70–79.

13. Ribeiro, S. C. L., Daniel, M. N., & Abiko, A. (2016). ZEIS maps: Comparing areas to be earmarked exclusively for social housing in São Paulo city. *Land Use Policy*, 58, pp. 445–455.

Fig. 2 Rapid urbanisation and housing crisis lead to unsustainable development practices (Source: author's image)

SEGREGATION IN THE CITY OF SÃO PAULO

The image of São Paulo's response to the inadequate housing situation on such ZEIS 4 areas is the recently built Conjunto Habitacional Chácara do Conde, as part of the Mananciais Program run by São Paulo City Hall. Located in Grajaú, the southern periphery of the city, the project offers appartments to 1289 households in a very efficient way.[14] It complies with the basic needs such as electricity, sewage, running water, and garbage management. However, the project follows a housing scheme based on modernist ideas:

- Monofunctional.
- Homogeneous: in terms of its dwellers.
- Universal architecture: not responding to any of its contexts and no sense of identity.
- Fixed: no room for incrementality and adaptability.
- Exclusive: excluding marginalized groups from its many collective facilities.

Spatial segregation not only influences the social fabric but also the feeling of citizenship in contemporary democratic societies. As people start to question their citizenship and agency, they develop their own rules and regulations. Because public space in high-density cities is highly contested as it is a space of conflicting interests, oftentimes public space is being privatized through corrupt micro-politics. The privatization of public space creates exclusive, non-democratic cities, fragmenting and disrupting the social structure of the city even more. In other words, the binary oppositions that strongly characterize the city of São Paulo in general and Grajaú in particular, bring forth a highly exclusive and undemocratic city.

14. Assiz, R. (2020, May 30). *Chácara do Conde*. JAA. https://arquiteturajaa.com.br/portfolio/chacara-do-conde/

Fig. 2 Conjunto Habitacional Chácara do Conde on ZEIS 4, Grajaú, with informal settlements in the background. (Source: Arquitetura JAA, 2018. from: https://arquiteturajaa.com.br/portfolio/chacara-do-conde/. Edited by author).

THEORETICAL FRAMEWORK

ASSEMBLAGE THINKING

In response to the housing shortage in Europe after the WWII, Heidegger wrote *Bauen, Wohnen, Denken*. Building and dwelling, although at first the same thing, like in the auto-constructed favelas of Grajaú, he writes, have become detached in Europe.[15] Although Heidegger is trying to think of ways to reconnect building and dwelling, he still has a way of looking at it in terms of *being-in-the-world*, to be thrown into, embedded, and fixed in the literal, physical, and tangible day-to-day world.[16] What modern architectural thinking extracts from Heidegger's text is the understanding of building and dwelling as abstract forms of being, which is accompanied by a top-down approach that fails to recognize the aspect of people inhabiting space.[17] Modernists like Le Corbusier, have been designing the city in a modernist top-down way, resulting in projects such as Conjunto Habitacional Chácara do Conde, where indeed residents struggle to inhabit the space. As a response to this approach, Jane Jacobs tried to break the city open from bottom-up with her book *The death and life of great American cities*.[18] Another scholar that has written about this subject more recently is Richard Sennett, asking the question of how to reconnect the *ville* (built environment) with the *cité* (lived environment) and the formal with the informal. Instead of approaching cities in terms of top-down or bottom-up, in his book *Building and Dwelling: Ethics for the City*, Sennet suggests developing the city as an open process, designing boundaries for a democratic and inclusive public life.[19]

Peripheral urbanization, Teresa Caldeira writes, is a process in which citizens and governments interact in complex ways.[20] These settlements are neither bottom-up nor top-down, as many simultaneous processes involve a multitude of human and non-human actors. Communities, social movements, and formal institutions all play key roles in the promotion -or opposition- of inclusive cities. This is what Deleuze calls, assemblage thinking, which is based on the central thesis that people do not act exclusively by themselves but instead rely on complex socio-material interdependencies, exchangeability, fluidity, and their connectivity. Assemblage thinking helps us to speak of housing in a language that transcends the oppressive

15. Heidegger, M. (1971). Building, Dwelling, Thinking. In *Poetry, Language, Thought*. Harper Colophon Books, New York.

16. Steiner, G. (1978). *Heidegger*. The Harvester Press Limited, Sussex

17. Jonas Holst. (2013). Rethinking Dwelling and Building. On Martin Heidegger's conception of Being as Dwelling and Jørn Utzon's Architecture of Well-being. Zarch: *Journal of Interdisciplinary Studies in Architecture and Urbanism*, 2, pp. 52–60.

18. Jacobs, J. (1962). *The death and life of great American cities: the failure of town planning*. Penguin.

19. Sennett, R. (2018). *Building and Dwelling: Ethics for the City* (First American Edition). Farrar, Straus and Giroux.

20. Caldeira, T. P. (2016b). Peripheral urbanization: Autoconstruction, transversal logics, and politics in cities of the global south. *Environment and Planning D: Society and Space*, 35(1), pp. 3–20.

dichotomy of top-down/bottom-up. It goes beyond binaries and instead looks at the interconnections between different actors, modes of settlement's production, and intersecting desires.[21] Through assemblage thinking it is recognized that housing and home are always a coproduction of diverse elements, breaking with static, fixed, closed, and essentialist notions of place and replacing the Heideggerian notion of *being-in–the–world* with the Deleuzian *becoming-in-the-world*.[22] Instead of speaking in terms of 'construct' and 'build', it allows us to use the language of 'repair' and 'consolidate'. As Dovey writes, assemblage thinking in architecture '*enables a replacement of binary paradigms such as people + environment with the dynamic inter-connectivity of the socio-spatial assemblage*.'[23]

Thinking relationally about housing allows for the awareness of the complexity of existing relationships and enables one to overcome simplistic dichotomies between auto-constructed/planned, top-down/ bottom-up, materiality/meaning, form/ function, and subject/object. Instead, it sees buildings and cities as embodying twofold concepts by looking at how things become entangled across space and time.

21. Shafique, T. (2021). Re-thinking housing through assemblages: Lessons from a Deleuzean visit to an informal settlement in Dhaka. *Housing Studies*, 37(6), pp. 1015–1034.

22. Easthope, H., Power, E., Rogers, D., & Dufty-Jones, R. (2020). Thinking relationally about housing and home. Housing Studies, 35(9), pp. 1493–1500.

23. Dovey, K. (2013) 'Assembling Architecture', in Frichot, H. & Loo, S. (eds) *Deleuze and Architecture*, Edinburgh: University of Edinburgh Press. pp.131-148.

Fig. 3 Hierarchical or tree thinking versus assemblage or rhizomatic thinking. (Source: Gloushenkova K. and Murray K. n.d. from: https://www.themantle.com/philosophy/rhizome-american-translation).

RESEARCH QUESTION

ASSEMBLAGE THINKING IN ARCHITECTURAL DESIGN

The problem of the exclusive and undemocratic character of the housing crisis in São Paulo brings forth the following research question:

How may assemblage thinking in architectural and urban design contribute to creating an **inclusive housing scheme** that mitigates the harsh transitions and binary oppositions that characterize the urban conditions of Grajaú, São Paulo?

The evocative existing situation is that of the segregated, undemocratic ways of life in Grajaú, São whose urban condition is strongly characterized by binary oppositions. The goal is to promote inclusive and democratic urban spaces and to move into a new paradigm of *becoming-in-the-world*. The method is assemblage thinking in architectural and urban design.

Sub-questions:
- What is assemblage thinking in architectural and urban design?

- How can assemblage thinking in architectural and urban design contribute to mitigating the harsh transitions and binary oppositions that characterize the urban conditions of Grajaú, São Paulo?

- How can assemblage thinking enrich the repair and consolidation of urban spaces to improve the segregated, unequal and polluting ways of life of Grajaú, São Paulo?

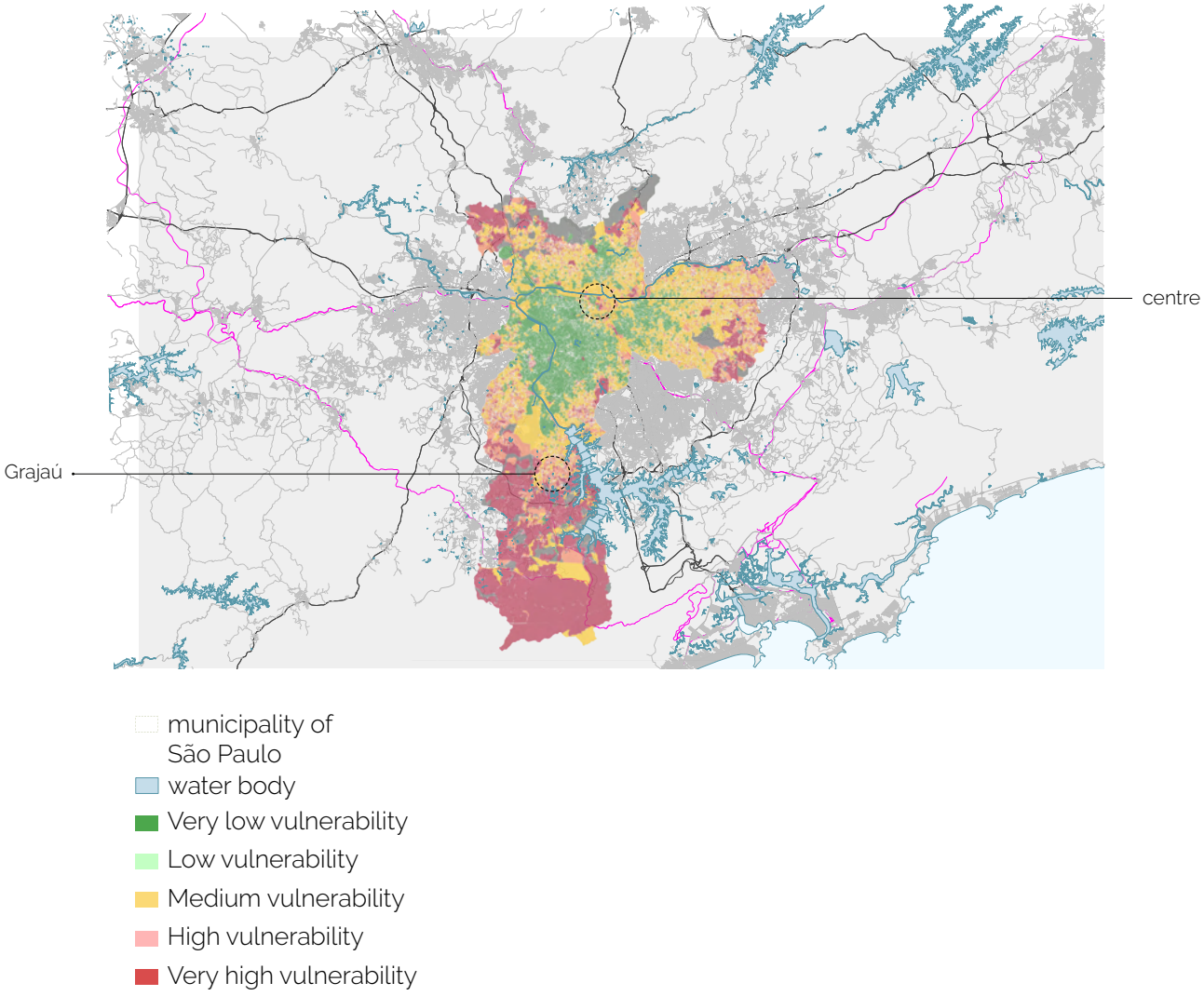


Fig. 4 Vulnerability in Grajaú, in the southern periphery of São Paulo. (Source: Goto E. A., Suarez A. M., Ye H. (2022). *Spatial analysis of social vulnerability in São Paulo city, Brazil.*)

METHODOLOGY AND METHODS

To fully understand the complex situation of Grajaú, São Paulo, I have started the research with a process of fieldwork, including site visits to the ZEIS 4 areas designated as project sites. To get a better understanding of how the city of São Paulo is currently dealing with the issue of social housing, I also visited different social housing case studies throughout the city. Through ethnographic research, I looked at the lived interactions in these sites and projects, which I translated into a travelogue. Photography and video shooting were the main means to register my visits. I also chose the methods of interviews with residents and architectural drawings as part of my methodology, as well as the method of comparative analysis for the case studies, comparing them to different Dutch social housing projects. In the next phase, I will continue doing contextual analysis of the sites, as well as cognitive and typological mapping.

Segregation is not just present in the socio-material realm. Theory has also largely been dominated by segregation, as each discipline stands as an island on its own. As Gautam Bahn writes: '*across theory and practice, this common sense sits nicely within our hierarchically segmented worlds of sectors, disciplines, and domains*.'[24] To overcome this segregation in theory, I want to base my research on the relational approach of assemblage thinking. For the coming months, I intend to continue establishing a theoretical framework concerning the main definitions that guide the project, such as assemblage thinking, *being-in-the-world*, and *becoming-in-the-world*. As I will have a relational approach to this project, I want to draw literature from different disciplines like philosophical inquiry, law, sociology, urban planning theory, economics, and political science as well as informal writings. I intend to continue to read and write to organize the theory in such a way that I can translate the ideas that ground the project into an architectural intervention that promotes the co-existence of heterogeneous elements that characterize the city of São Paulo in general, and Grajaú in particular.

24. Bhan, G. (2019b). Notes on a Southern urban practice. *Environment and Urbanization*, 31(2), pp. 639–654.

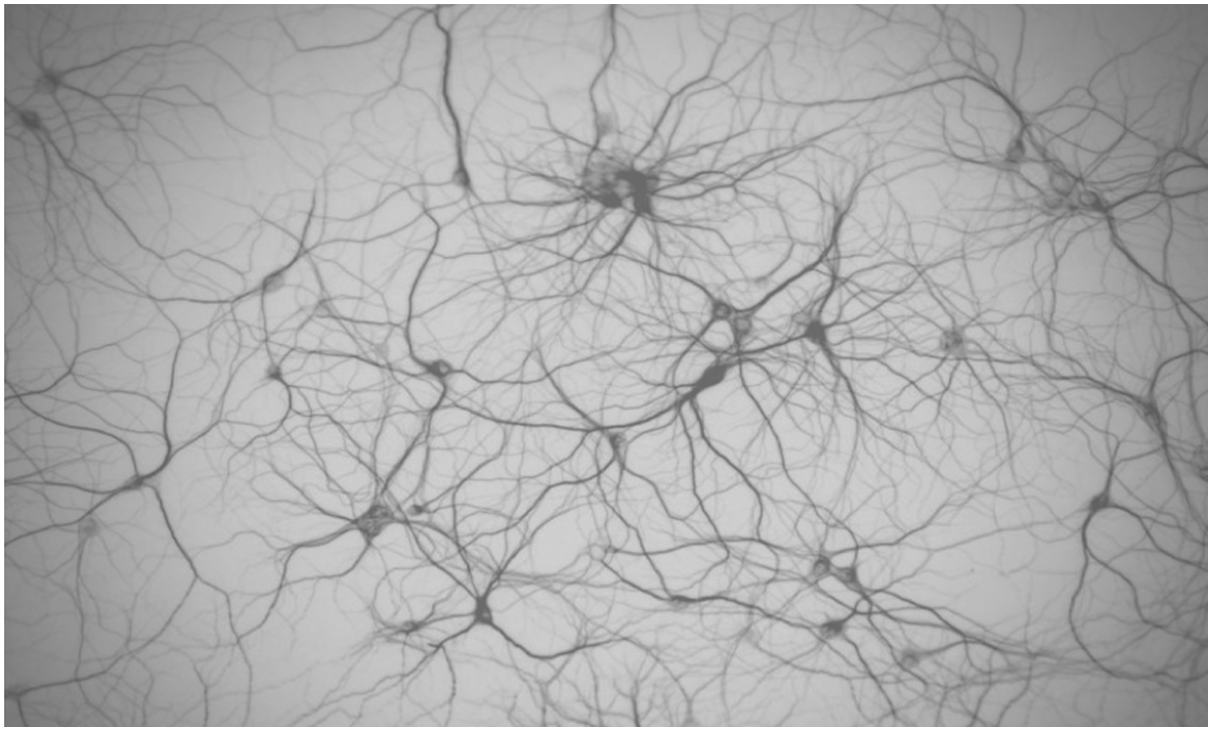


Fig. 5 Relational approach to both practice and theory. (Source: from https://www.iaacblog.com/programs/rhizome-2/. Edited by author).

ASSEMBLAGE THINKING

DELEUZE AND GUATTARI'S THEORY

WHAT IS ASSEMBLAGE THINKING?

In their book *A Thousand Plateaus: Capitalism and Schizophrenia,* Deleuze and Guattari describe assemblage theory as "The 'holding together' of heterogeneous elements" (1987 p. 323). It contains 3 Core Features:

- "Relations of exteriority"
- Anti-essentialism
- The notions of:
  - Territorialization
  - Deterritorialization
  - Reterritorialization

Fig. 3 Polarities that characterize the segregated and unsustainable ways of life in Grajaú, São Paulo.

Deleuze undoes any binary concepts by acknowledging that relations are under a constant processes of transformational becoming. In doing so, he escapes the hegemony of the way we collectively are apt to think.

"as it shows that "[t]here are no separately determinate individual entities that interact with one another; rather, the co-constitution of determinately bounded and propertied entities results from specific intra-actions."[13] The entanglements also mentioned by Haraway would then not simply be connections between definitely separate things but "specific material relations of the ongoing differentiating of the world."[14] This immediately dissolves any hard conceptual boundaries between the self and the other, even the other no longer or not yet there.

The debt to the other results from the fact that they are "threaded through"[15] the self, indelibly, and each intra-action promoted by oneself is then a way of mutual constitution with the other. Simply put, we make the world as we intra-act with it. This means I need to continuously assess and reassess the entanglements on which the design would rest and the new ones it could create, at every moment of the process, all the way into the materialization of the project"

ASSEMBLAGE THINKING IN HOUSING DESIGN

HOW CAN ASSEMBLAGE THINKING BE USED IN ARCHITECTURAL AND URBAN DESIGN?

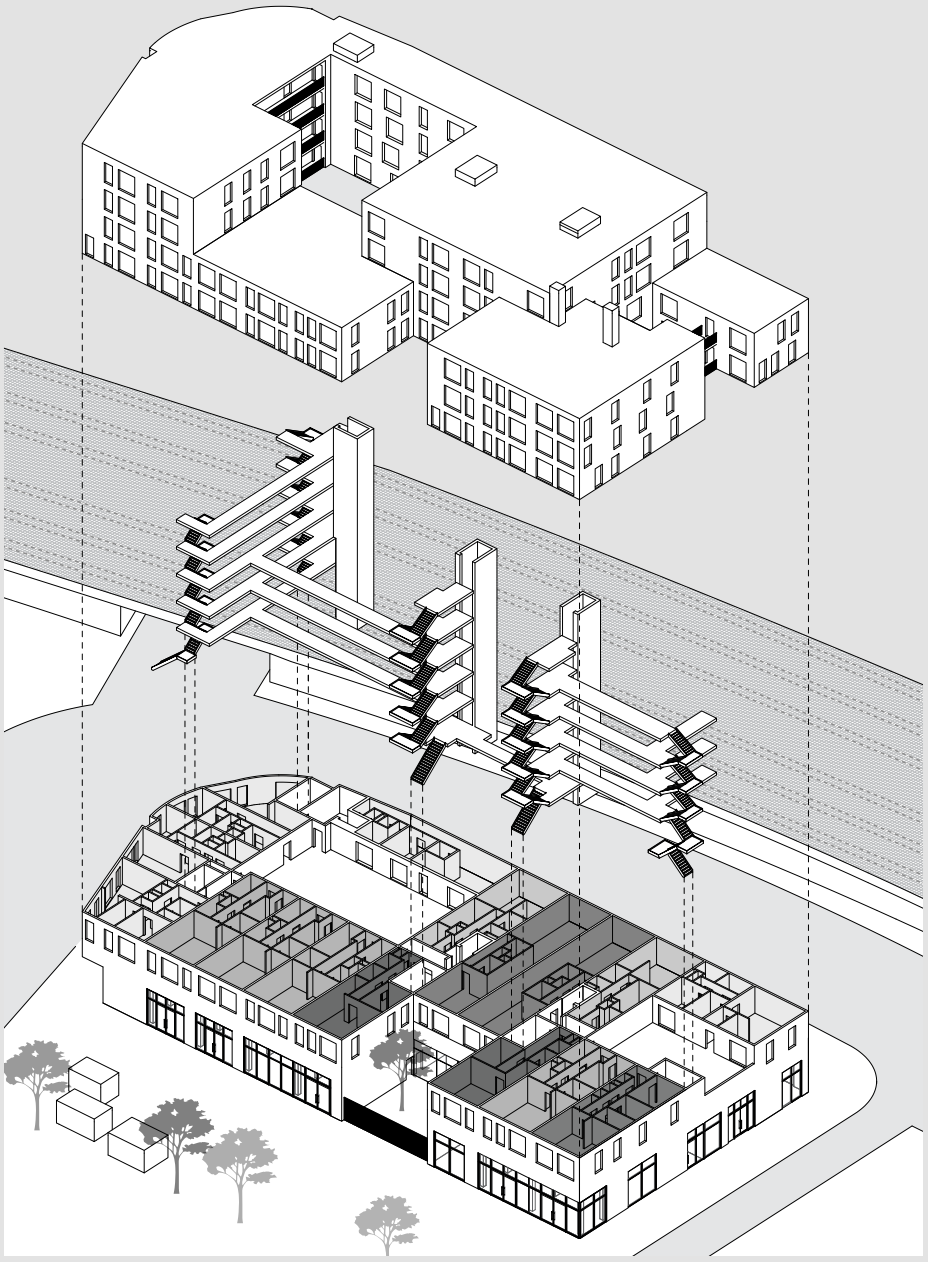
the struggle for housing, popular organization, environmental preservation and architecture. as a technical tool for building the right to the city, through this concrete case.
Justice as a concept, not only in terms of adequate housing but also economically, culturally and environmentally.

By looking at what the demands and desires are of the actors that are at play in Anchieta.

an architecture of becoming, instead of an architecture of being (heidegger's being-in-the-world). In Heidegger's philosophy, humans take a very central position, whereas Deleuze's, Guattari's and Latour's philosophy's take a post-human approach, where they acknowledge there are certain entanglements at play between all life-forms, both human and non-human, such as animals, technologies and even spirits. In understanding these entanglements lies the opportunity for (social) change, or as Deleuze and Guattari would call it: deterritorialization and reterritorialization. Allowing an architecture-of-becoming to emerge as its entanglements are navigated.

PART II: RESEARCH AND PROJECT SITE ANALYSIS

COMPARATIVE ANALYSIS



Haarlemmerplein

Amsterdam, Dick van Gameren, 2004 - 2012

The Haarlemmerplein project is a Housing project commissioned by Heijmans Vastgoed Realisatie and designed by Dick van Gameren, Mecanoo from 2004 - 2006. In the late 1960's three rows of 17th century houses were demolished on the site of the project. These houses were built before the Housing Act of 1901 and were considered slum dwellings. In 1990 the road crossing the square was moved towards the northern side of the square, along the lines of the train tracks. From 2006 - 2012 the newly designed appartment building by Dick van Gameren was built, with a pause of construction of 2,5 years due to resistance from the local residents. It follows the 17th century parcellation which divides the appartment into narrow plots.

The sound pollution coming from the train tracks has hugely influenced the configuration of the dwellings. In order to eliminate the noise levels of the adjacent rail and motorways, a deaf wall is built on the northern outer wall of the building block, meaning it has no openable windows. The deaf wall on the train tracks side of the building goes up until the sixth floor in order to protect not only the dwellings on the northern side of the building but the houses on the southern side as well. Because of the non-openable windows on the northern side, 3 courtyards are cut from the buildings volume in order to provide all the appartments with fresh air and daylight, .

The building contains 69 dwellings, of which 22 are social houses, commercial spaces on the ground floor, and a four-storey underground car park. For the past decade, as the waiting list for social housing has extended to the problematic period of more than 10 years, the municipality of Amsterdam has been striving to bring up the rate of social housing in the city by setting rules for newly built appartment blocks: 40% social housing, 40% middle class housing and 20% high income housing. Although this is something the municipaltiy is striving for, in practice unfortunately the rate of social housing is oftentimes lower or inexistent.

Typological Research
Global Housing São Paulo: Repair and Consolidate
Autumn Semester [AR3AD105]

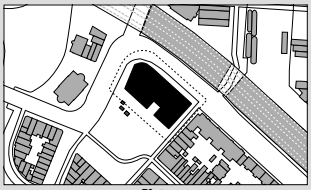
Tutors:
Ir. Harald Mooij
Dr. Nelson Mota
Prof. Dick van Gameren

Student:
Beatrijs Kostelijk

TU Delft BK Bouwkunde

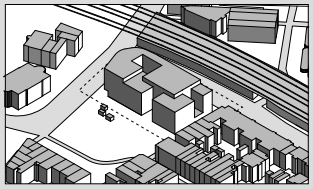
Architecture & Dwelling

Neighbourhood



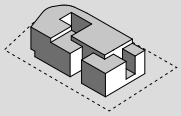
Plot
Area: 0.47 Ha
Dwelling Units: 69

Program
Housing: 5,700 m2
Commercial Area: 1,200 m2



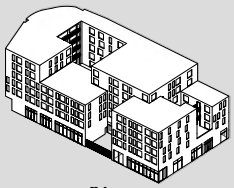
FSI/FAR
1.9

GSI
0.38

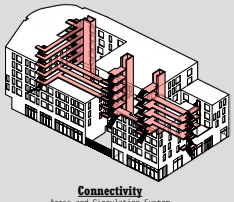


Density
147 dw/ha

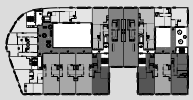
Block



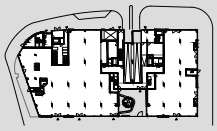
Volume
Ground floor + 6



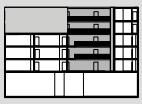
Connectivity
Acess and Circulation System



Typical Floor Plan
Dwelling Type Variations

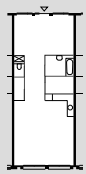


Ground Floor Plan
Access Points

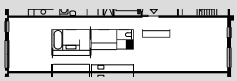


Section
Court yard

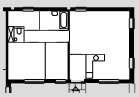
Unit



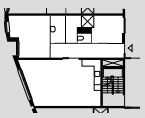
Dwelling Type 1
Area: 83 m2



Dwelling Type 2
Area: 109 m2



Dwelling Type 3
Area: 69 m2



Dwelling Type 4
Area: 80 m2

Haarlemmerplein

Amsterdam, Dick van Gameren , 2006

Plot Area: 0.47 ha
Number of Dwellings: 69
Density: 147 dw/ha
FSI: 1.9
Unit Sizes: 69 sqm; 109 sqm
GSI: 0.38
Client: Heijmans Vastgoed Realisatie
Scheme: Public Housing
Design: Dick van Gameren, Mecanoo
Tenure: Owner-Occupied / Rental

The Haarlemmerplein appartment block defines the northern side of the Haarlemmerplein square. The ground floor houses commercial spaces, the entrance towards the appartments and the entrance for the parking garage. The pedestrian entrances for the commercial spaces and appartments are all facing the square. The entrance of the parking garage connects to the road on the opposite side. The entrances of the dwellings together with the parking garage on the ground floor are used to split the commercial space in two. A court serves as the entrance for the apartments and forms a transitional area between the square and the houses.

The block contains 69 dwellings of which 22 are social houses. There are two stairwells with elevator to reach the regular appartments; one to acces the appartments on the east side and one to acces the ones on the west side. The social houses are situated on the western side and have their own stairwell and elevator. Two additional stairwells are added on each side for fire safety. To reach most appartments, you cross one of the other two courtyards.

There are 10 different types of appartments. They all follow the 17th century parcellation, meaning they are relatively narrow and deep. Because of mechanical ventilation, the bathroom doesn't necessarily need windows and the kitchen doesn't have to be seperated from the living areas. All appartments have an open kitchen.

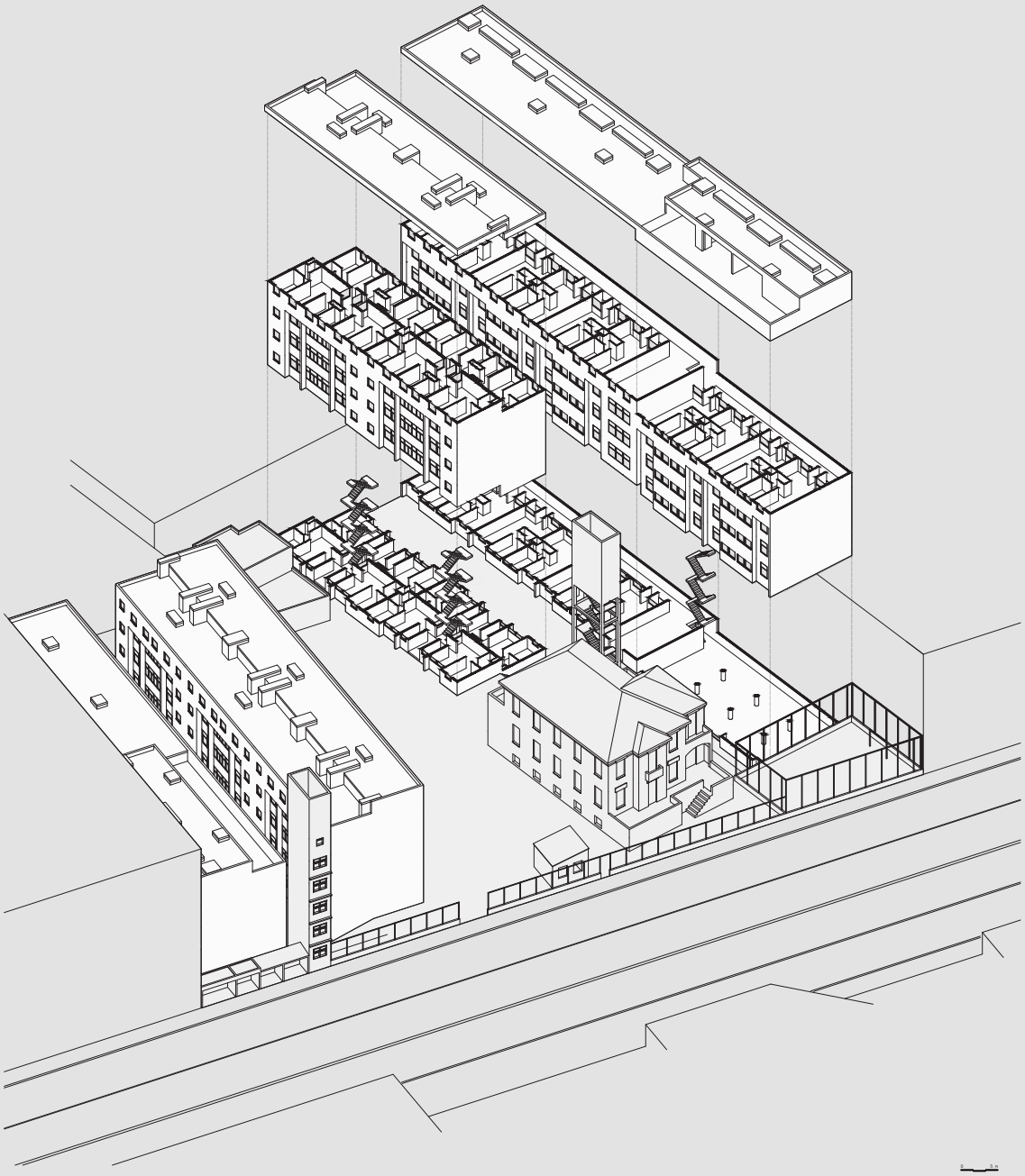
Typological Research
Global Housing São Paulo: Repair and Consolidate
Autumn Semester [AR3AD105]

Tutors:
Ir. Harald Mooij
Dr. Nelson Mota
Prof. Dick van Gameren

Student:
Beatriis Kostelijk

TU Delft BK Bouwkunde

Architecture & Dwelling



Conjunto Casarão Celso Garcia

Sao Paulo, HABI/SEHAB, 1992 (completion in 2003)

Conjunto Casarão Celso Garcia is a social housing project consisting of four residential towers with communal facilities such as a nursery, kitchen and laundry. In addition, a colonial mansion can be found on the site, which has been preserved during the realization of the new program. Casarão Celso Garcia, together with 'Madre de Deus', was one of the first housing projects aimed at housing people with low incomes in the center of the city. Because the land costs of the plot in the center of Sao Paulo were higher than in the periphery, it was decided to keep the number of square meters per home to a minimum. However, the limited living space was compensated with common areas such as a courtyard garden, roof terrace and childcare.

Unique to the Conjunto Casarão (Portuguese for housing complex), located on Avenida Celso Garcia, is the participation that the residents of the complex had during the design process. Although they were not the client in the traditional sense, their wishes formed the basis for the design.

In total, the complex consists of 182 apartments over a gross floor area of 8,485 m2. The surface of the common areas such as the garden and childcare is also 1,563 m2. An average apartment has a net floor area of approximately 30m2.The complex as a whole is enclosed on three sides by walls and is only accessible through the two guarded entrances on Avenida Celso Garcia.

The design of the complex is largely related to the shape of the plot and the surrounding buildings. Because the plot, as mentioned, is enclosed by blank walls, the complex is oriented inwards. The apartments in the outer flats only receive daylight via a single facade and via shafts that extend to the roof. The two middle flats, on the other hand, are free on the plot, making the lack of daylight less of an issue here.

Typological Research
Global Housing São Paulo: Repair and Consolidate
Autumn Semester [AR3AD105]

Tutors:
Ir. Harald Mooij
Dr. Nelson Mota
Prof. Dick van Gameren

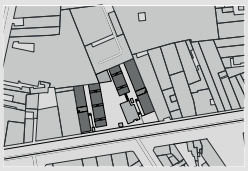
Student:
Robbert Laan

TU Delft BK Bouwkunde

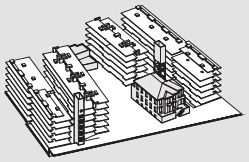
Architecture & Dwelling

Neighbourhood

Plot
Area: 0,54 Ha
Dwelling Units: 182

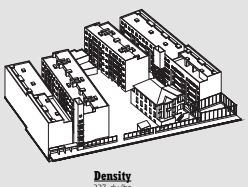


Program
Housing: 8,485 m2
Ammenities: 1,563 m2



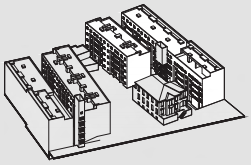
FSI/FAR
1,76

GSI
0.45

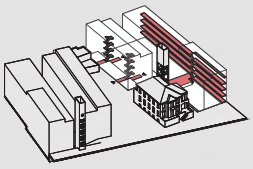


Density
337 dw/ha

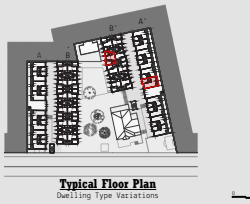
Block



Volume
Groud floor + 4

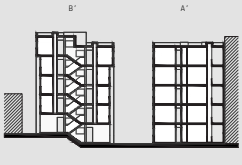


Connectivity
Acess and Circulation System



Typical Floor Plan
Dwelling Type Variations

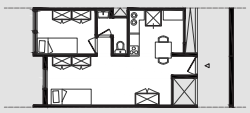
Ground Floor Plan
Access Points



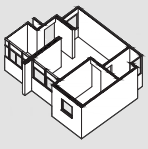
Section
Dwelling Types

Unit

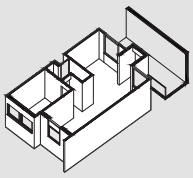
Dwelling Type 1
Area: 30m2



Dwelling Type 2
Area: 32m2



Apartment Type 1
Area: 30m2



Apartment Type 2
Area: 32m2

Conjunto Casarão Celso Garcia

Plot Area: 0.54 ha
Number of Dwellings: 182
Density: 337 dw/ha
FSI: 1.76
Unit Sizes: 30 sqm; 32 sqm
GSI: 0.45
Client: Local residents
Scheme: Public Housing
Design: HAB1/SEH40
Tenure: Owner-Occupied

The complex consists of four residential towers and communal facilities. The project was initiated by local residents, many of whom still live on the conjunto. Partly because the residents own the homes, the complex is subject to continuous evolution over time. Initially, for example, the creche was located in the middle of the site, but a few years ago it was moved to the basement of the outermost residential tower (A'). Where the creche was once located, a kitchen and launderette have now taken its place.

By applying relief to the facade, the designers have prevented the building from appearing to be a homogeneous mass; despite the fact that the entire complex has only two types of housing.

The floor plan and the end walls clearly show how the costs for the project have been kept low. The floor plan is created by a repetition of the same houses that are mirrored in relation to each other. The number of access points to the homes is kept to a minimum, so that as little floor space as possible is lost to transport spaces. However, this means that there are no extra exits in the event of a fire.

with regard to the end walls, no effort has been made here to provide the houses with extra windows because the houses would then deviate from the two standard types.

Typological Research
Global Housing São Paulo: Repair and Consolidate
Autumn Semester [AR3AD105]

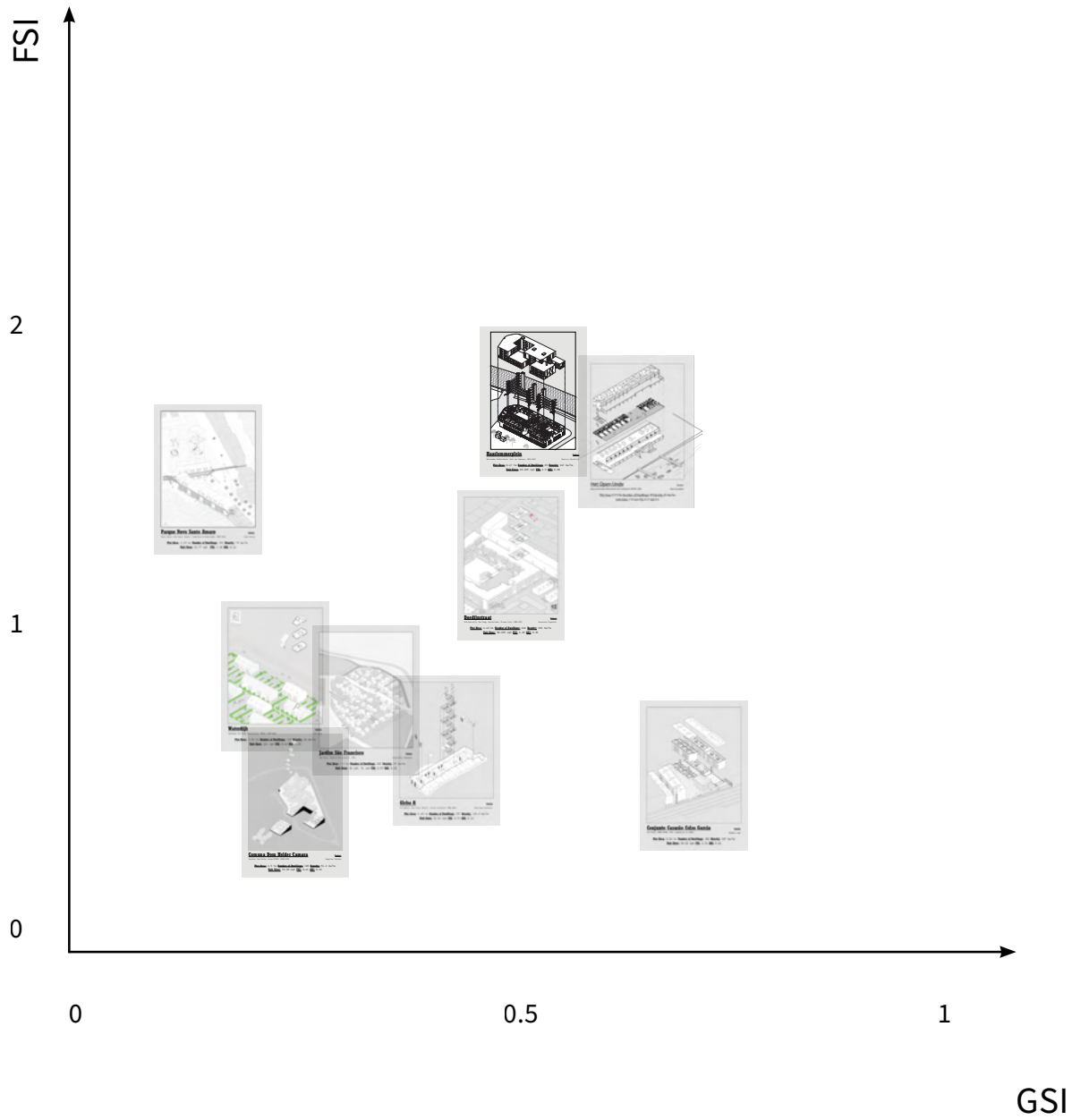
Tutors:
Ir. Harald Mooij
Dr. Nelson Mota
Prof. Dick van Gameren

Student:
Robbert Laan

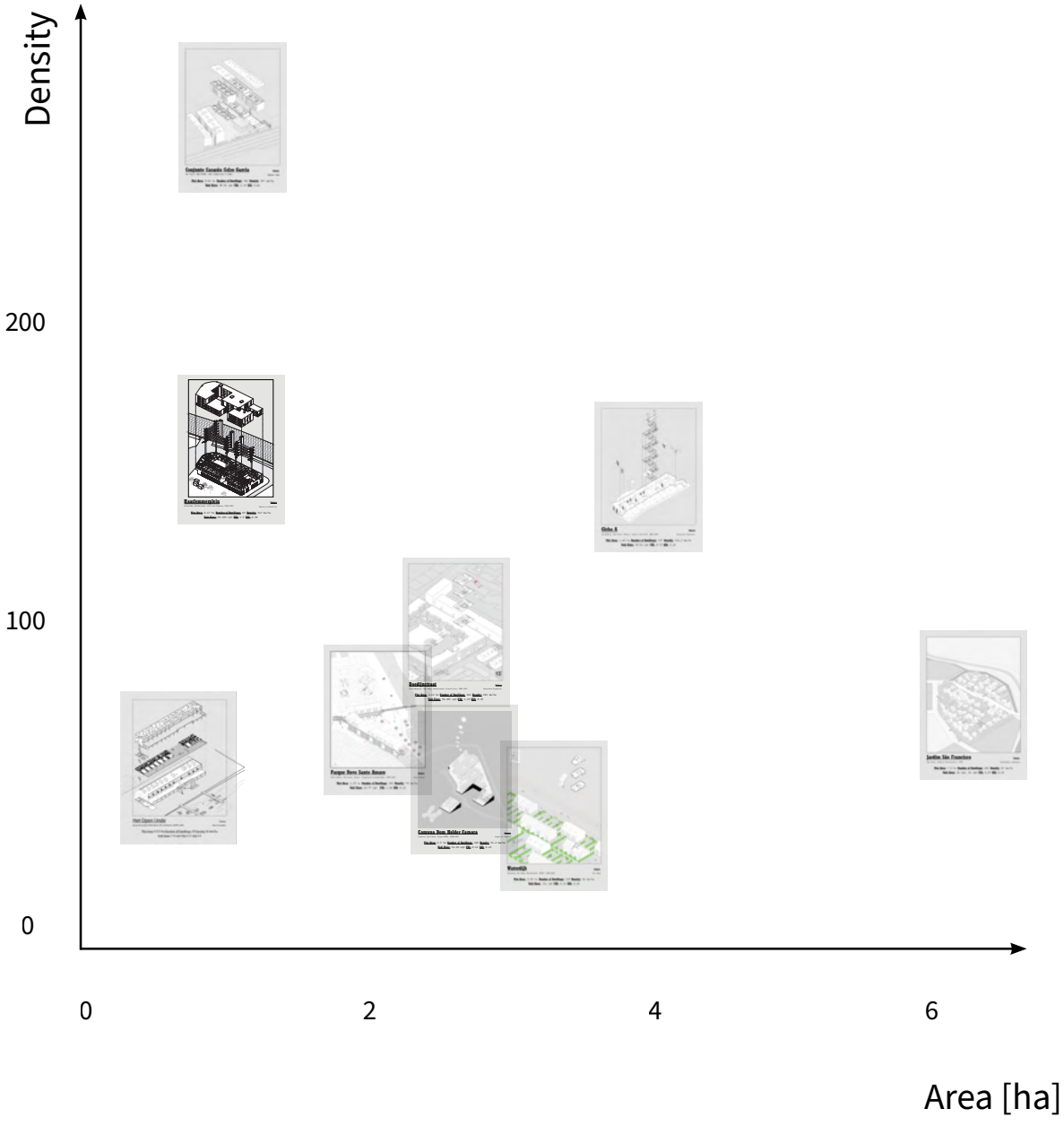
TU Delft BK Bouwkunde

Architecture & Dwelling

FSI VERSUS GSI

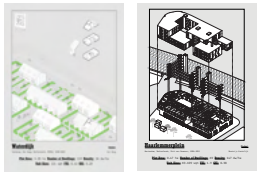


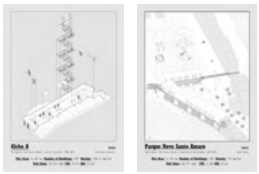
AREA VERSUS DENSITY



TOP-DOWN VERSUS BOTTOM-UP

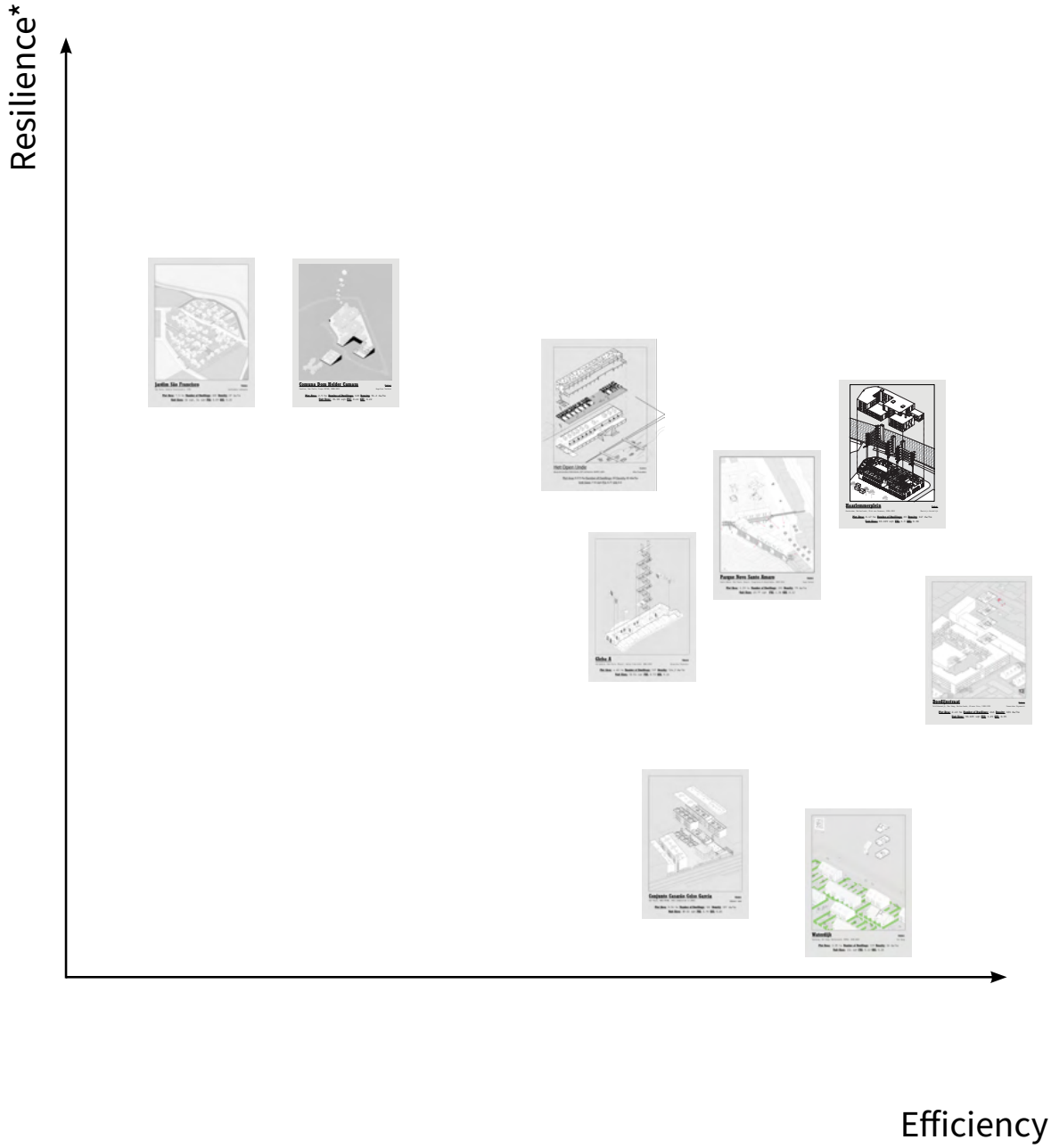
Top-Down





Bottom-up

EFFICIENCY VERSUS RESILIENCE



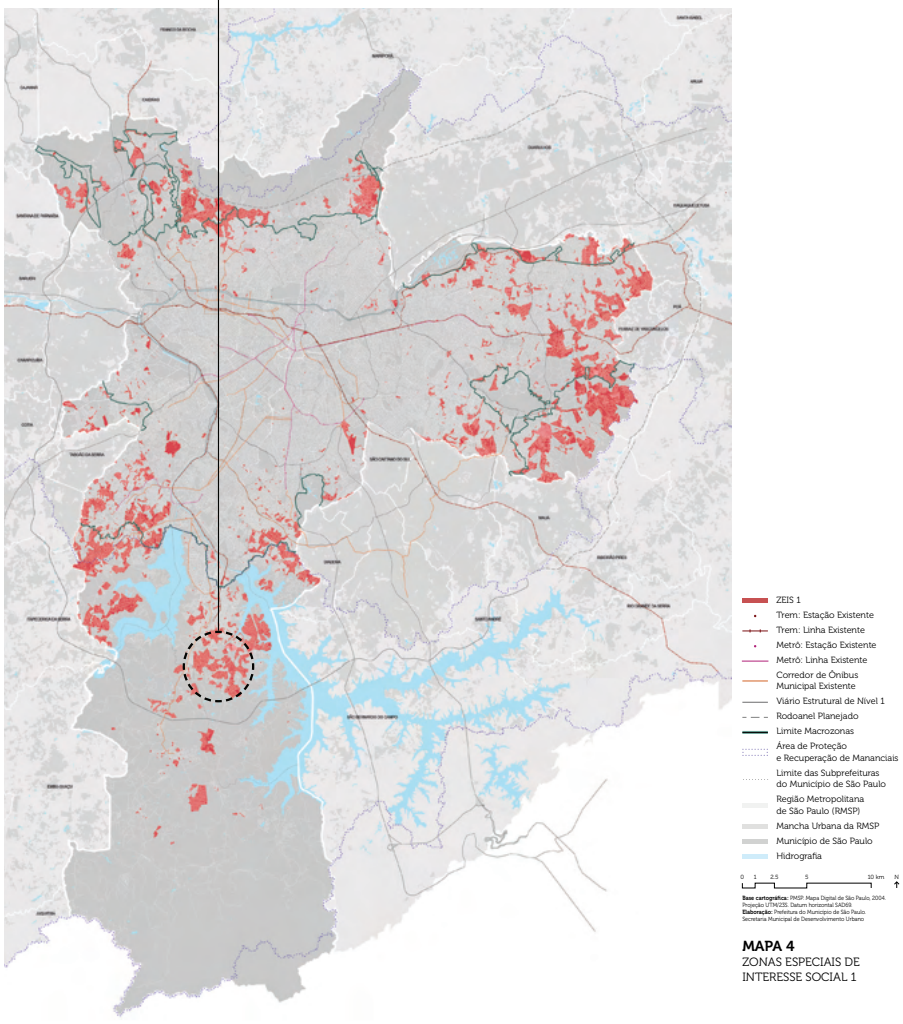
* determined on the basis of deversity and community involvement

ZEIS AREAS

ZEIS 1

for occupied land (PDE)

Project



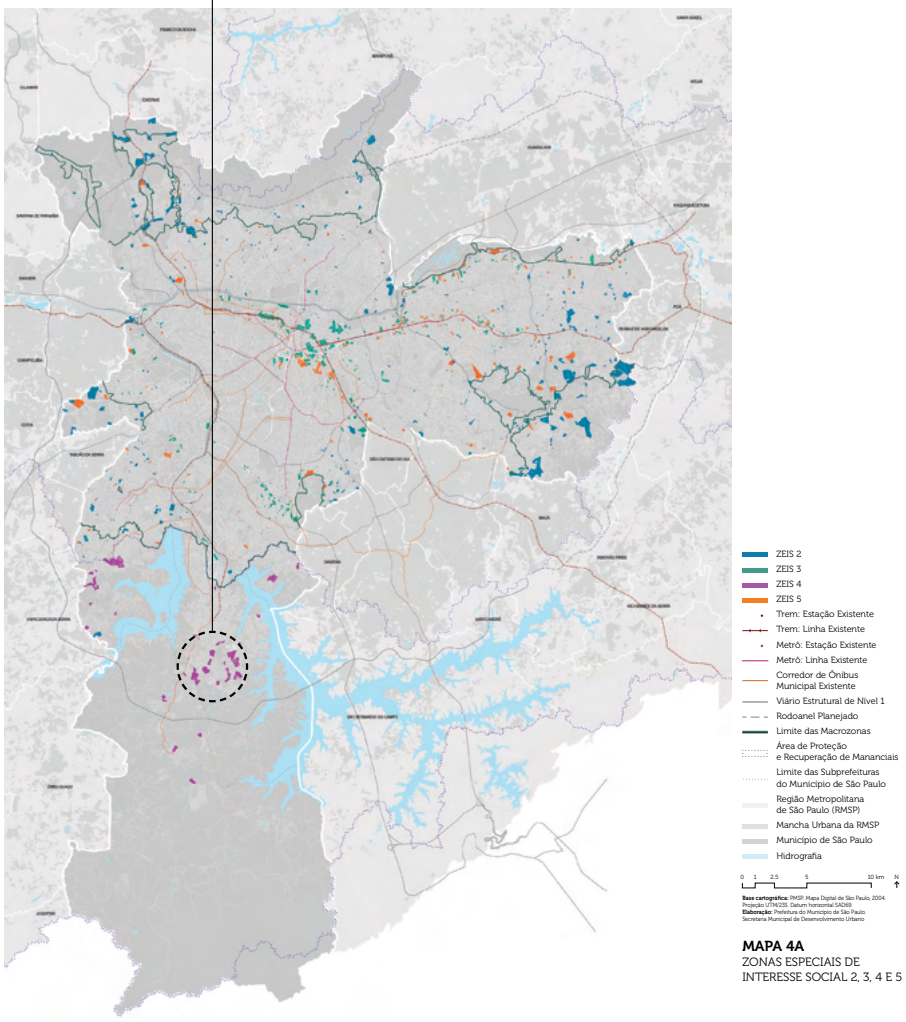
MAPA 4
ZONAS ESPECIAIS DE INTERESSE SOCIAL 1

(Source: Plano Director Estratégico do Município de São Paulo, 2014)

ZEIS 4

vacant land located in headwater or environmental protection areas. (PDE)

Project

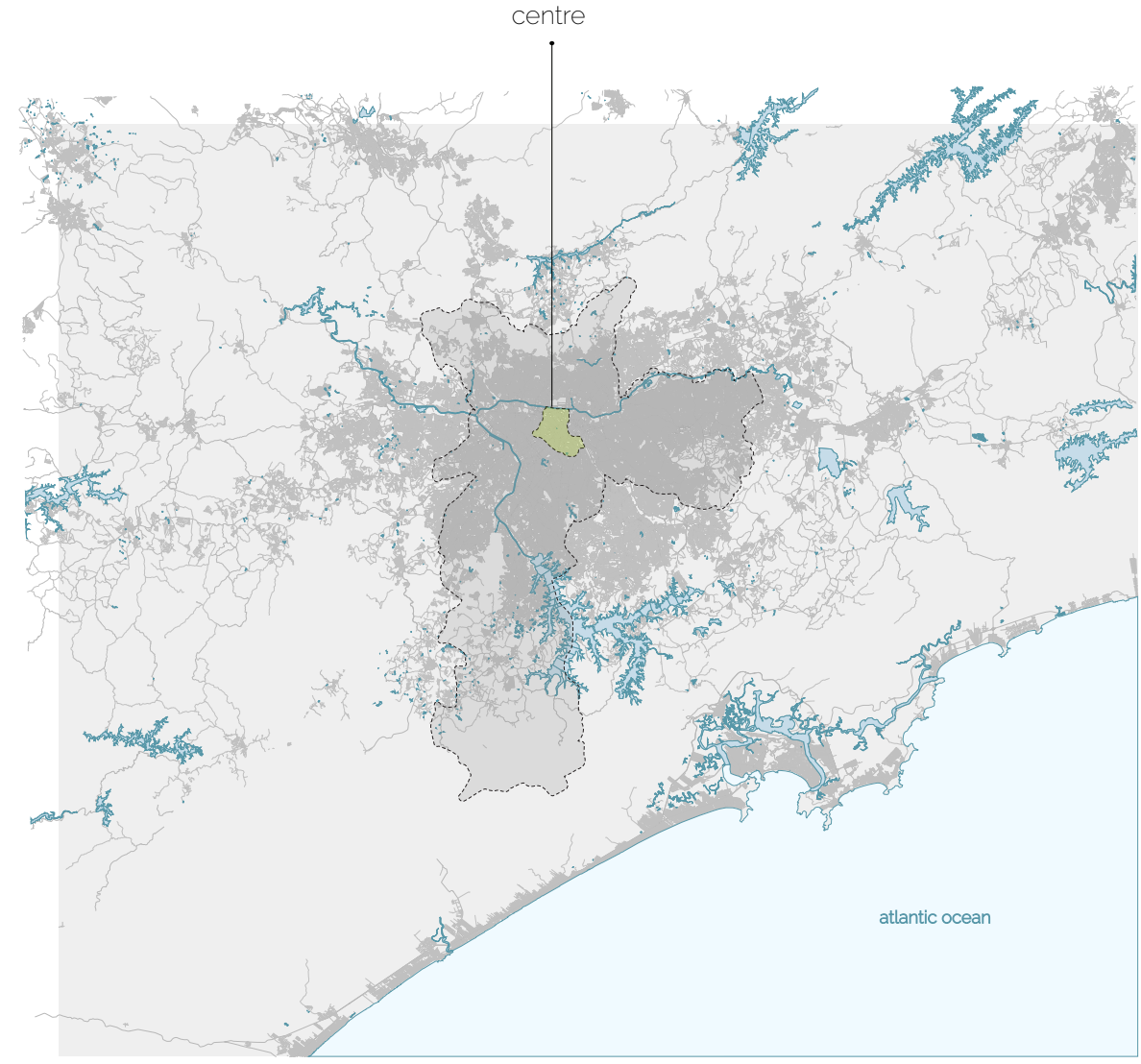


MAPA 4A
ZONAS ESPECIAIS DE INTERESSE SOCIAL 2, 3, 4 E 5

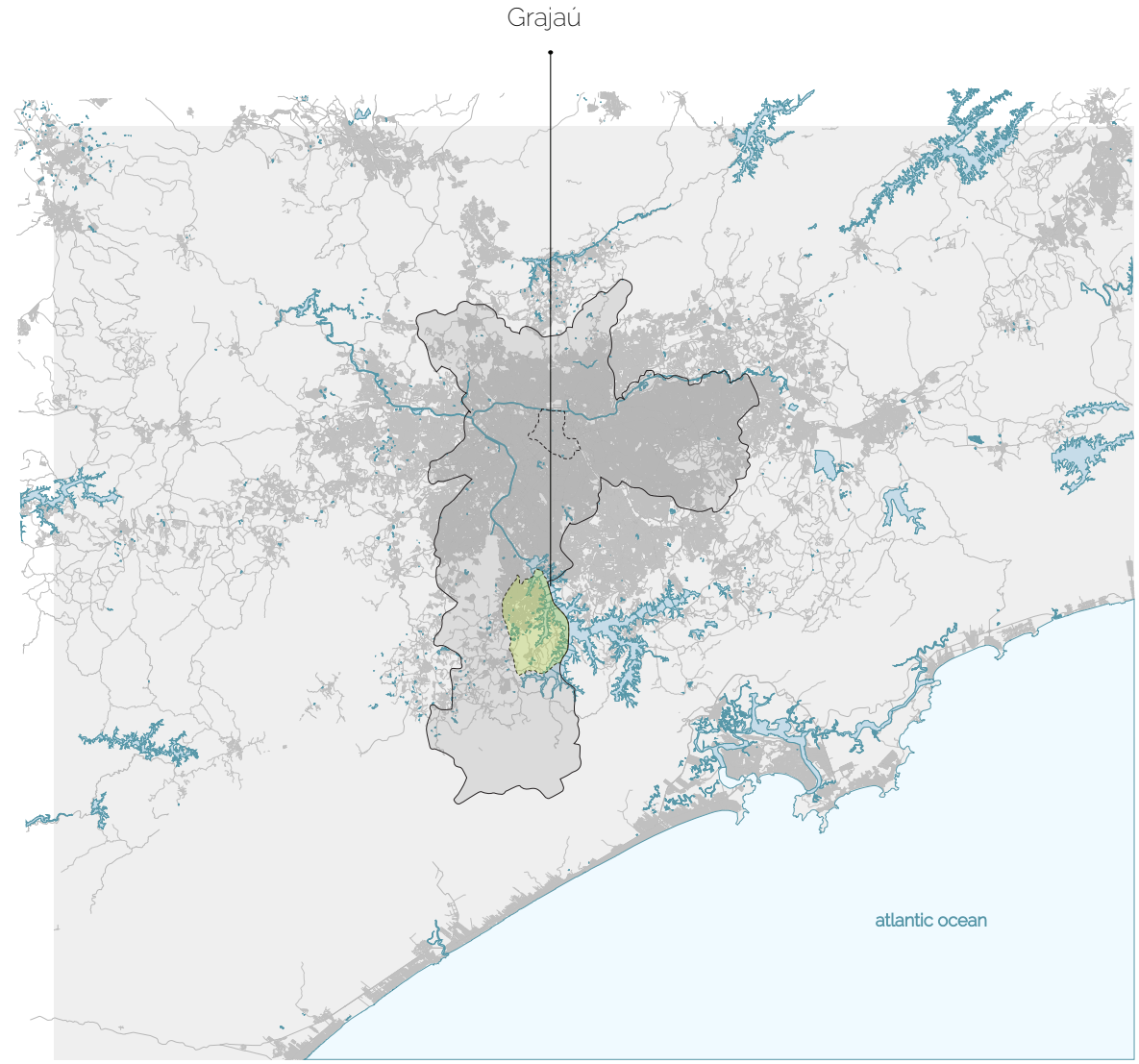
(Source: Plano Director Estratégico do Município de São Paulo, 2014)

SITE ANALYSIS

SÃO PAULO

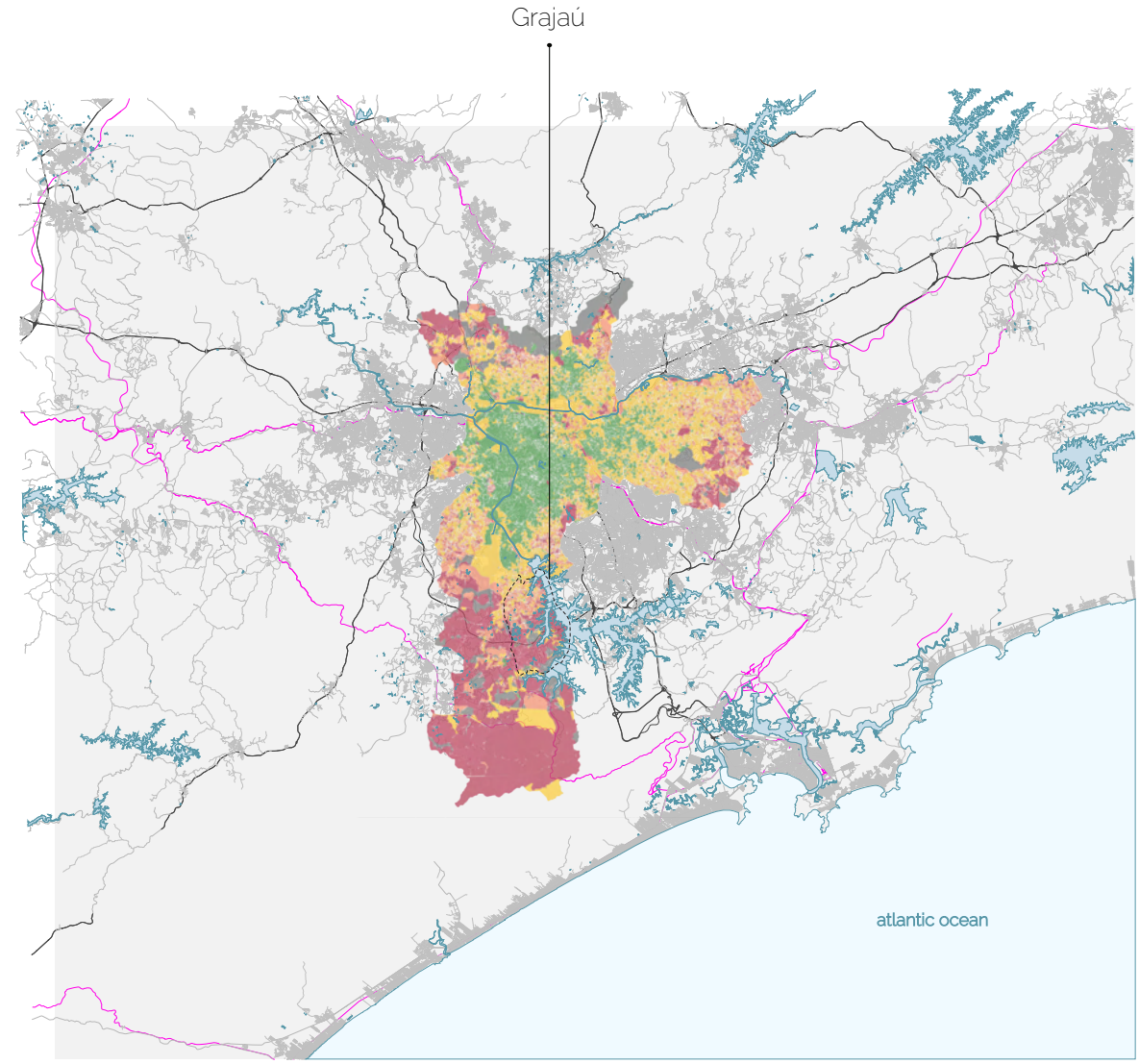


GRAJAÚ



municipality of São Paulo
water body

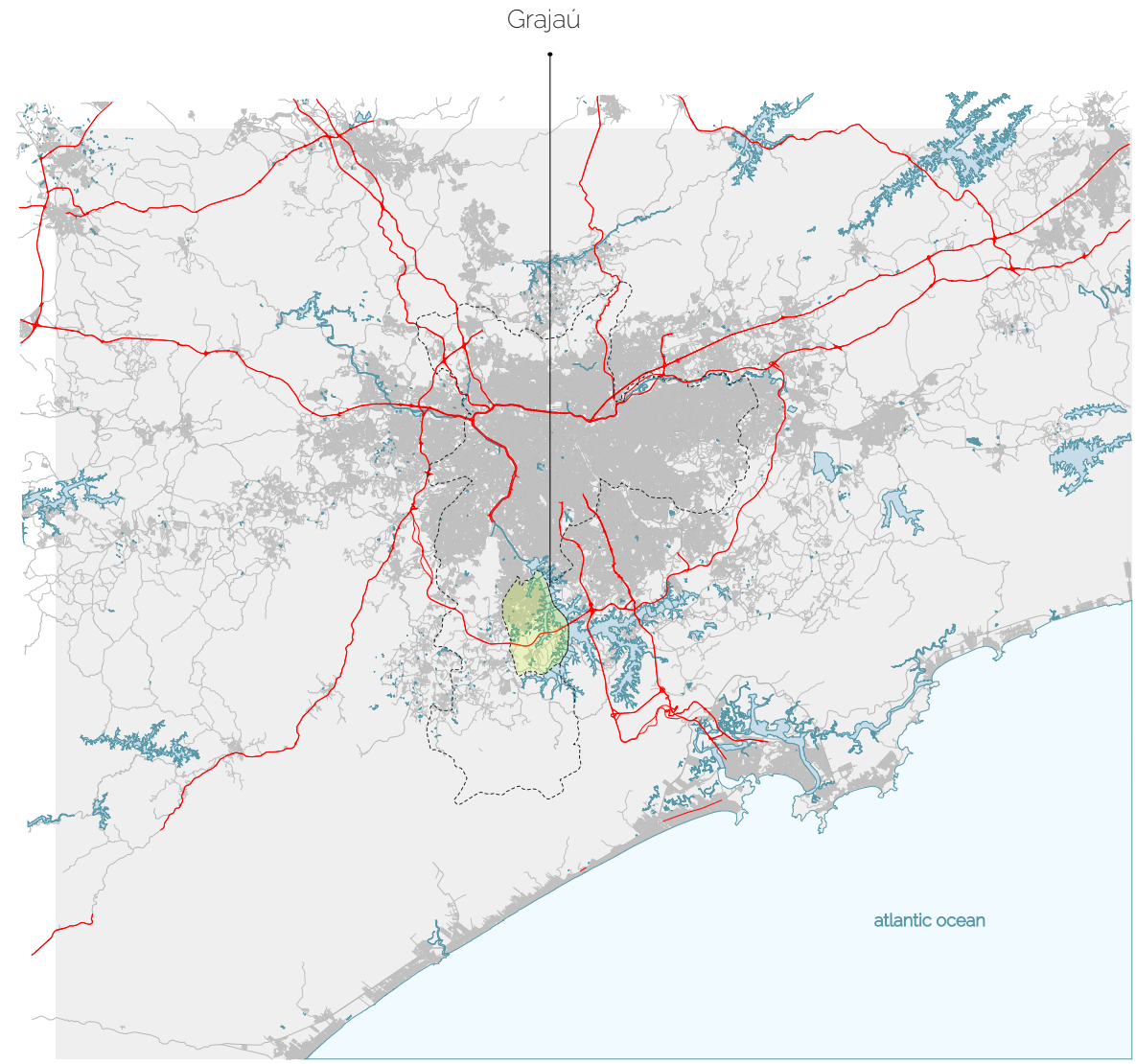
SOCIO-SPATIAL ANALYSIS



municipality of São Paulo
water body
Very low vulnerability
Low vulnerability
Medium vulnerability
High vulnerability
Very high vulnerabil-

(source: Goto E. A., Suarez A. M., Ye H. (2022). *Spatial analysis of social vulnerability in São Paulo city, Brazil.)*

MOBILITY: HIGHWAYS

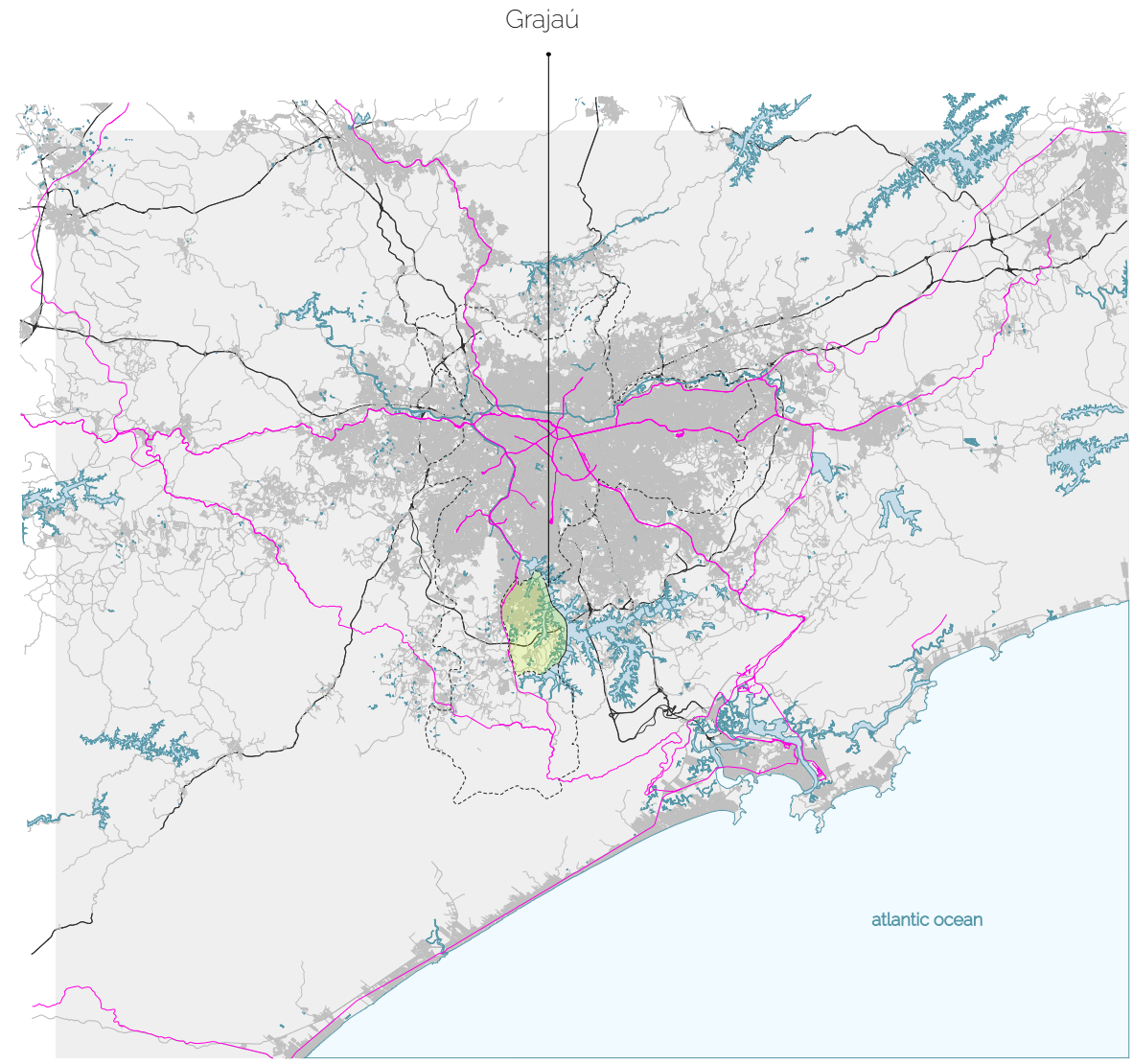


— highway

municipality of São Paulo

water body

MOBILITY: RAILROADS

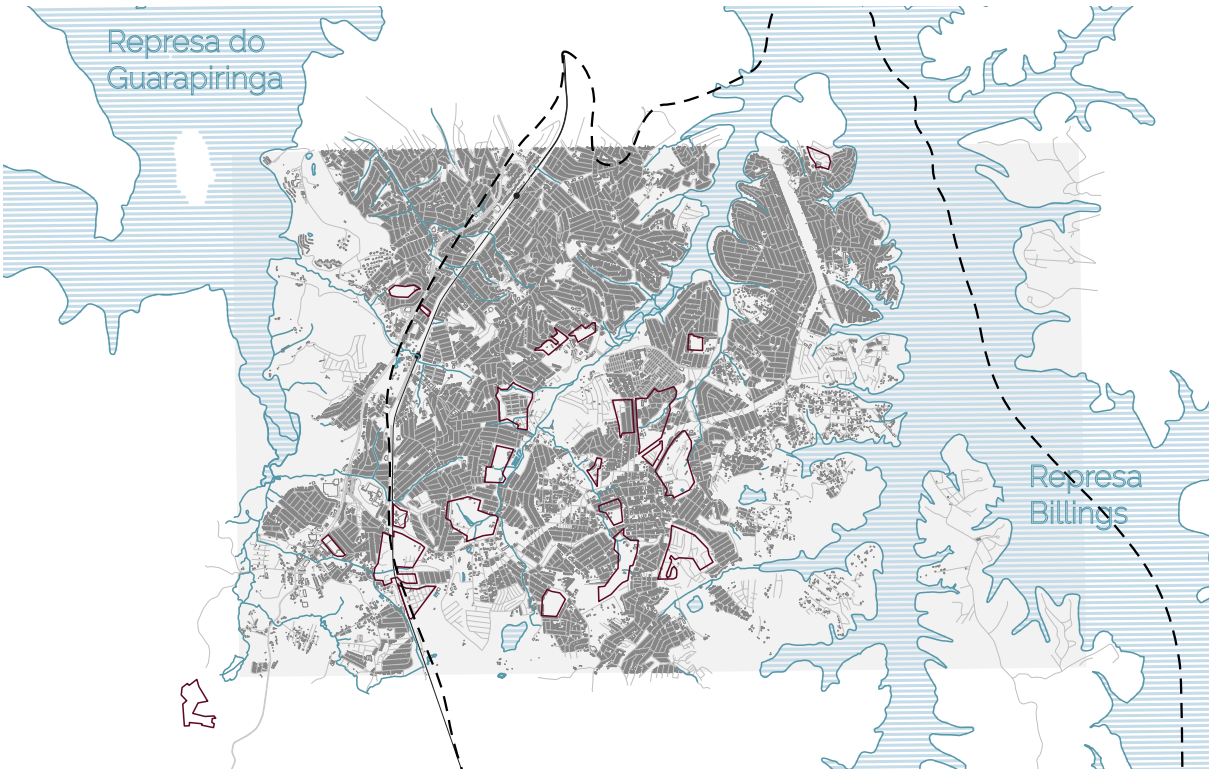


— railroad

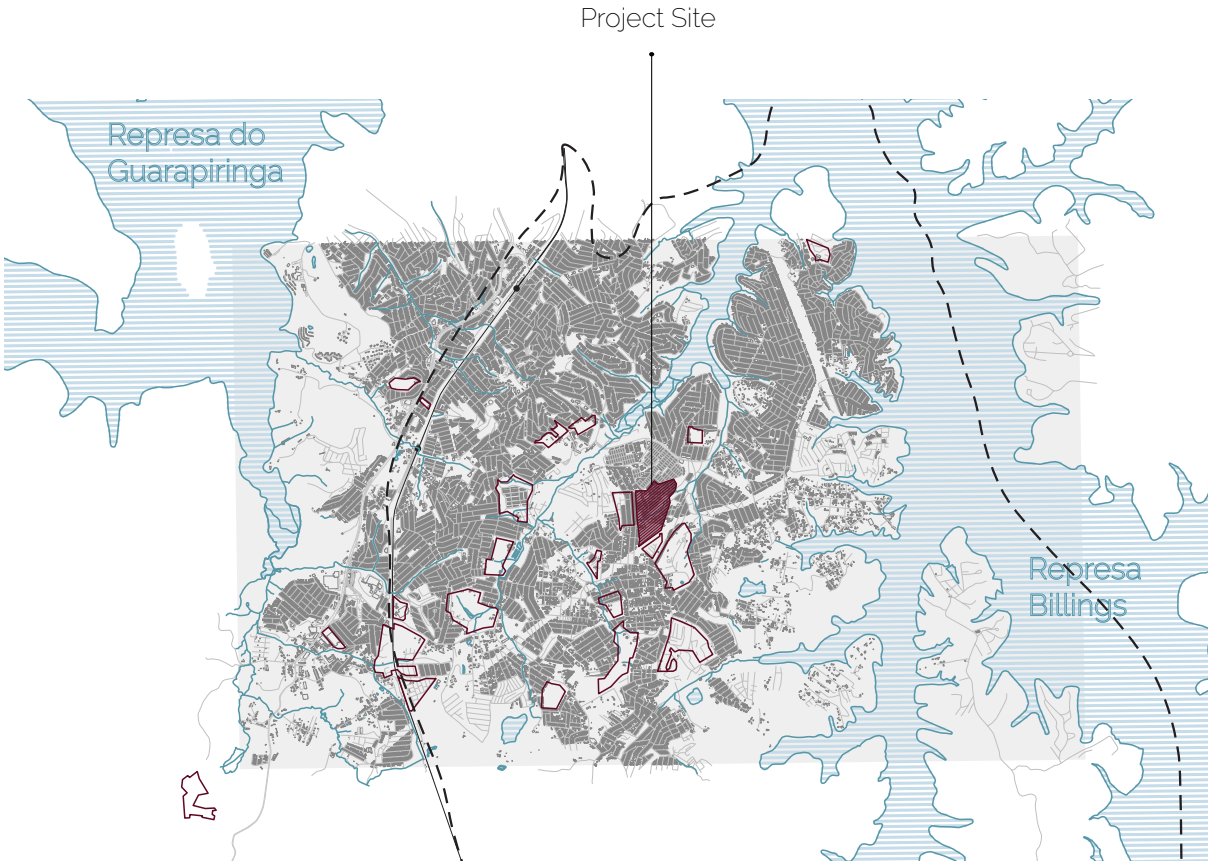
municipality of São Paulo

water body

ZEIS 4 AREAS GRAJAÚ

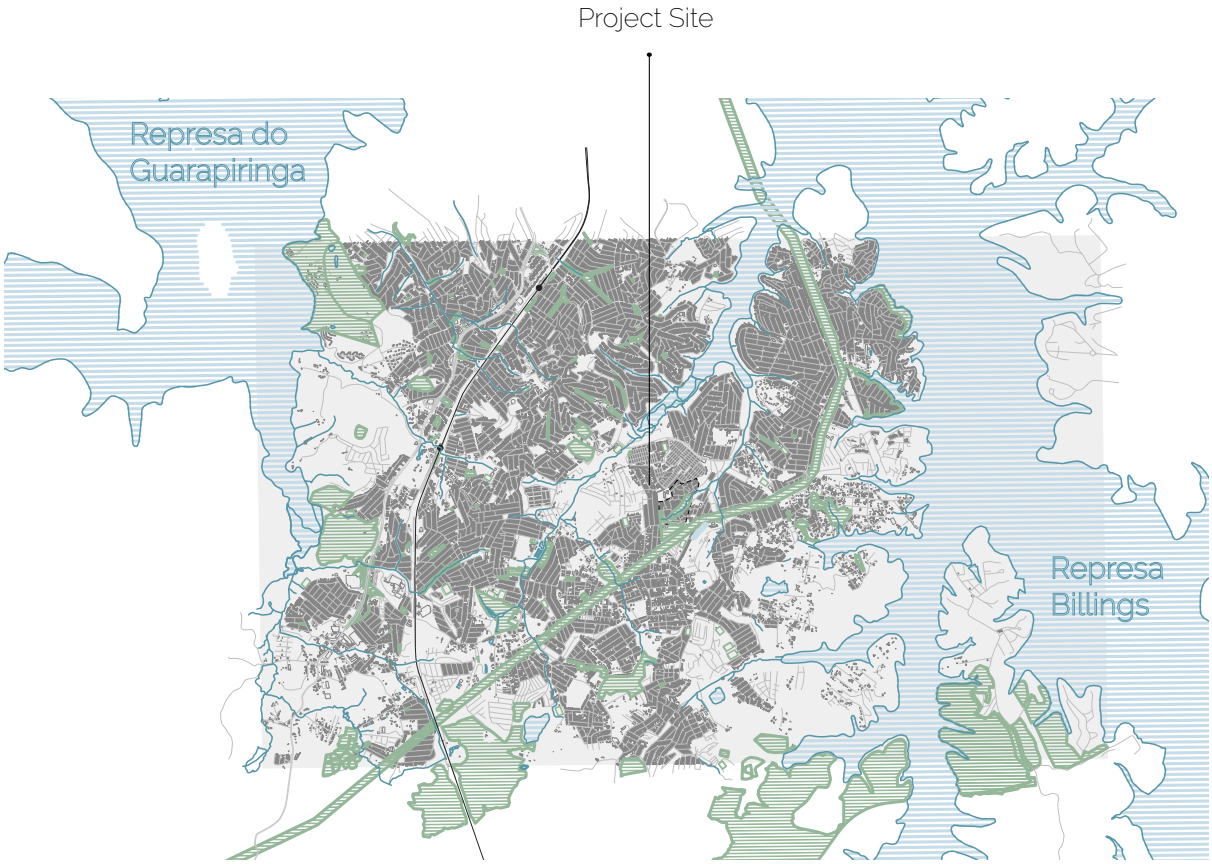


- ZEIS 4
- Railway
- Grajaú
- water body

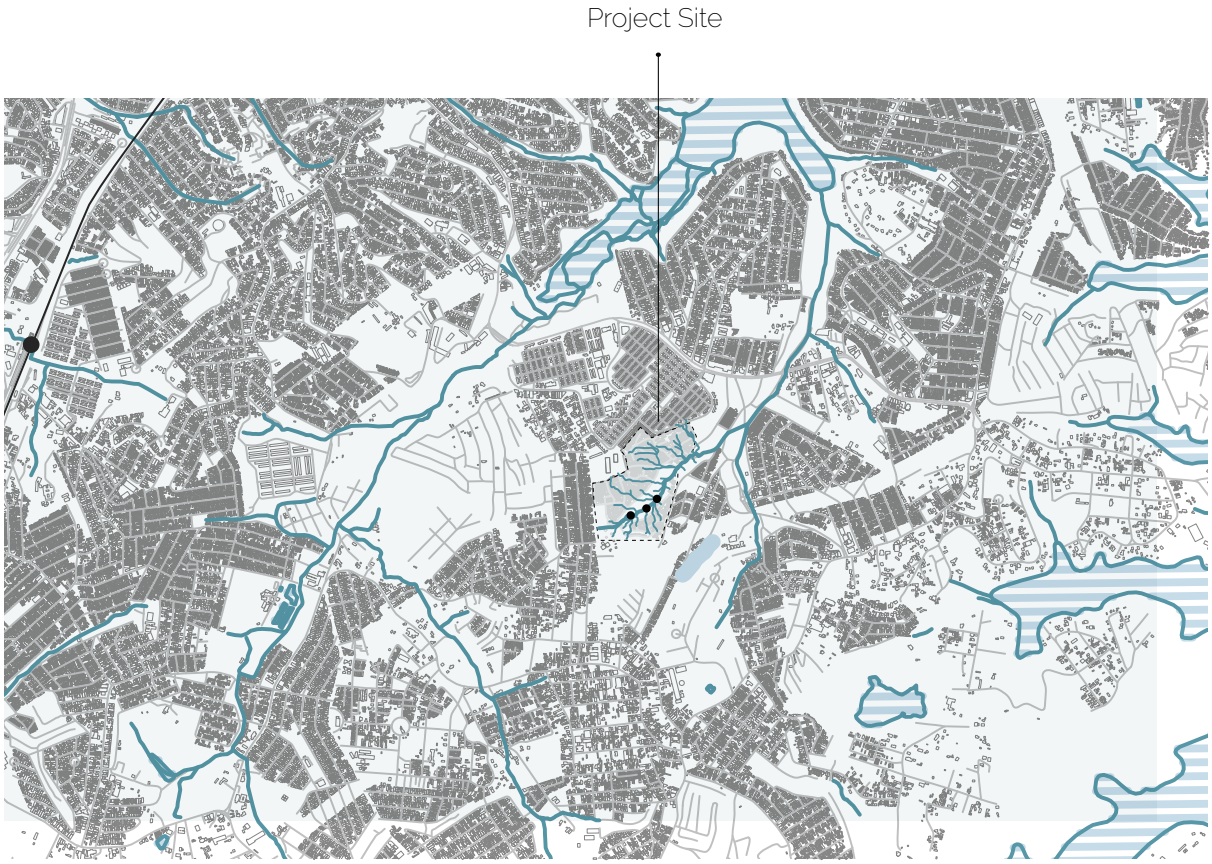


Anchieta
ZEIS 4
Railway
Grajaú
water body

WATER DRAINAGE

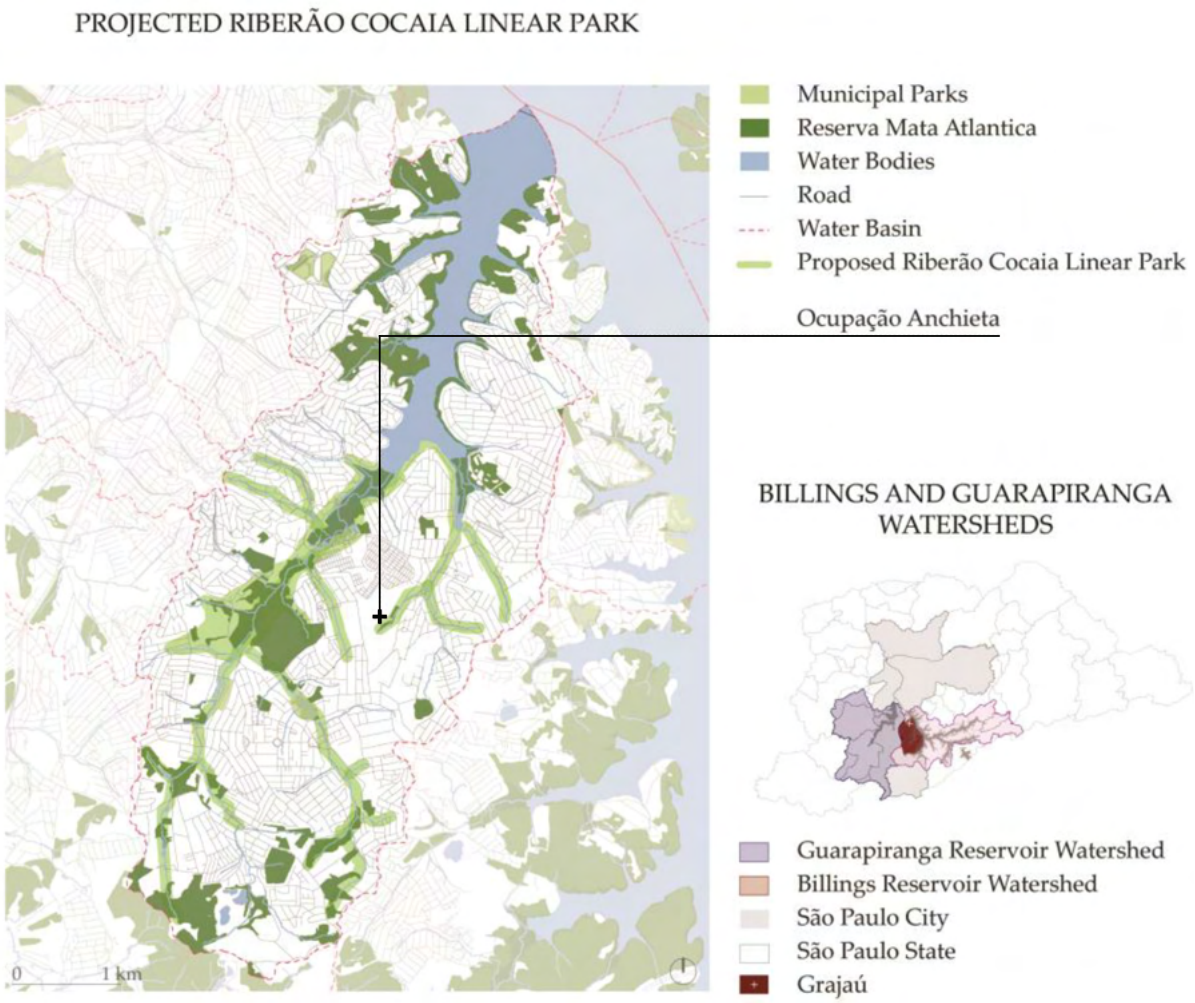


- Drainage
- Green
- Anchieta
- water body



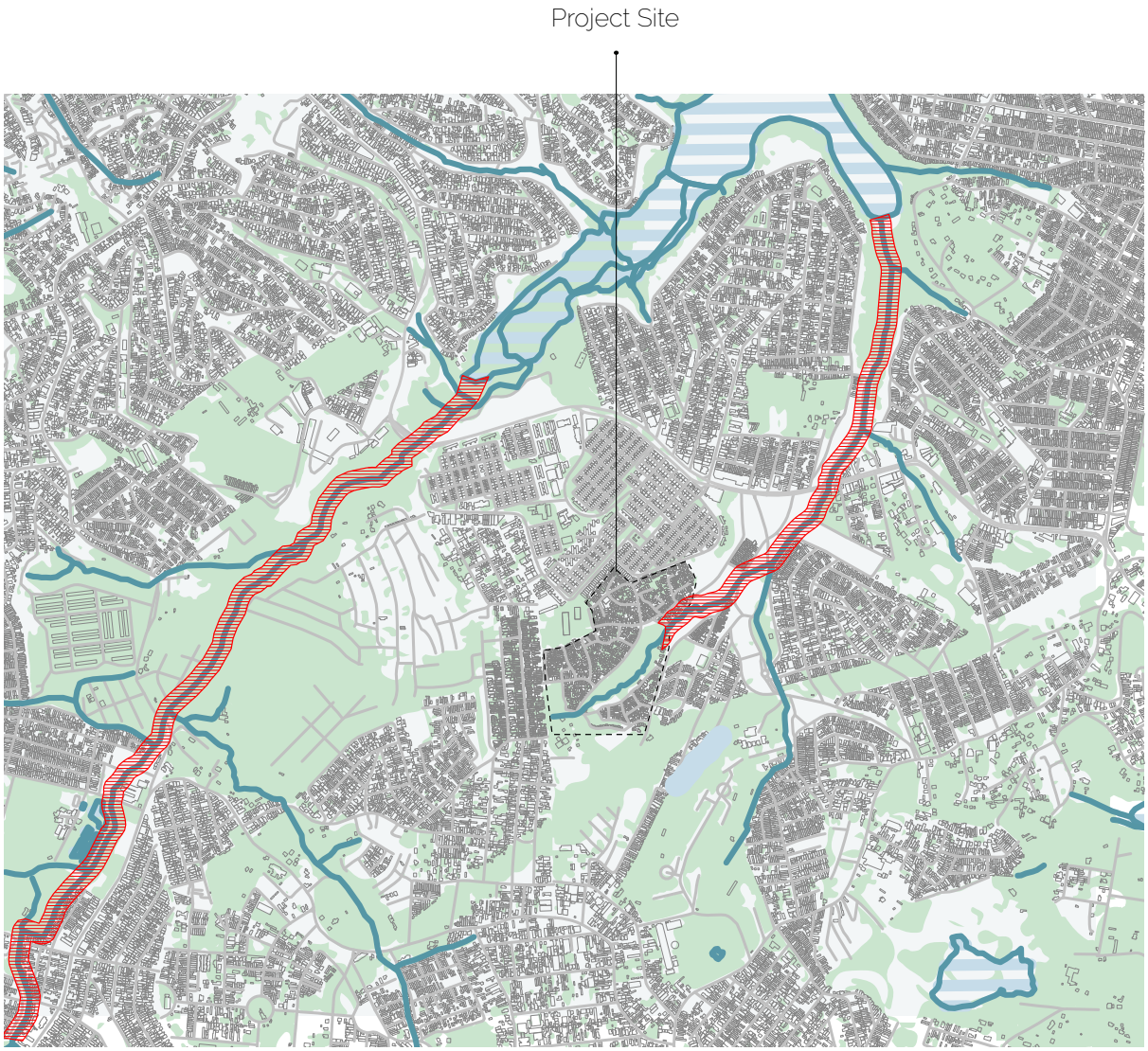
- Spring
- Drainage
- Anchieta
- water body

PLANNED LINEAR PARKS



Source: map redrawn by the authors with data from SVMA/ PMSP Laboratório de Habitação e Assentamentos Humanos—LabHab/ FAUUSP.

WATER PROTECTION AREA

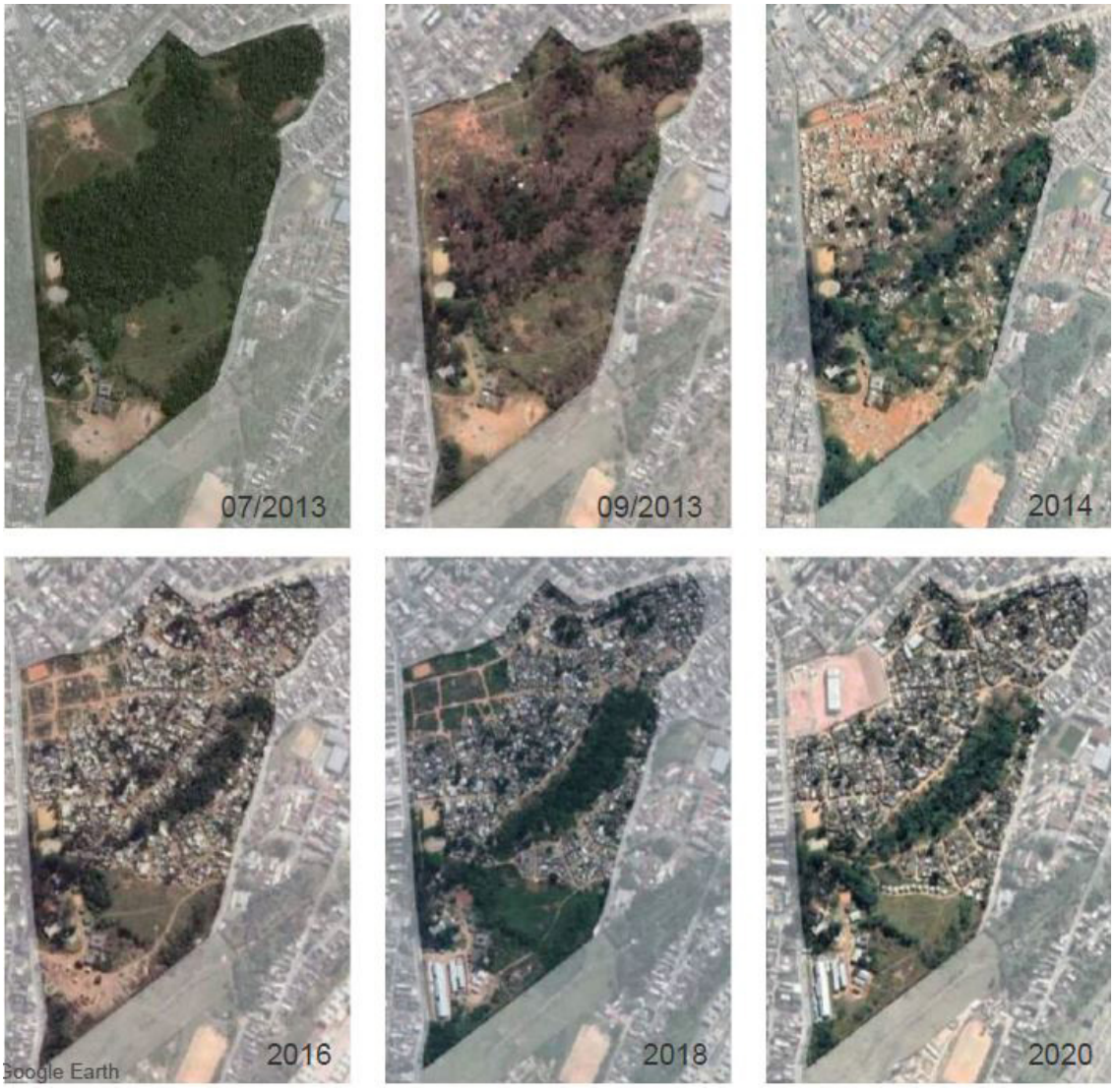


Protected Area
Drainage
Anchieta
water body

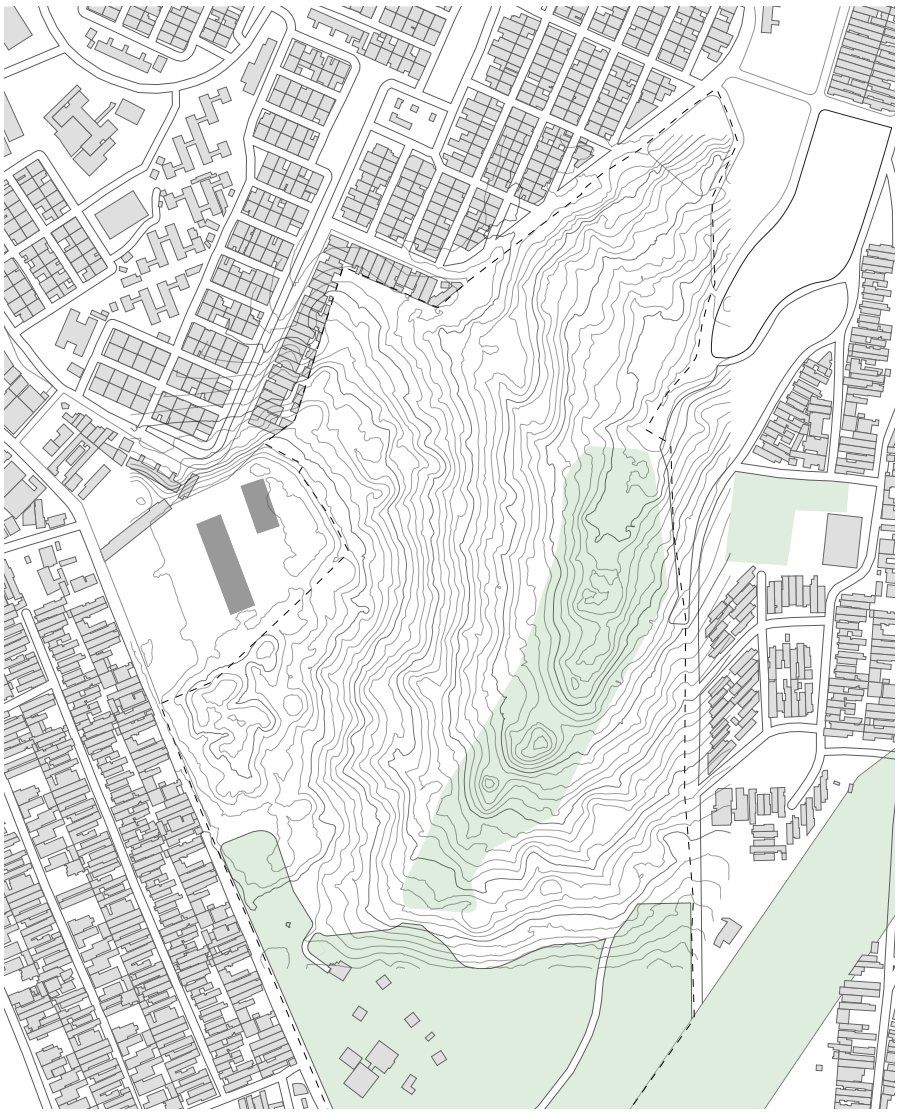
POJECT SITE

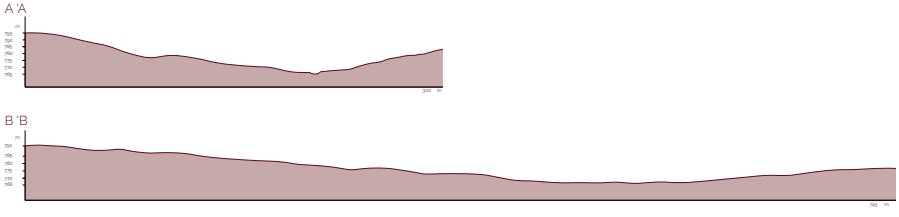
ANCHIETA

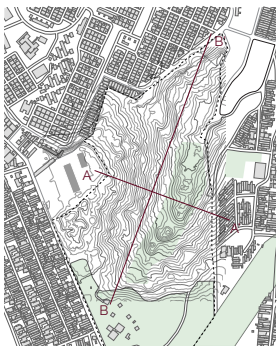
DEVELOPMENT



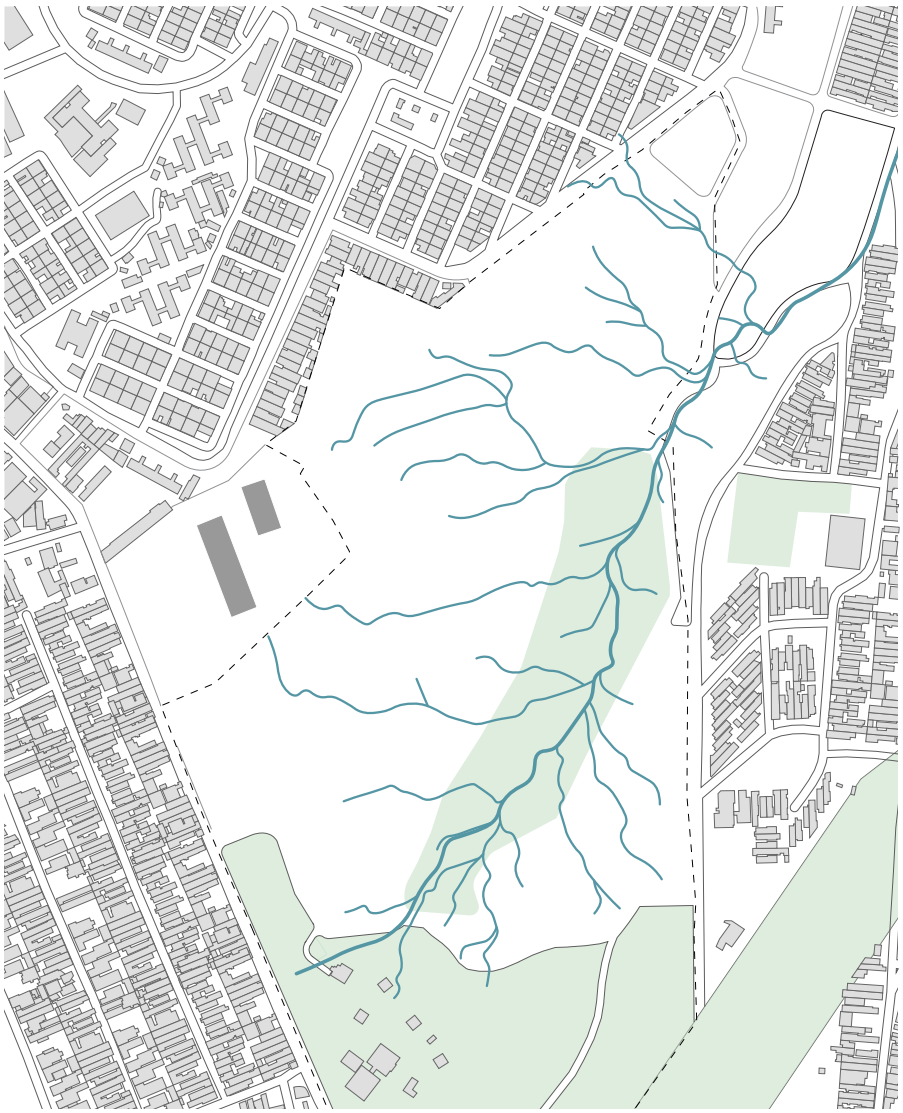
TOPOGRAPHY



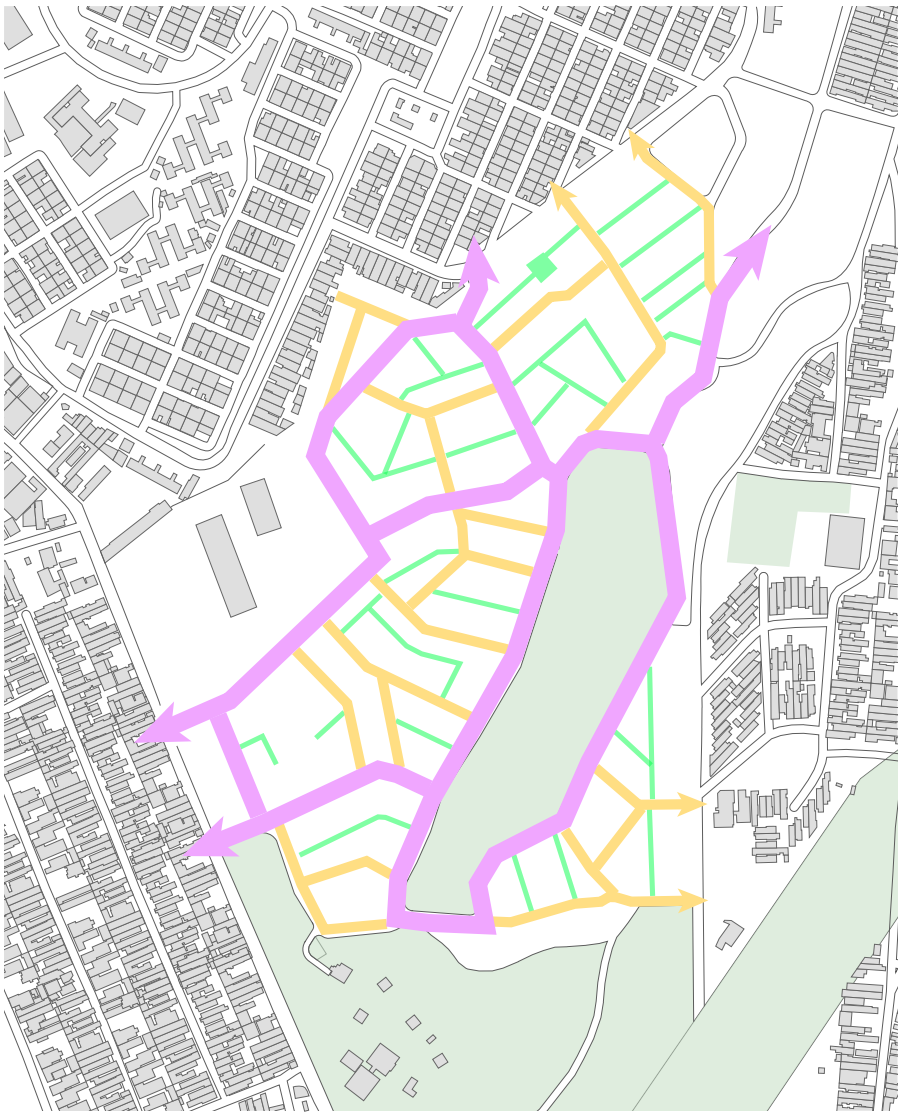




DRAINAGE

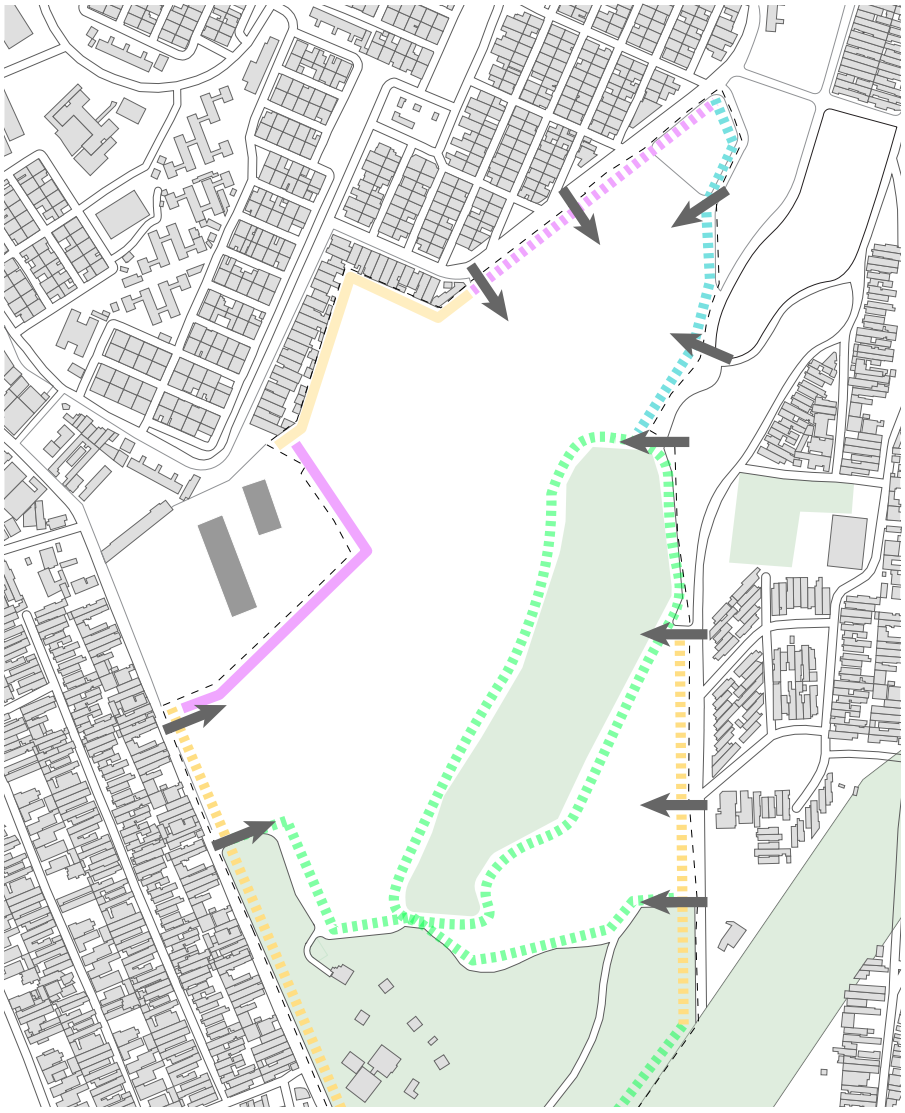


STREET PATTERN



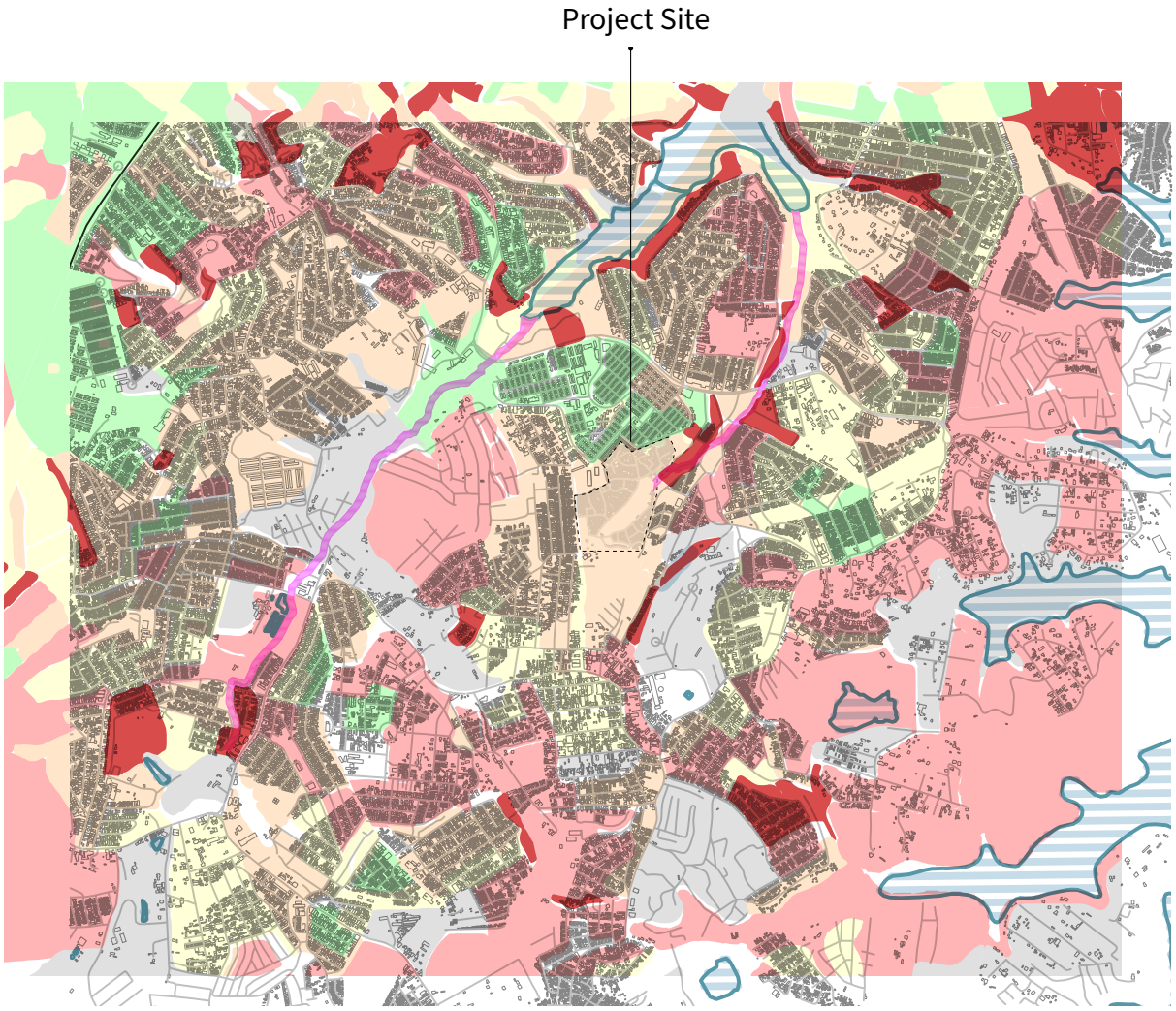
primary roads
secundary roads
tertiairy roads

EDGE CONDITIONS



street with informal settlement
street with regular settlement
ecological sensitivity
irregular settlement
backside informal settlements
wall
access point

VULNERABILITY



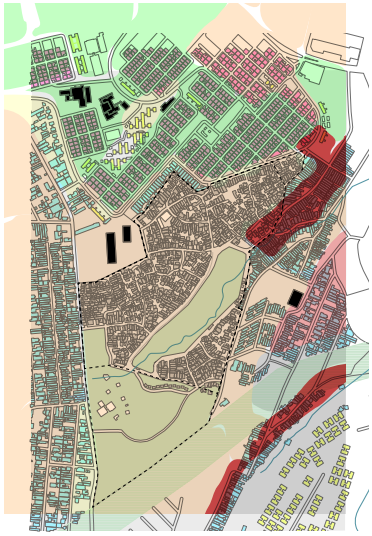
Drawing by author. (Source vulnerability: GeoSampa, 2023)

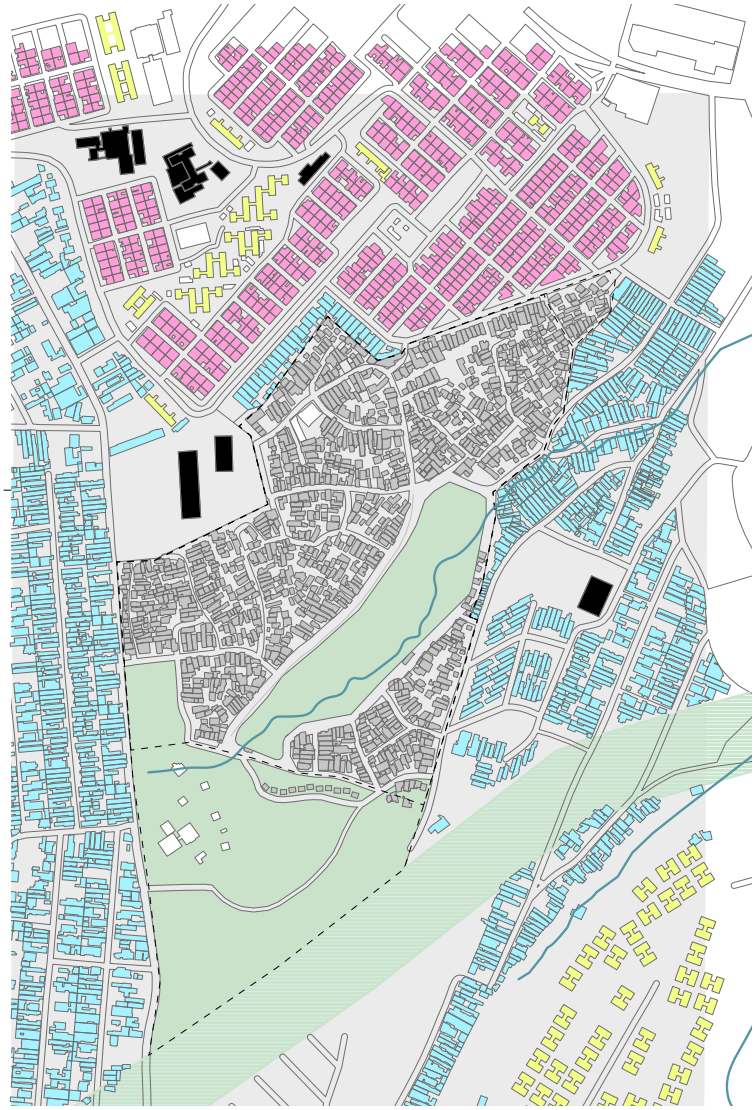
- Very low vulnerability
- Low vulnerability
- Medium vulnerability
- High vulnerability
- Very high vulnerability
- Drainage
- Anchieta
- water body

CONTEXT BUILDING TYPES

Drawing by author. Source building occupation: inFORMA Ocupação Anchieta, Taubman College of Architecture and Urban Planning (2017).

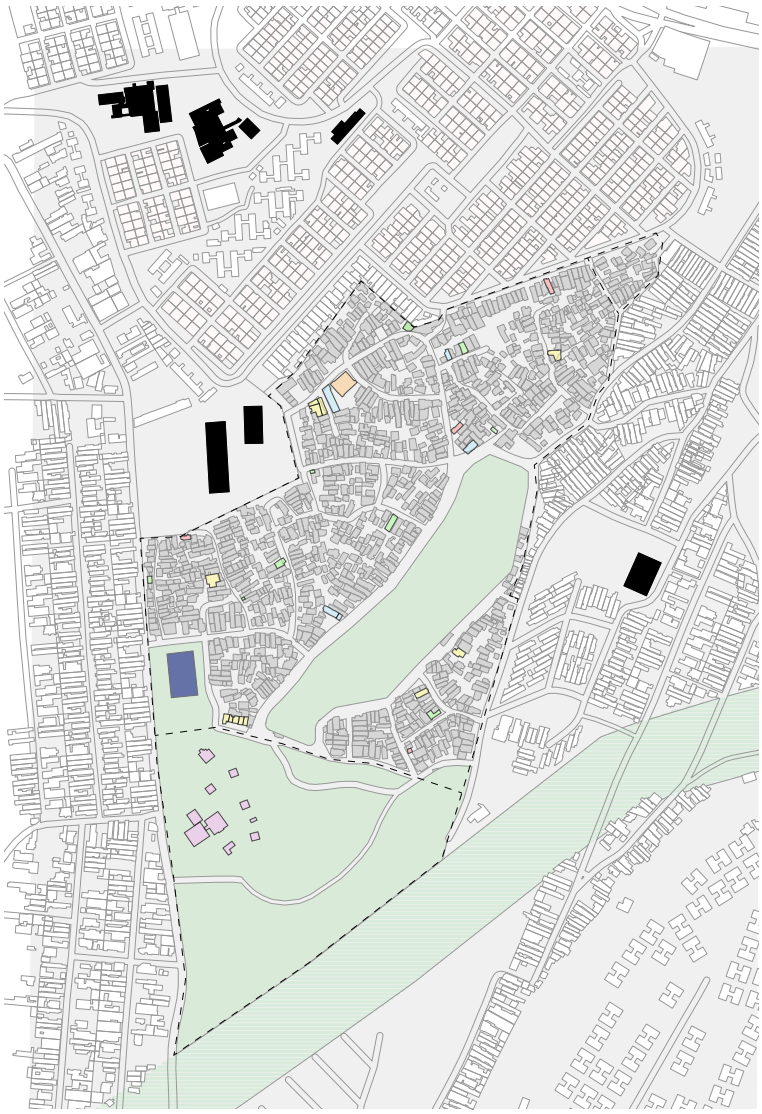
Link water, building type and vulnerability





Middle income (Low-rise)
Condominium (High rise)
Informal Settlements (Low-rise)
Occupation
Schools
Social institution

AMENITIES AND ECONOMIC ACTIVITY



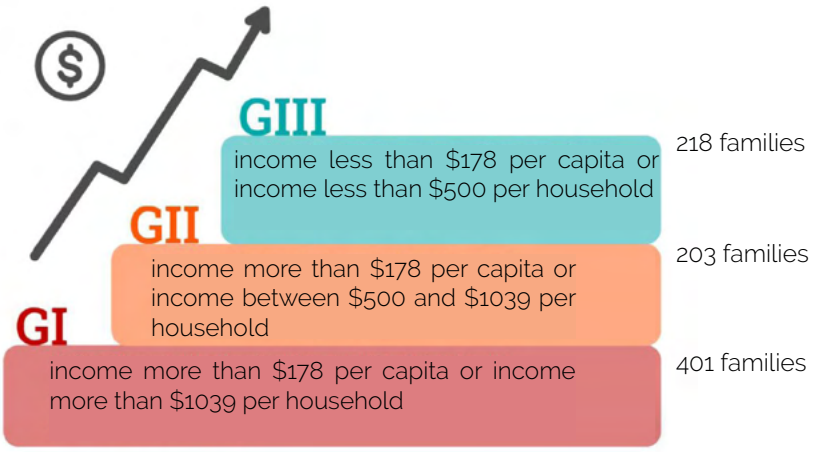
Drawings by author. Source data economic activity: inFORMA Ocupação Anchieta, Taubman College of Architecture and Urban Planning (2017).

- Church
- Community Center
- Stores
- Restaurants & Bars
- Hair Dressers
- Instituto Anchieta
- Elementary School
- Football field

DEMOGRAPHICS

1063 families,

Income groups: (Source: Peabiru, 2019)



Number of people per family
(Source: Peabiru, 2019)

Racial composition of residents
(Source: Peabiru, 2019)

VEGETATION

Plant Species


Giant Cutgrass


Water Primrose


Wild Radish


Water Willow


Brachiara Grass

Tree Species


Astrocaryum Aculaetissimum

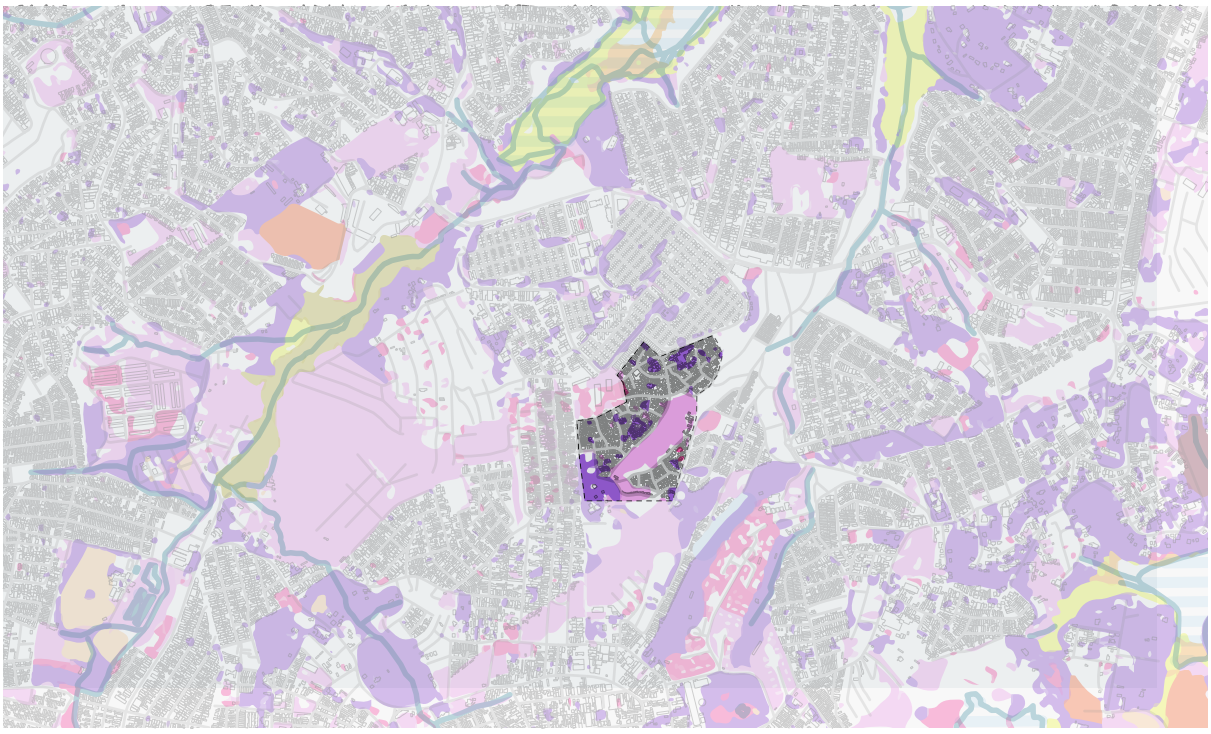

Euterpe Edulis


Cupania Racemosa


Tabebuia Heptaphylla


Brachiara Grass


Heisteria Silvianii



low tree, tree-shrub and/or tree cover

medium to high tree cover, tree-shrub and/or tree cover

herbaceous vegetation

Drainage

Anchieta

water body

ASSEMBL

Identifying the assemblages that holds Anchieta together. can identify helpful interventions that act as catalysts for t neighbo

GOVERNO DE SÃO PAULO

Billings Springs Protection and Recovery Area Zoning (APRMB)

↓

CÂMARA MUNICIPAL DE SÃO PAULO

Strategic Director Plan (PDE) of 2002

↓

- Macro area of Urban Vulnerability Reduction and Environmental Recovery

- Special Social Interest Zone (ZEIS 4): Unbuilt land located in headwater or environmental protection areas suitable for urbanization projects involving the building of HIS. In ZEIS 4, at least 70% of the total computable built area must have use of HIS.

Low-income housing 1 (HIS 1):1-3 minimum wages
Low-income housing 2 (HIS 2): 4-6 minimum wages
low-income market housing (HMP): up to 16 minimum wages

↓

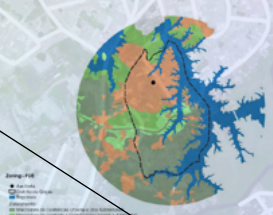
São Paulo Municipal Housing Secretariat (SEHAB)

DEFENSORIA PÚBLICA DO ESTADO DE SÃO PAULO

Public Defender of the State of São Paulo

The occupation received technical assistance in 2016 from a group of lawyers formed as a result of the Anchieta Movement, in order to advise the occupants in the fight against eviction and the case became more complex with the action of the Ombudsman of the State of São Paulo.

(Source: GeoSampa)



(Source: GeoSampa)

(Source: GeoSampa)

Gaspar Garcia Center for Human Rights

NATIONAL UNION OF POPULAR HOUSING MOVEMENTS (UNMP)

OCU

MOVE

(source: Rio on Watch, 2022)

peabiru

Technical and Architectural Advisory bureau

(IN)FORMAL REAL ESTATE MARKET

Plot divisions by illegal landowners
Speculation
Installments

Construction of embryo-house developed by Peabiru (image by Torbica A., 2022)

Typological map of the embryo-house (drawing by Jodłowska A., 2022)

NGO

AGE MAP

If we know what holds the slums of Anchieta together we
he reterritorilization of a more diverse, inclusive and open
urhood.

Surrounding neighbourhoods

Taubman College: In 2016 the first contact with the University of Michigan arises, based on the relationship between its research professors with the Gaspar Garcia Center.

Cocaia Stream

protests via WhatsApp, paper flyers, and word of mouth.

strong sense of community because of a shared cause: the struggle for housing.

since 2013
PAÇÃO ANCHIETA
MENTO ANCHIETA

RIGHT TO HOUSING

ENVIRONMENT

conflicting desires: desire to build and own a house versus the desire to restore and protect the creek area.

4 Natural Springs

Atlantic Forest

Minha Sampa
Action network for a fairer, more inclusive and participatory São Paulo

Water management project

Arq.Futuro
Platform for teaching and research on the urban environment

ANCHIETA GRAJAÚ INSTITUTE (IAG)
NGO, landowner of Anchieta

sabesp
Waste management company

emae
Water and energy company

FLUXUS
Ecological design company

Homes in Anchieta informally connect to the municipal water system via rubber hoses, known as *gato*. Some households store water in blue tanks adjacent or on top of their dwelling.

Surrounding neighbourhoods

BILLINGS RESERVOIR

Plants Species


Giant Cutgrass


Water Primrose


Wild Radish


Water Willow


Brachiara Grass

Tree Species


Astrocaryum Aculaetissimum


Euterpe Edulis


Cupania Racemosa


Tabebuia Heptaphylla

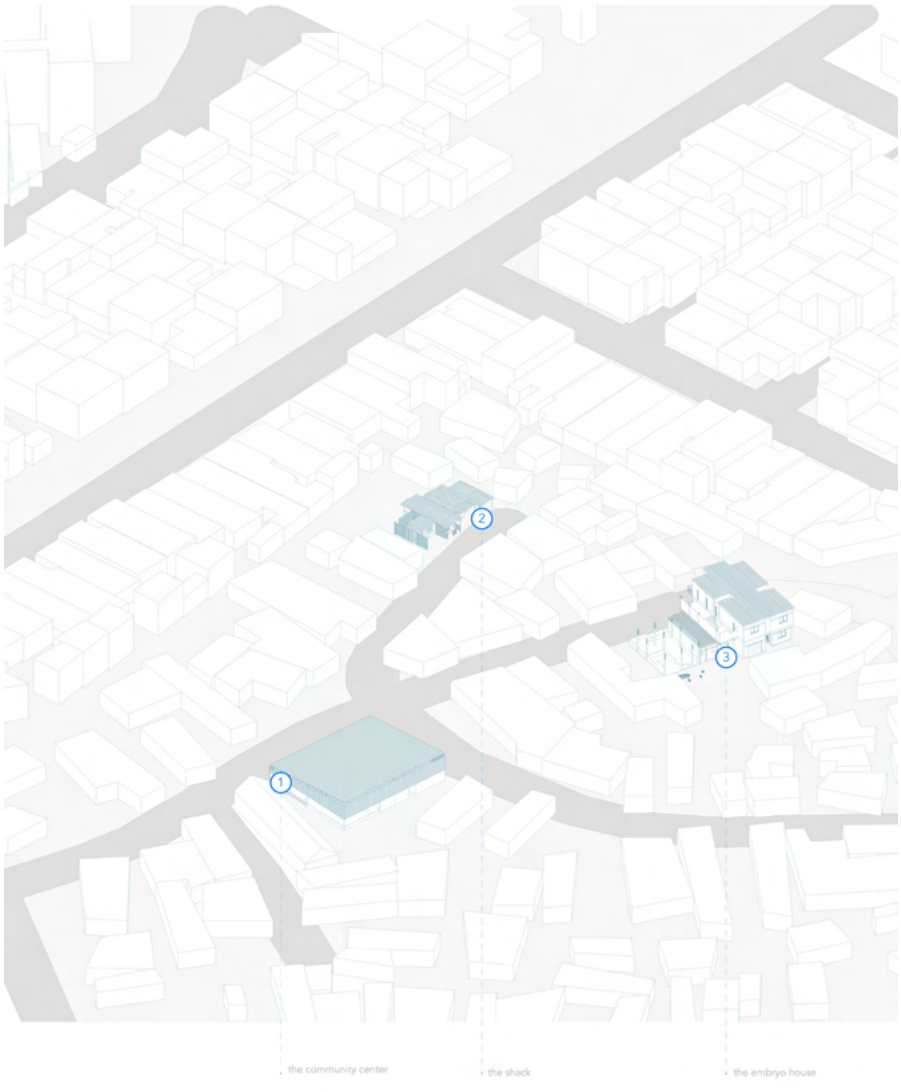

Brachiara Grass


Heisteria Silvianii

Animal Species

TYPOLOGICAL ANALYSIS

ANCHIETA, GRAJAÚ



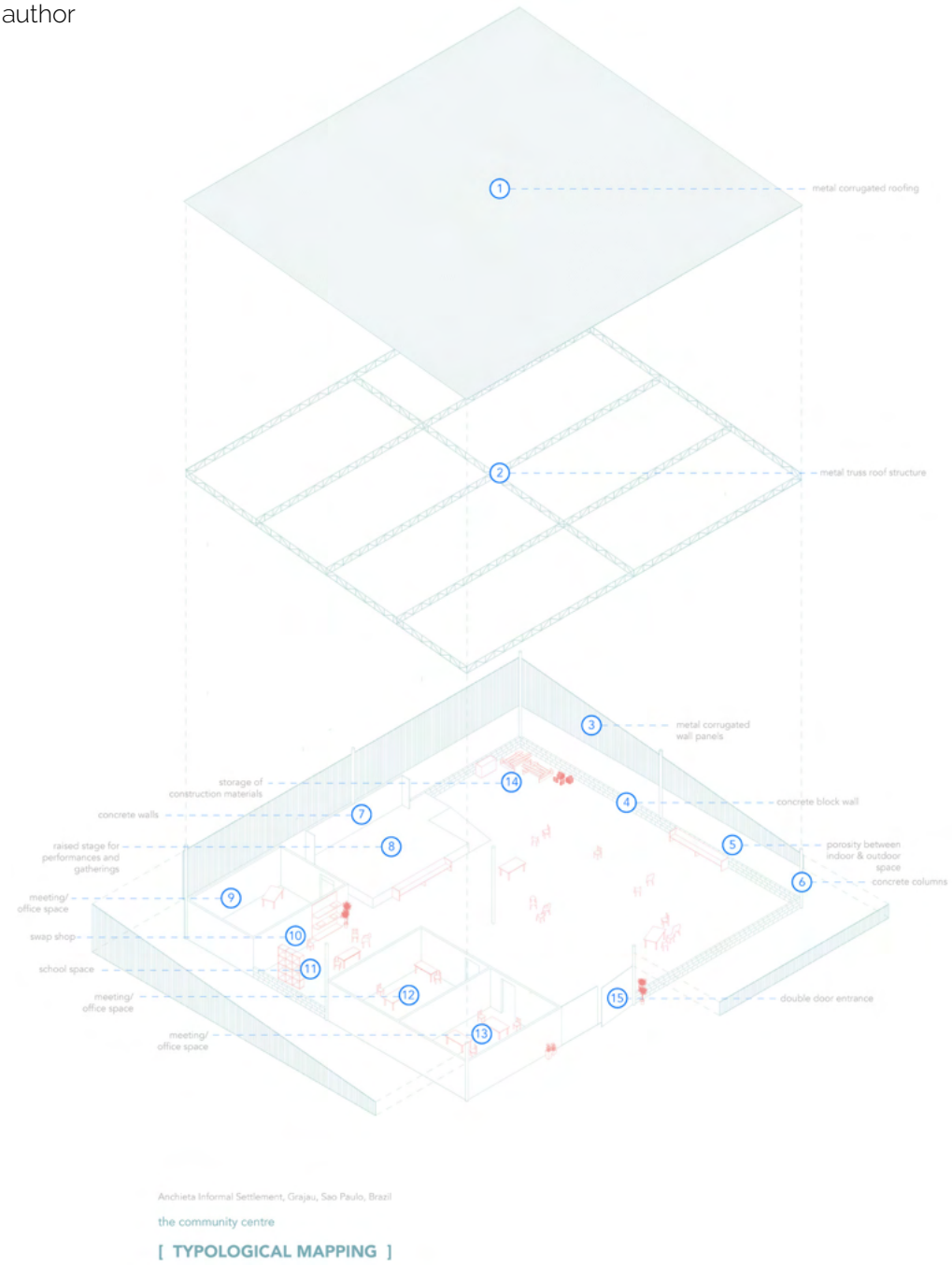
drawing by author

Anchieta Informal Settlement, Grajau, Sao Paulo, Brazil

[COGNITIVE MAP]

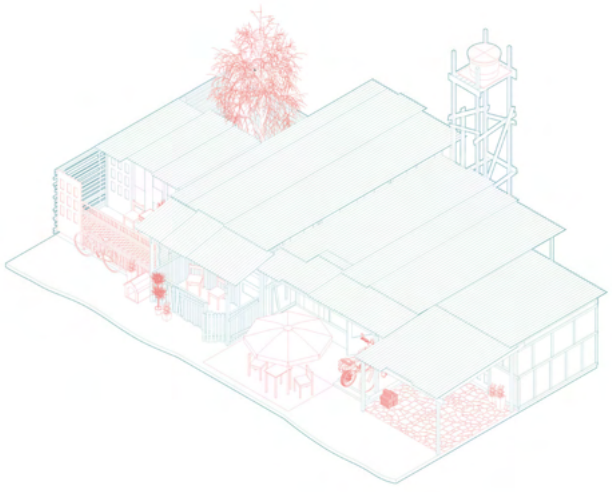
COMMUNITY CENTRE

drawing by author



THE INFORMAL SHACK

drawing by
Angelina Torbica

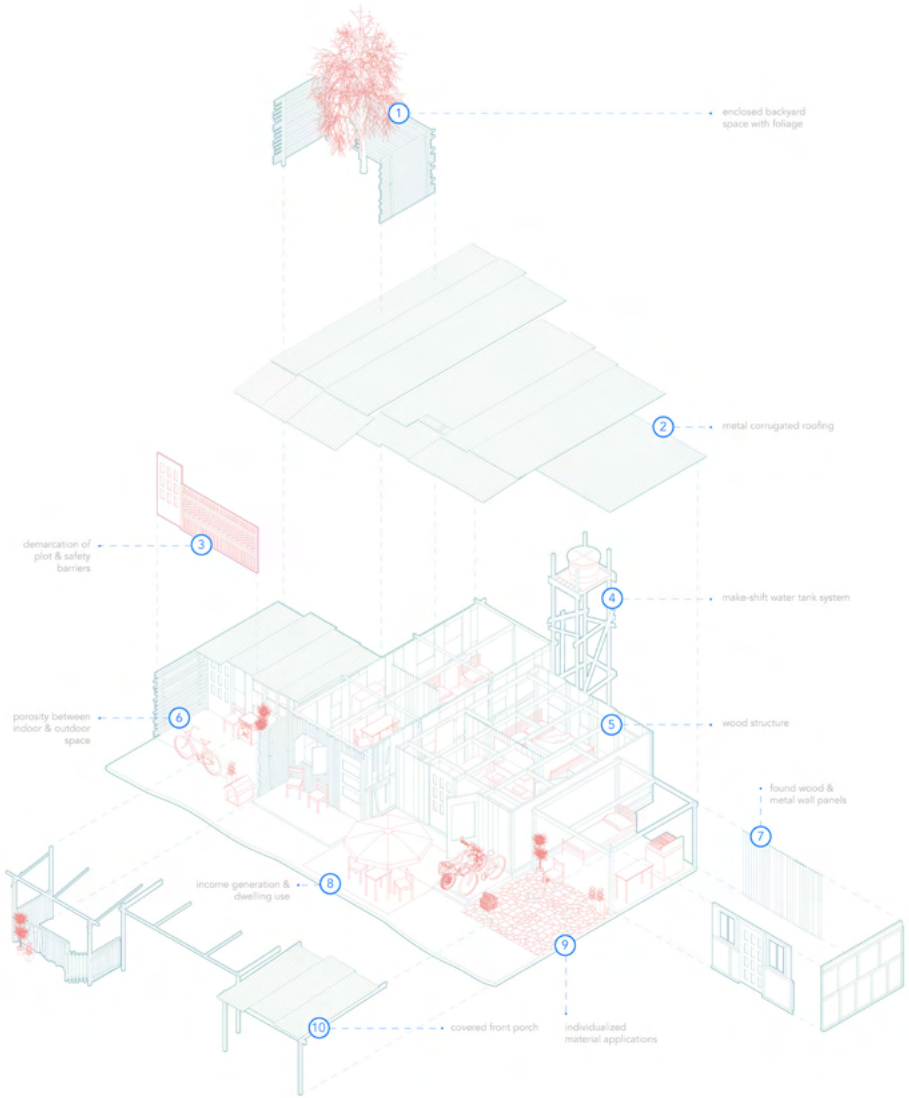


Anchieta Informal Settlement, Grajau, Sao Paulo, Brazil

the informal shack

[TYPOLOGICAL MAPPING]

drawing by
Angelina Torbica



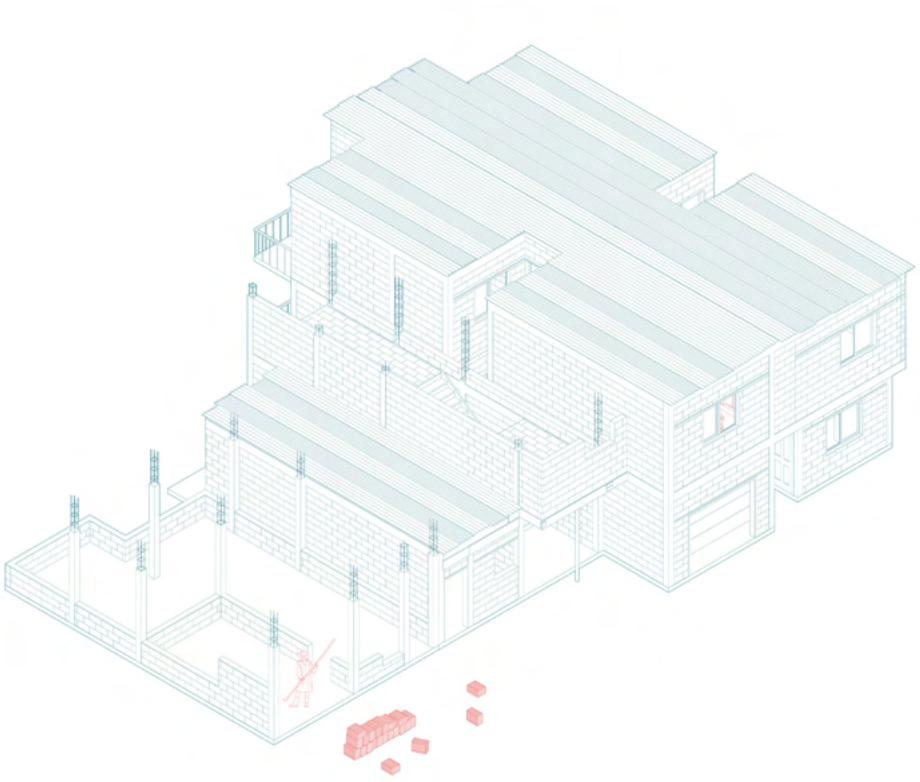
Anchieta Informal Settlement, Grajau, Sao Paulo, Brazil

the informal shack

[TYPOLOGICAL MAPPING]

EMBRYO HOUSE

drawing by
Aleksandra Jodłowska

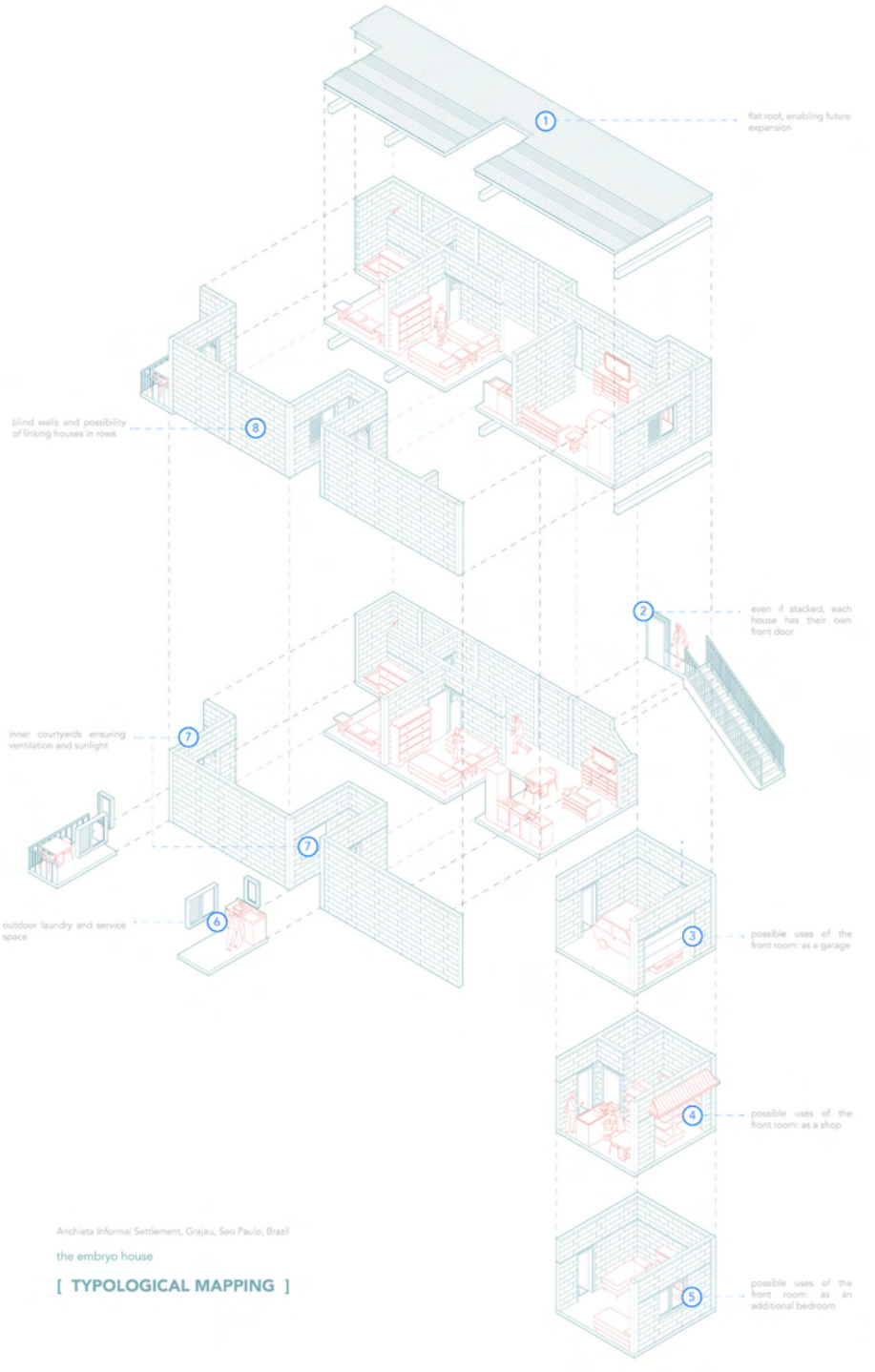


Anchieta Informal Settlement, Grajau, Sao Paulo, Brazil

the embryo house

[TYPOLOGICAL MAPPING]

drawing by
Aleksandra Jodłowska



ETHNOGRAPHIC RESEARCH

SYNTHESIS OF TYPOLOGIES AND ACTIVITIES

drawing by Angelina Torbica, Aleksandra Jodłowska and author.

CURRENT DEVELOPMENT STRATEGY

URBANIZATION PLAN

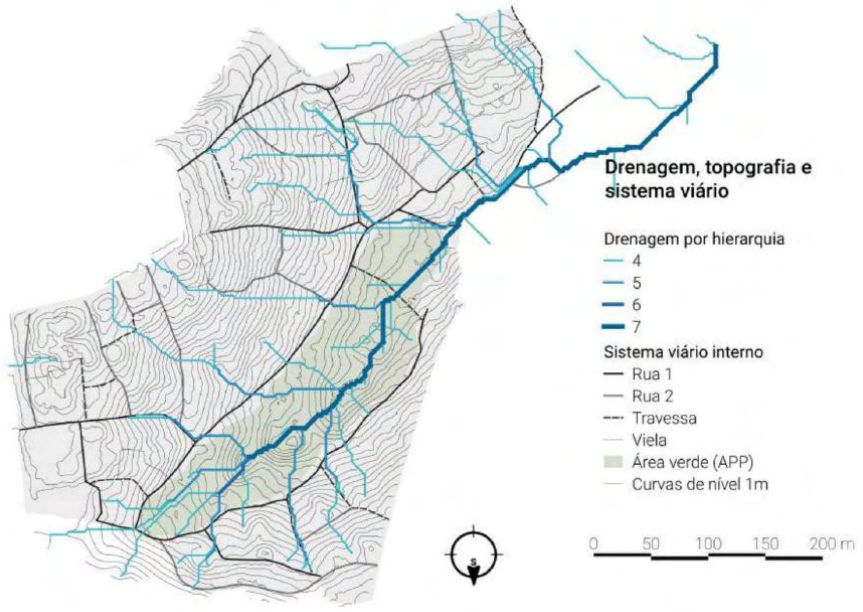
CURRENT SITUATION

drawing by Peabiru TCA, (2022) edited by author.

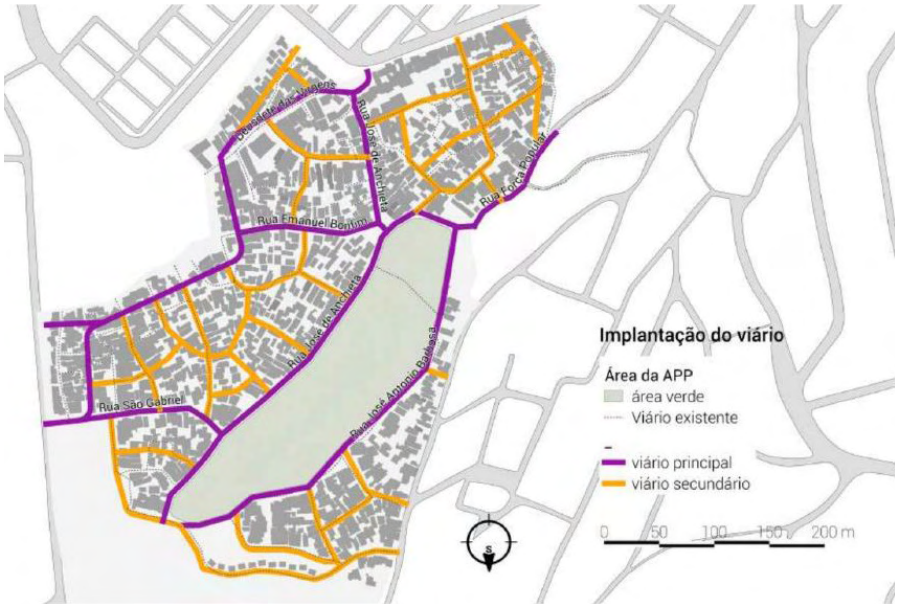
PEABIRU URBANIZATION PLAN

drawing by Peabiru TCA, (2022) edited by author.

NEGOTIATION: NOBODY LEAVES. THAT'S THE PREMISE.



Source: Peabiru TCA, (2020)



Source: Peabiru TCA, (2020)

Step 1:
Analysis of risk areas because of:
- flooding (natural drainage line)
- land slides (steep slopes).

Step 2:
Removal of dwellings on risk areas.

Step 3:
Opening up of:
- the road system
- unbuilt spaces (green areas)

Step 4:
Parcellation

EMBRYO HOUSE:

Embryo house:
auto-constructed dwelling that has incremental growth and adaptability possibilities.

Different plot sizes and incremental growth and adaptability possibilities (Source: Peabiru TCA, 2020)

AUTO-URBANISATION

image taken by Angelina Torbica, 2022

CONCLUSION

Qualities

- Grassroot/rhizomatic organisation.
- Emancipation and empowerment of residents
- Incremental growth
- Based on existing urban fabric and environmental risks.
- Community center

Critique

- Homogeneous
- Disregarding the quality of the public space and collective facilities
- Isolated
- Low density

PART III: DESIGN PROPOSAL

DESIGN BRIEF

- Masterplan for Sustainable Housing in Grajaú, São Paulo
- To be integrated in a ZEIS 1 and/or ZEIS 4 area in Grajaú.
- Considering social, environmental and economic factors.
- Following the legal frameworks defined by the Sao Paulo's Strategic Plan (PDE, 2014)

Sao Paulo's Strategic Plan (PDE, 2014):

- FSI:
  - ZEIS 1:
    - Minimum: 0,5
    - Basic: 1
    - Maximum: 2,5
  - ZEIS 4:
    - Minimum: NA
    - Basic: 1
    - Maximum: 2
- % of built area for Social Interest Housing and Popular Market Housing:
  - HIS 1: min. 60%
  - HIS 2: allowed
  - HMP: max, of 20%

DESIGN HYPOTHESIS

CO-EXISTENCE OF HETEROGENEOUS ELEMENTS

Dialogic is different from dialectics bc it doesn't pursue closure but is concerned with finding problems (staying with the trouble) in cooperation of difference: process instead of closure. Opening up space of ambiguity through subjunctive expression instead of declarative.

Empathy: curiosity towards the other. Deployment of object-centred objectivity.

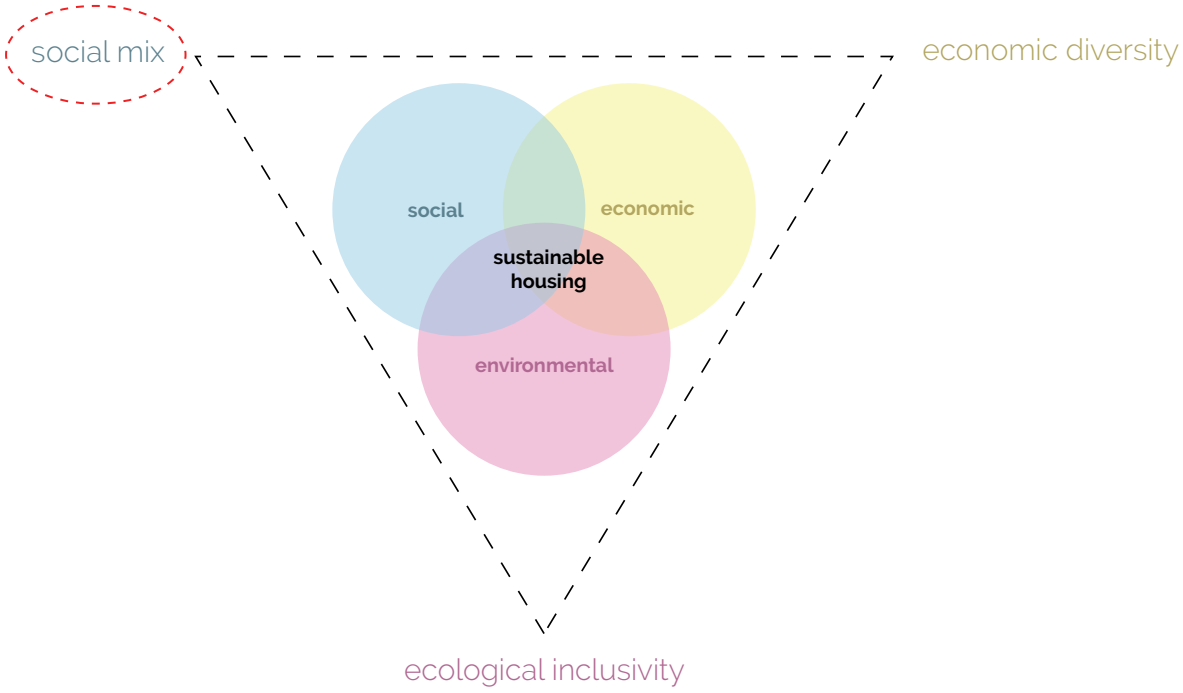
Sheer openness is an error. Nou dat has a certain porosity but at the same time resistance. Space needs protection as well as openness.

Boundaries: top-down

Borders: bottom-up. places of interaction, intense exchange, of negotiation (Arendt). - Sennett

Mixedusedstreetstocounterisolation.Create border conditions that promote dialogic, subjunctive and empathic interaction. Give people the skills to negotiate ambiguous terrains which require interaction. In which both porosity and resistente are enabled

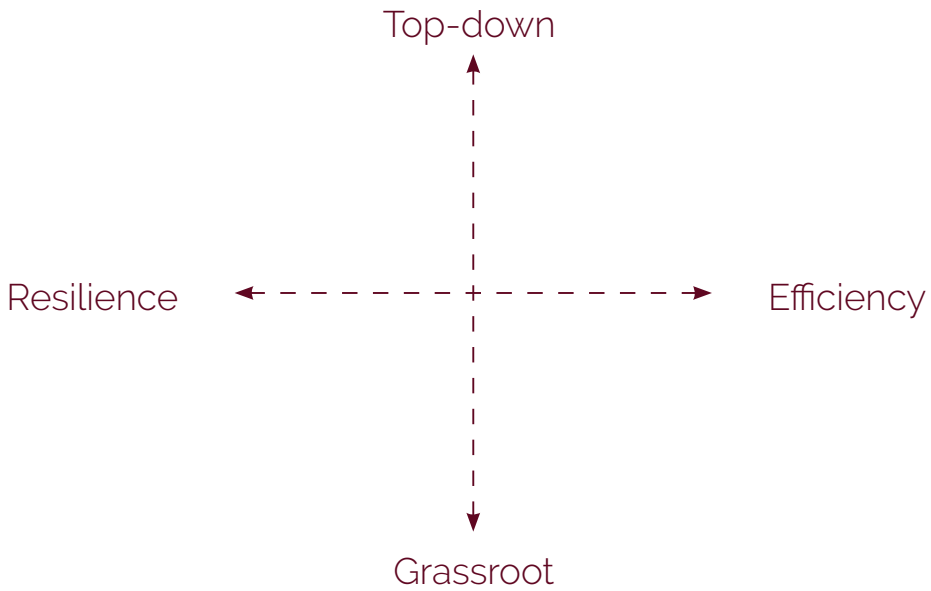
Capillary city: flows and flux.



TRADE-OFF

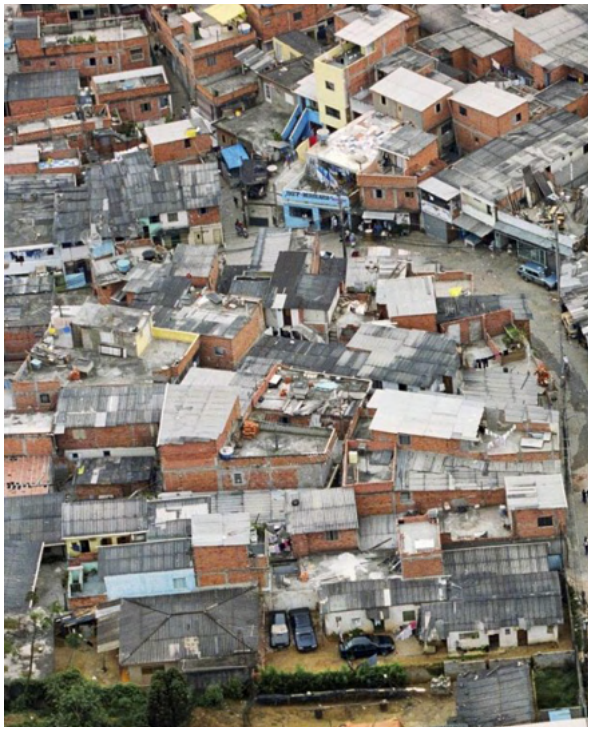
I'm introducing diversity of income groups and typologies to make it resilient, but by using the same materials and construction systems they will also be affordable.

Furthermore, my design is trying to find a balance between bottom-up and top-down in order to create socially stratified cities.



TRADE-OFF

2 opposing ways of social housing development in Grajaú, São Paulo.



(Source: The Guardian, 2017).

(Source: Arquitetura JAA, 2018. from: https://arquiteturajaa.com.br/portfolio/chacara-do-conde/. Edited by author).

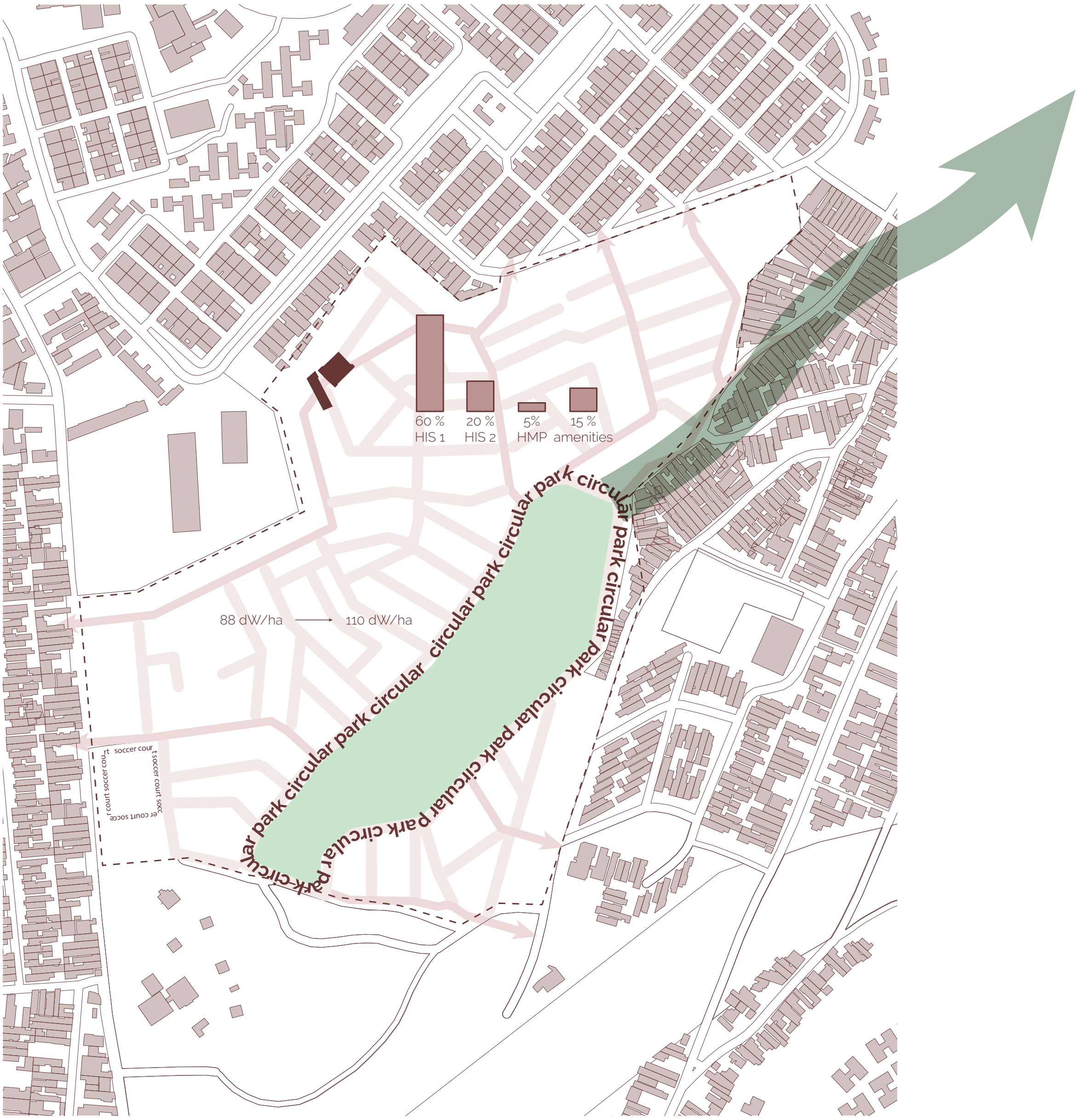
PROGRAM OF REQUIREMENTS

Density goal: 110 Dw/ha
Current density: 66 Dw/ha
If you want to house all 1063 families (60% of total):
1063 families/60 x 100 = 1772 dwellings
1772 dwellings/16 ha = 110 Dw/ha

"The residents expressed a strong desire for spaces for worship, children, culture and dance."
- Michigan University interview, 2017

Amenities:
- Construction education centre
- Elementary school
- Playground
- Football field
- Recreational and cultural center
- Space for worship

Public space:
- Network of unprescribed public spaces at border conditions
- Circular park at centre condition: Use the waterfront for high-quality public space to attract other income groups as a catalyst for transformation.



Keep

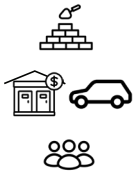
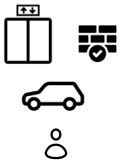
- community centre
- spaces for worship
- football field

Add

- construction education centre
- playground
- public space
- circular park

INCOME GROUPS

LIFESTYLES

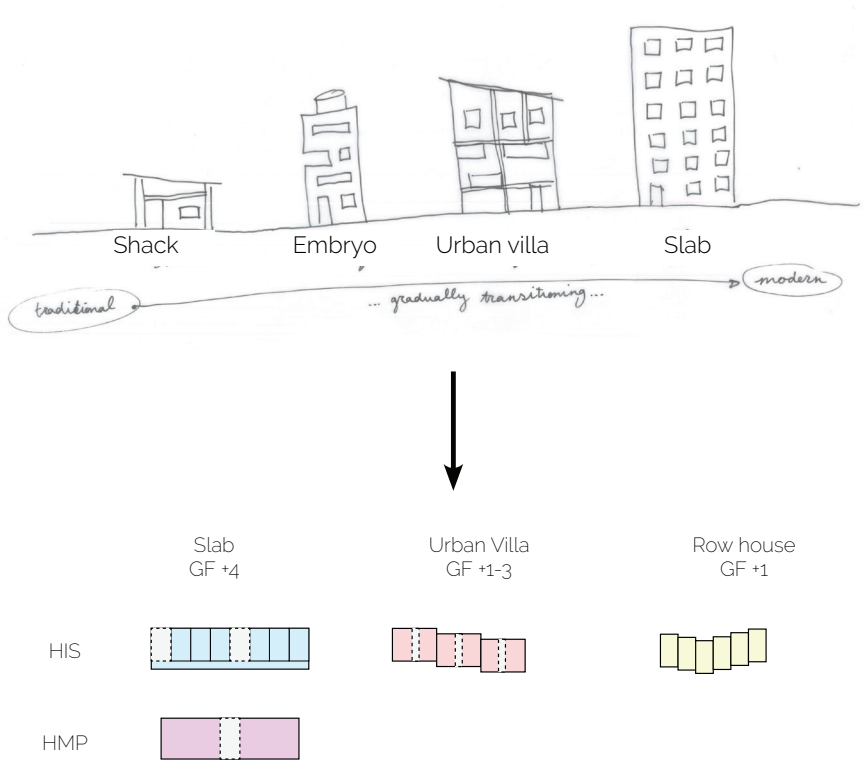
GROUP	X MINIMUM WAGE	OCCUPATION	FAMILIY SIZE	LIFESTYLE	
< HIS 1 $	<1 min. wage <R$1.302	Informal shop owner			Informal shops Incremental growth Rent-out room Live/work unit
HIS 1 $ $	1-3 min. wage R$1.302 - R$3.906	Carpenter			Formal and informal shops car owner Rent-out room
HIS 2 $ $ $	3-6 min. wage R$5.208 -R$7.812	Teacher			Formal and informal shops car owner Collective spaces
HMP $ $ $ $	6-12 min. wage R$9.114 -R$14.322	Official			Formal shops Car owner Elevator Privacy

LIVING CONDITIONS

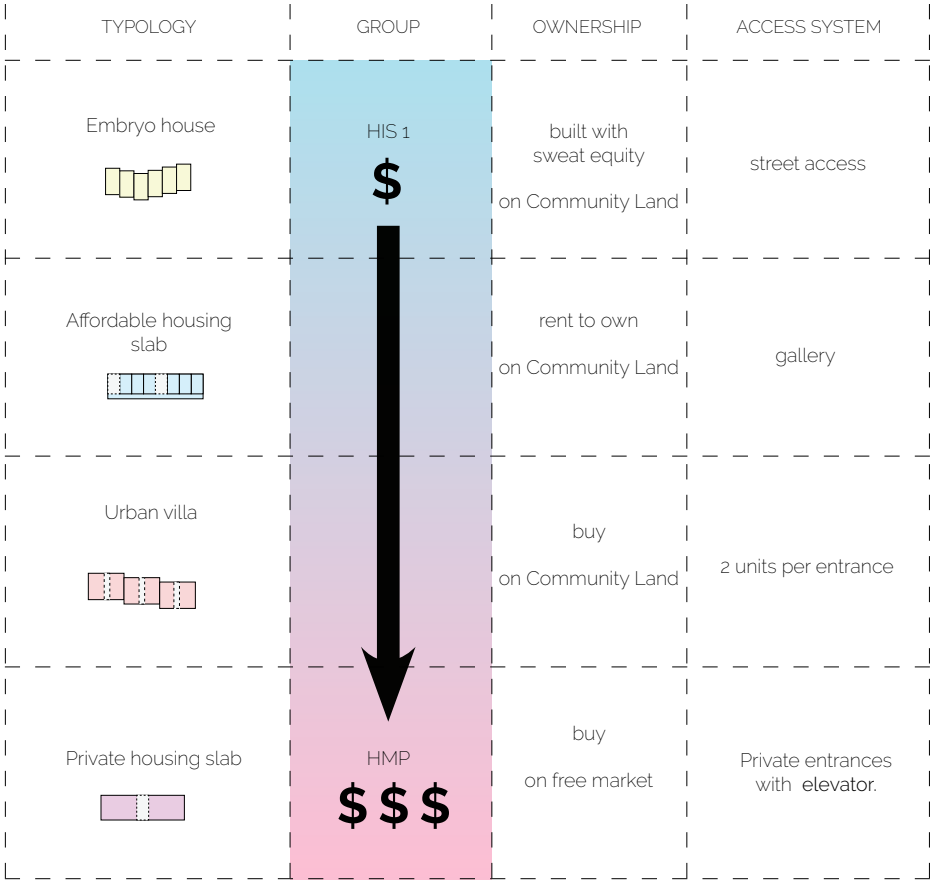
GROUP	UNIT SIZE	ROOMS	GROUND FLOOR
< HIS 1 **$**	30-60 m²	living room 2 bedrooms 1 bathroom	Extra bedroom Rent-out room Informal shop
HIS 1 **$ $**	30-60 m²	(collective) living room 2-4 bedrooms 1-2 bathroom	Garage space (In)formal Shop
HIS 2 **$ $ $**	40-60 m²	(collective) living room 2-4 bedrooms 1-2 bathroom	Garage space (In)formal Shop
HMP **$ $ $ $**	70-80 m²	living room 4 bedrooms 2 bathrooms	Garage space Formal shops

TYPOLOGICAL STRATEGY

PROMOTE SOCIAL MIX THROUGH TYPOLOGICAL MIX

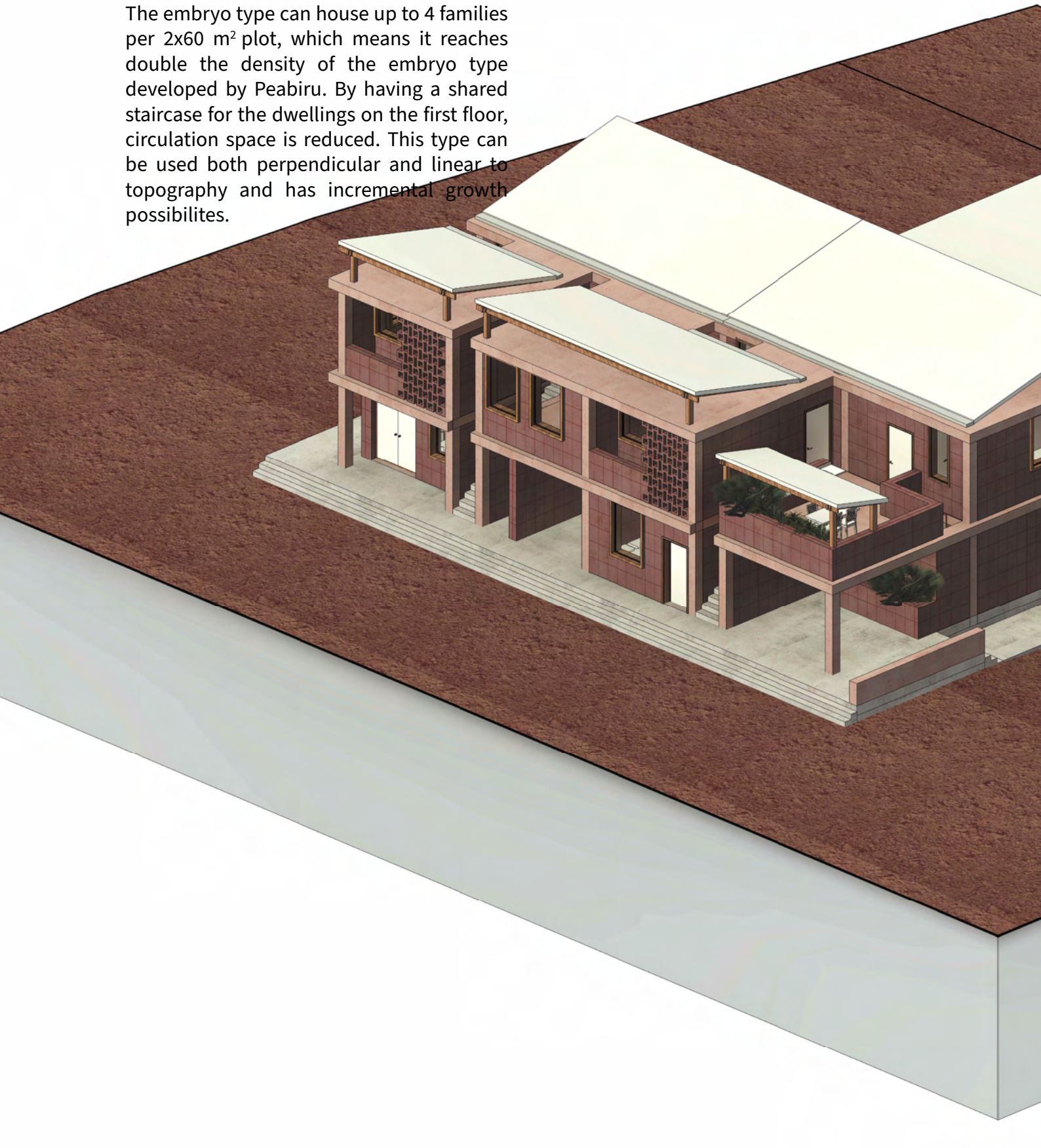


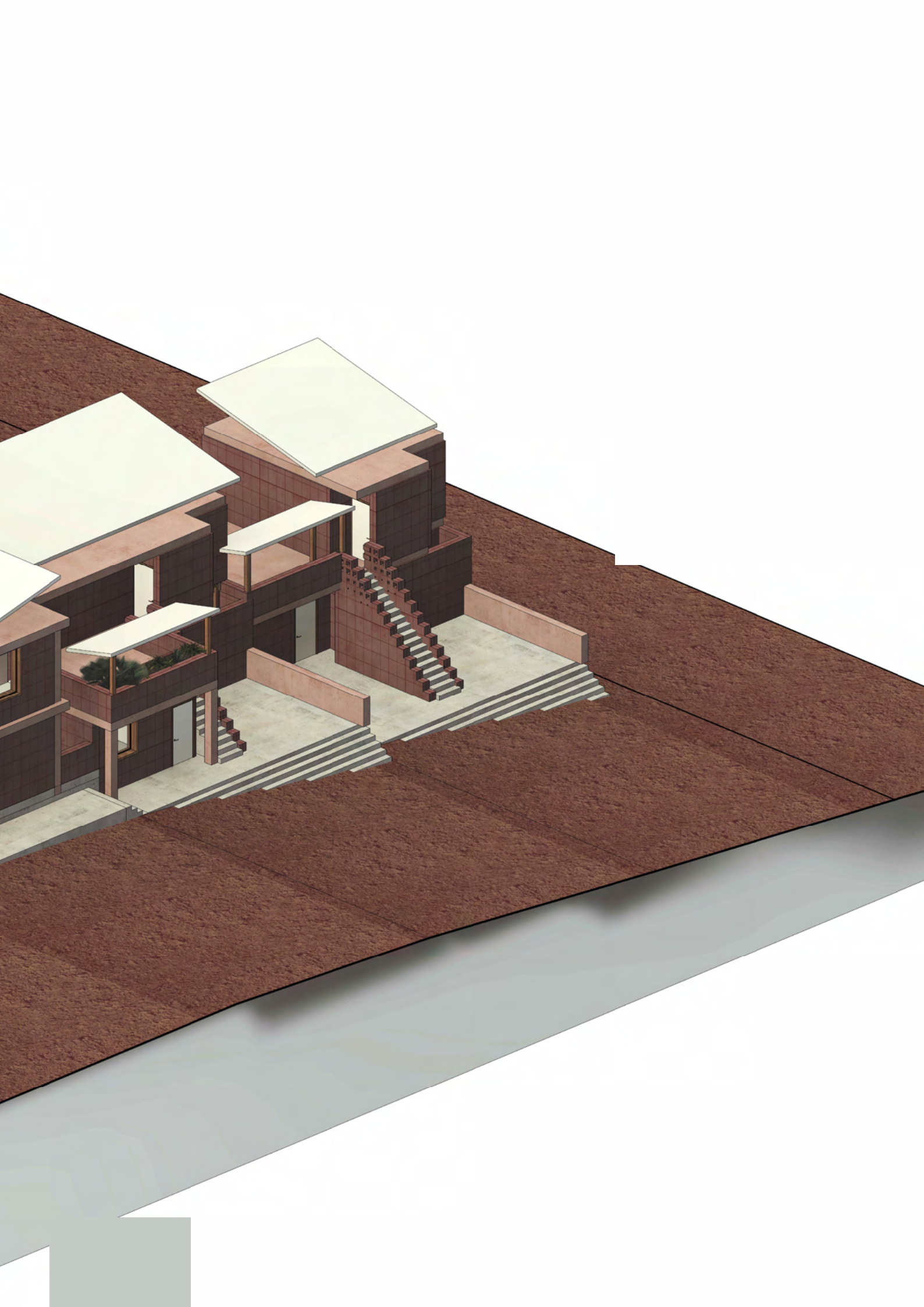
TYPES


TYPOLOGY
GROUP
OWNERSHIP
ACCESS SYSTEM
Embryo house
HIS 1
$
built with sweat equity
on Community Land
street access
Affordable housing slab
rent to own
on Community Land
gallery
Urban villa
buy
on Community Land
2 units per entrance
Private housing slab
HMP
$ $ $
buy
on free market
Private entrances with elevator.

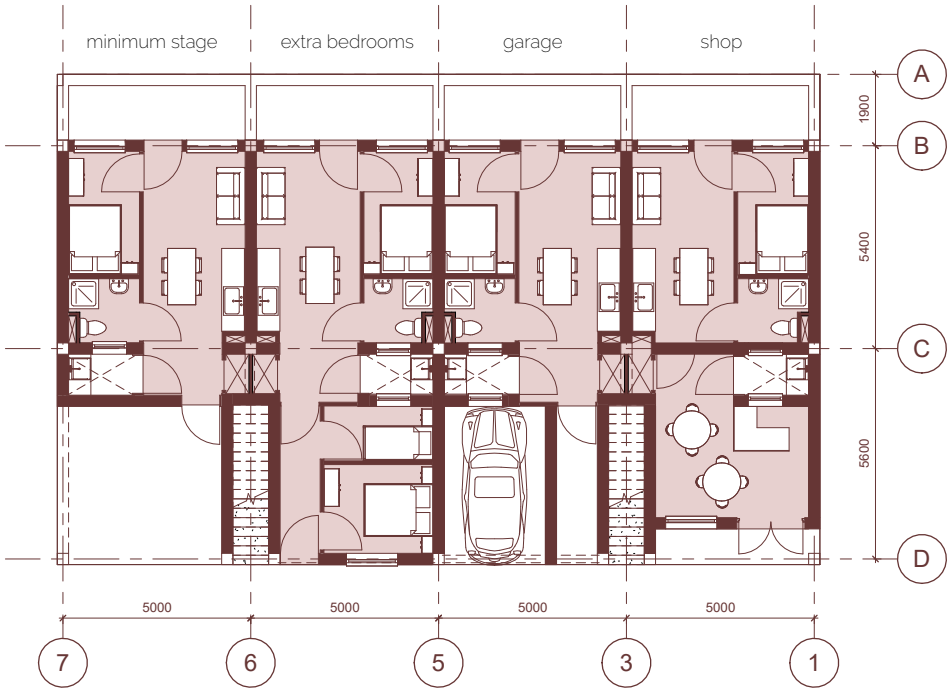
EMBRYO HOUSE

The embryo type can house up to 4 families per 2x60 m^2 plot, which means it reaches double the density of the embryo type developed by Peabiru. By having a shared staircase for the dwellings on the first floor, circulation space is reduced. This type can be used both perpendicular and linear to topography and has incremental growth possibilites.





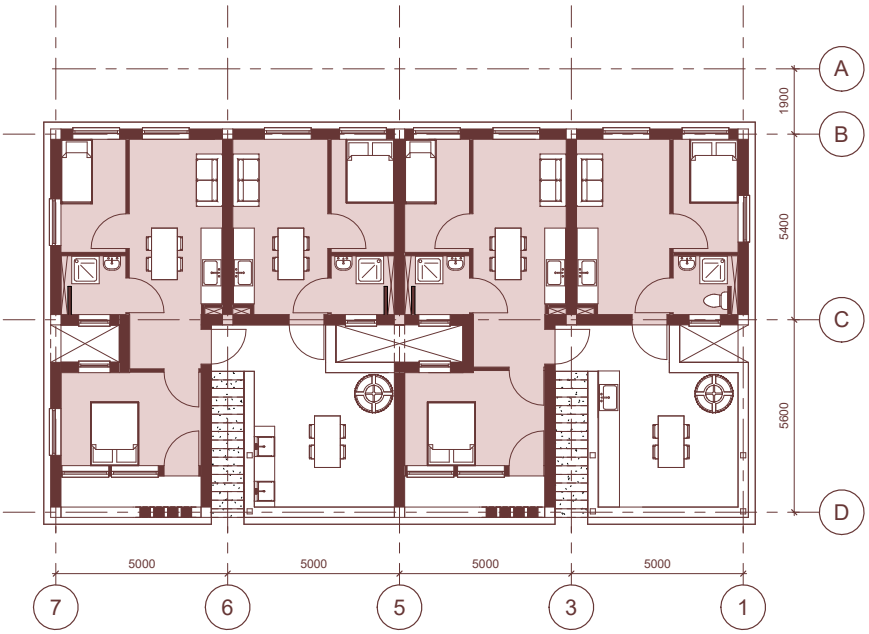
GROUND FLOOR PLAN



incremental growth possibilties and flexible and adaptable use of extra space on plot.

1:200

FLOOR PLANS DUPLEX FIRST FLOOR



- 2 seperate units

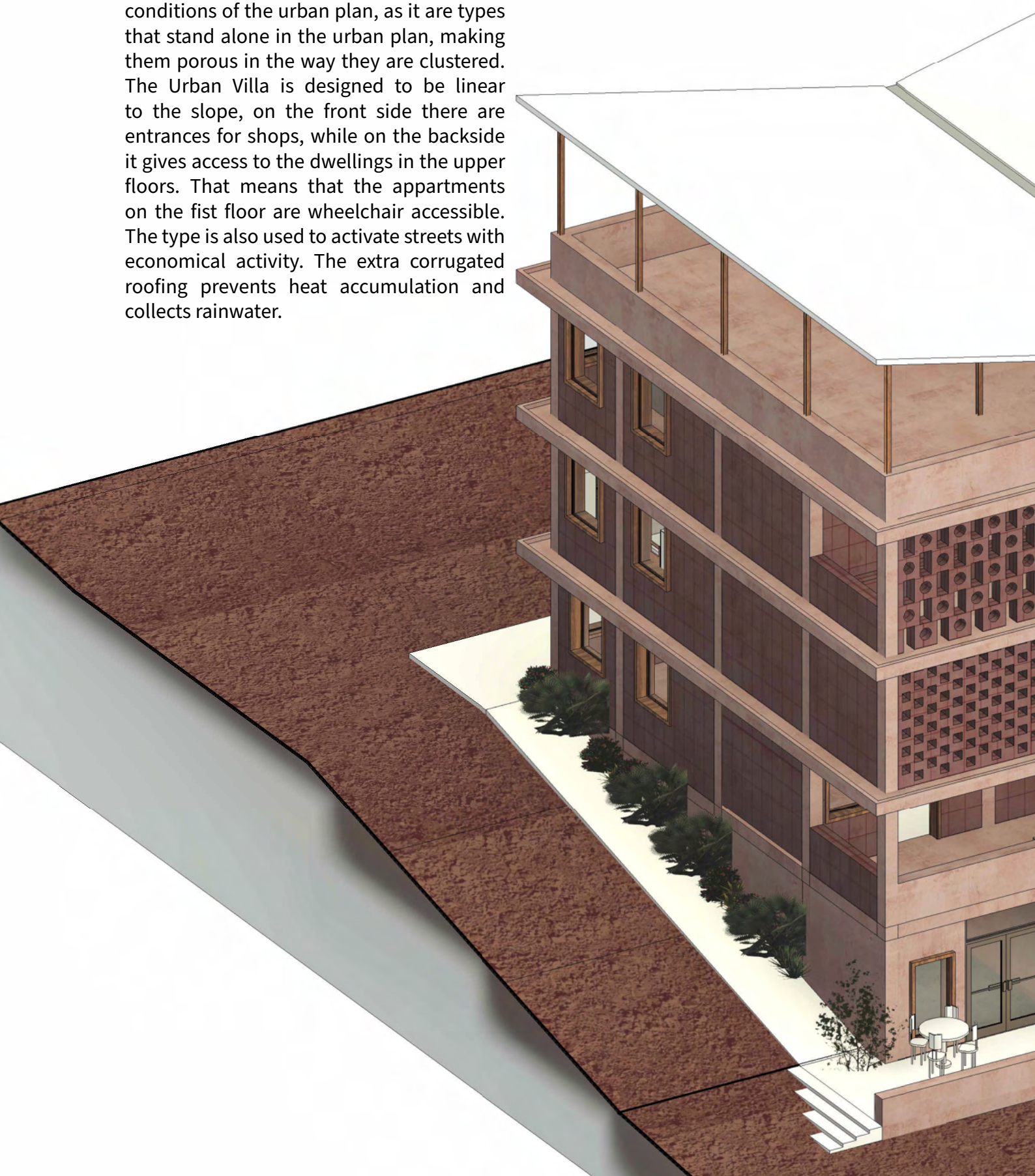
or

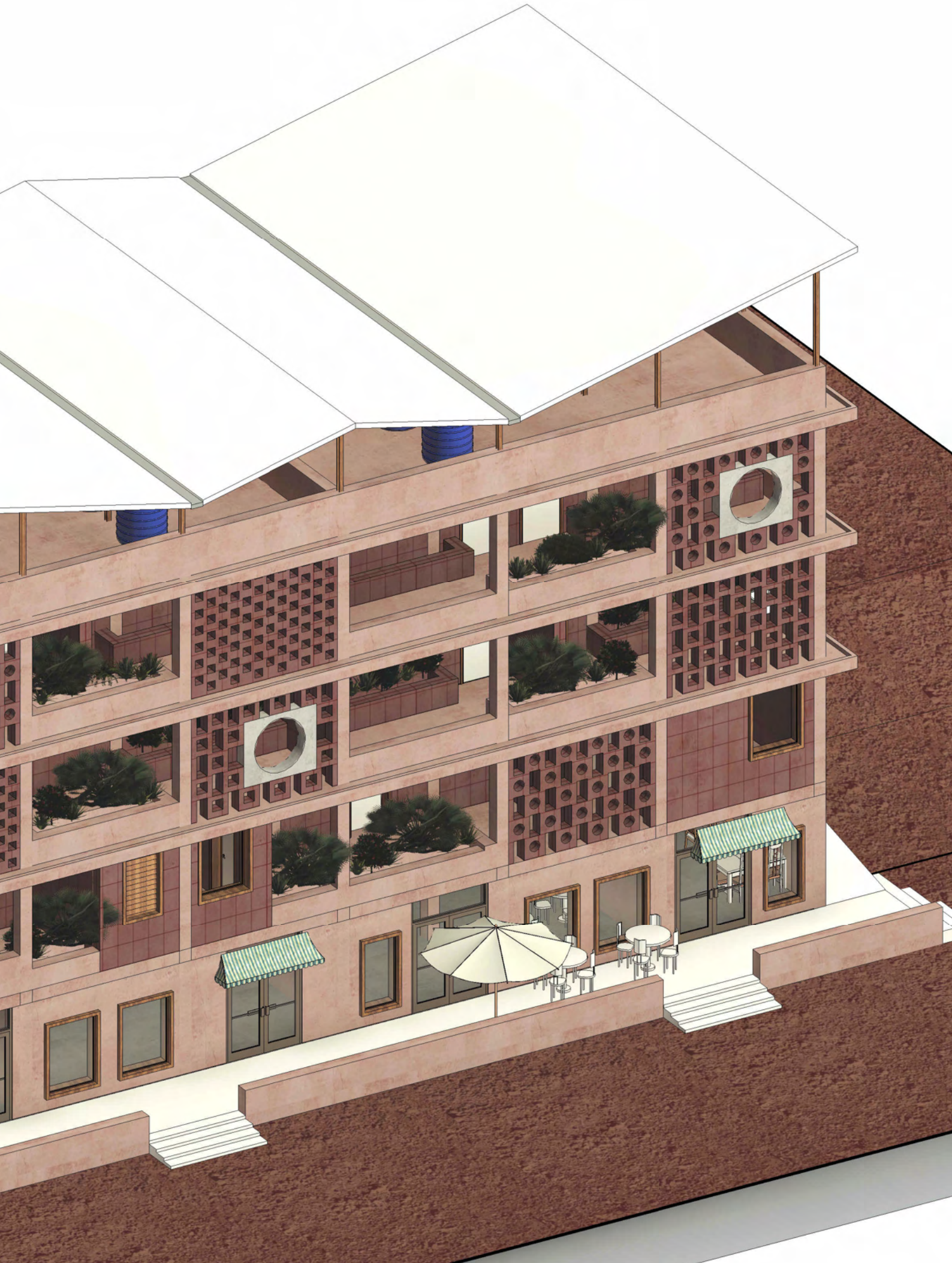
- 2 families/
generations of
single family

1:200

URBAN VILLA

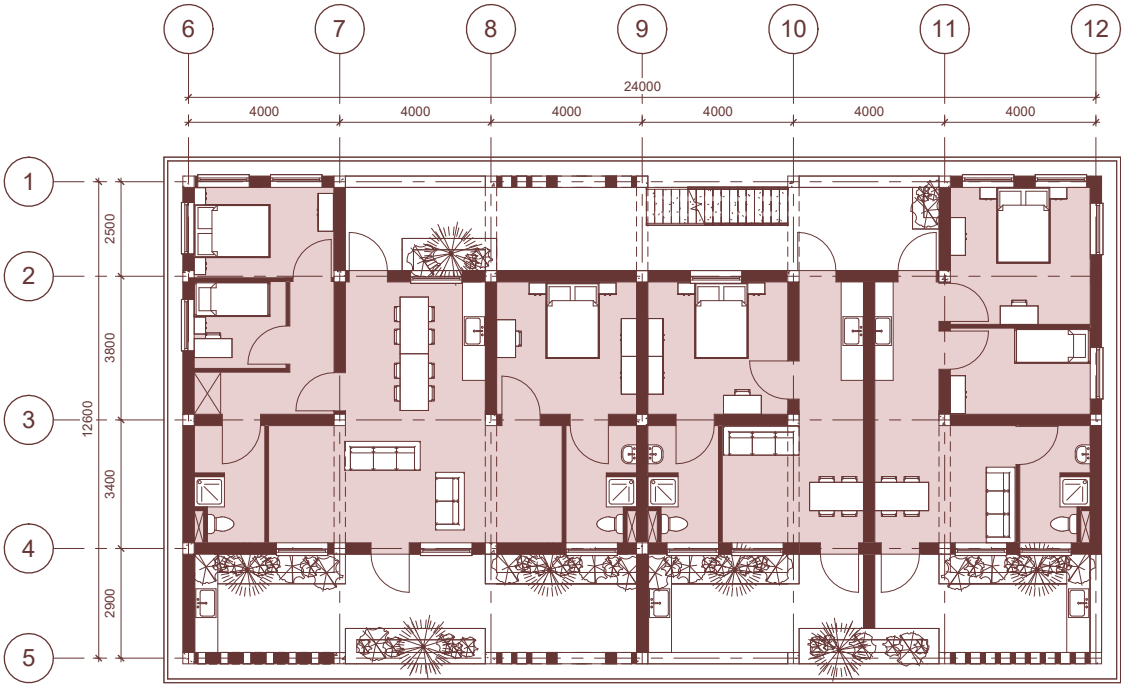
The Peabiru type is designed for the edge conditions of the urban plan, as it are types that stand alone in the urban plan, making them porous in the way they are clustered. The Urban Villa is designed to be linear to the slope, on the front side there are entrances for shops, while on the backside it gives access to the dwellings in the upper floors. That means that the appartments on the fist floor are wheelchair accessible. The type is also used to activate streets with economical activity. The extra corrugated roofing prevents heat accumulation and collects rainwater.





FLOOR PLANS

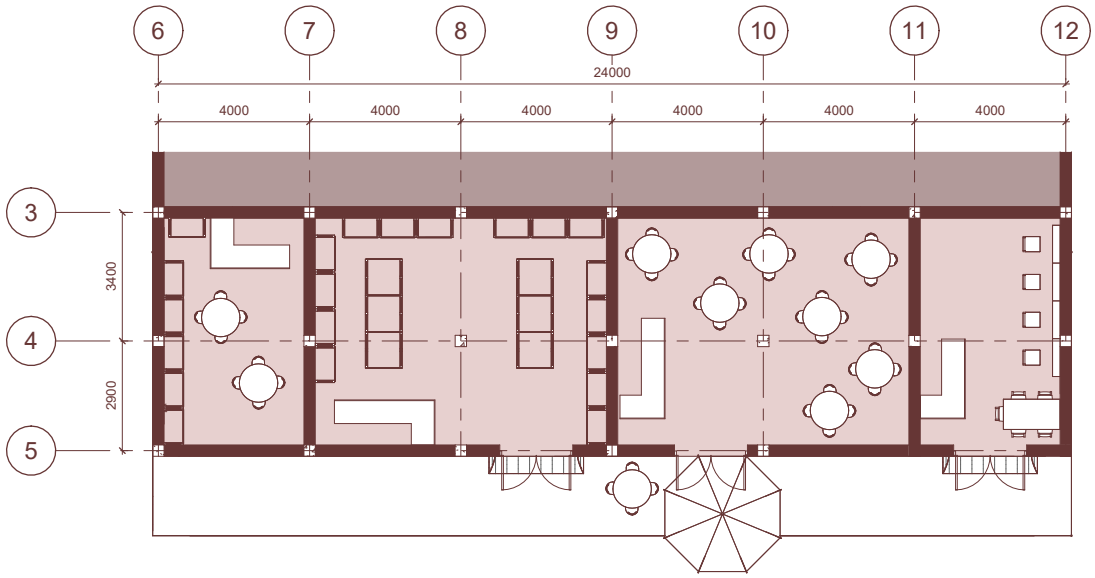
- Four units share access system



1:200

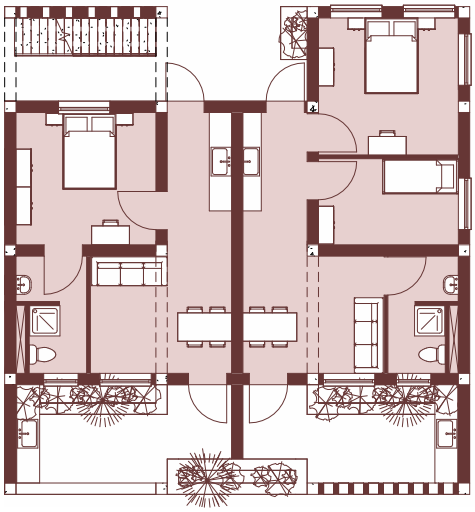
GROUND FLOOR PLAN

- Shops on ground floor

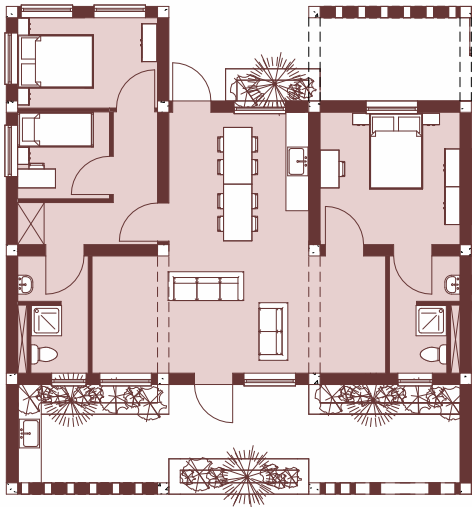


1:200

PRIVATE DUPLEX



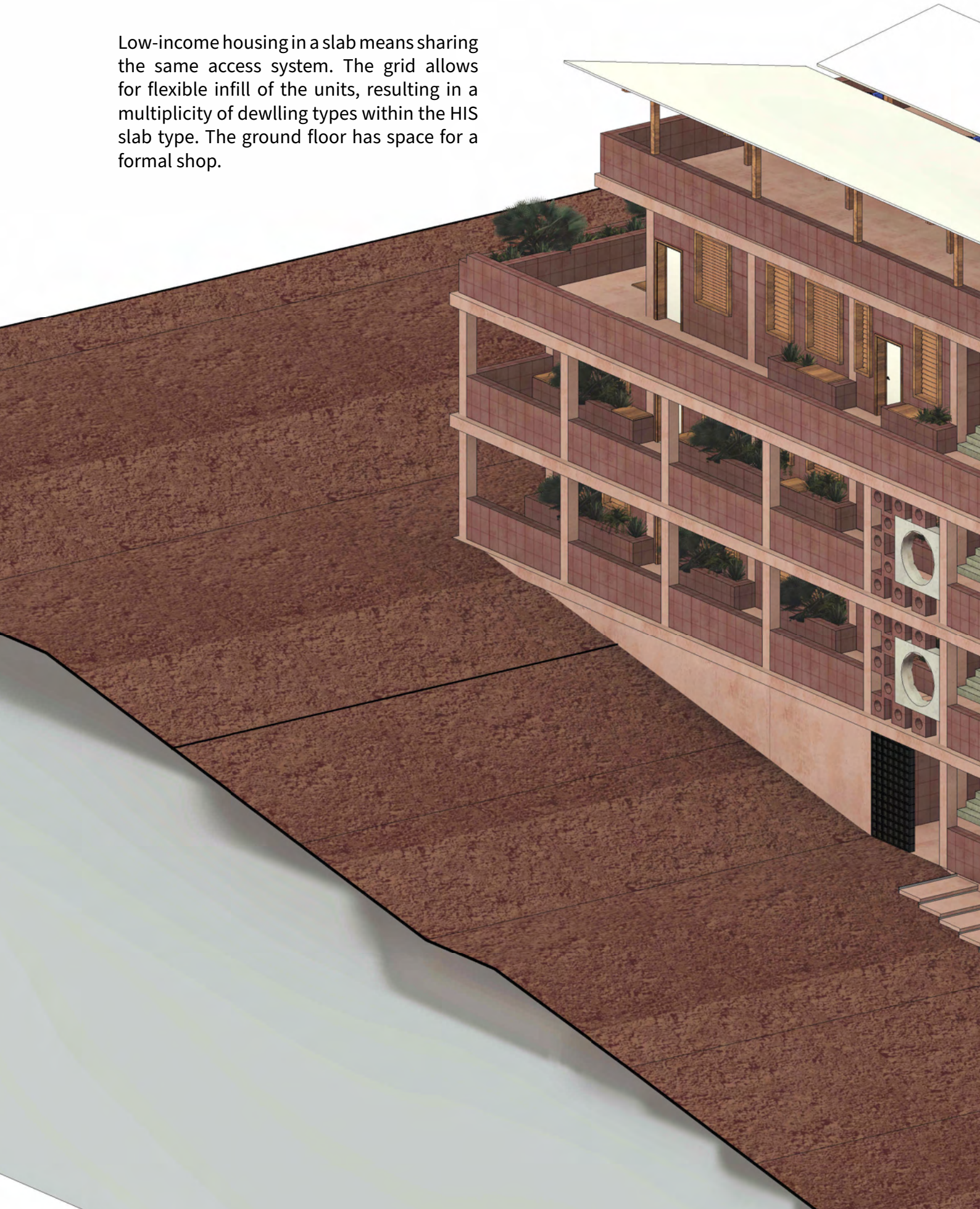
1:200



1:200

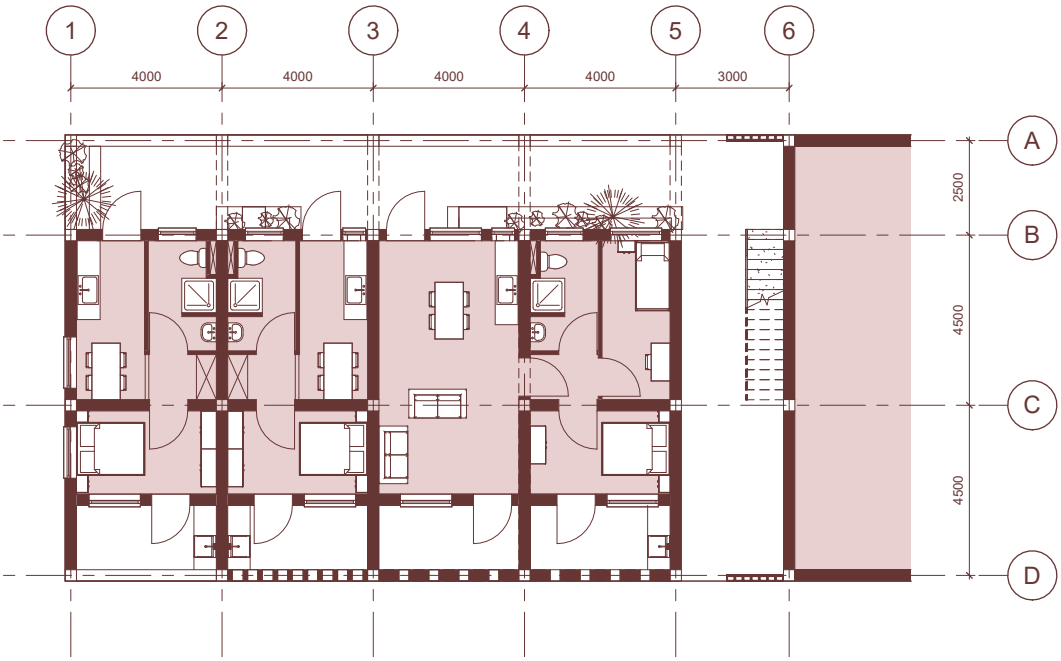
HIS SLAB

Low-income housing in a slab means sharing the same access system. The grid allows for flexible infill of the units, resulting in a multiplicity of dewlling types within the HIS slab type. The ground floor has space for a formal shop.

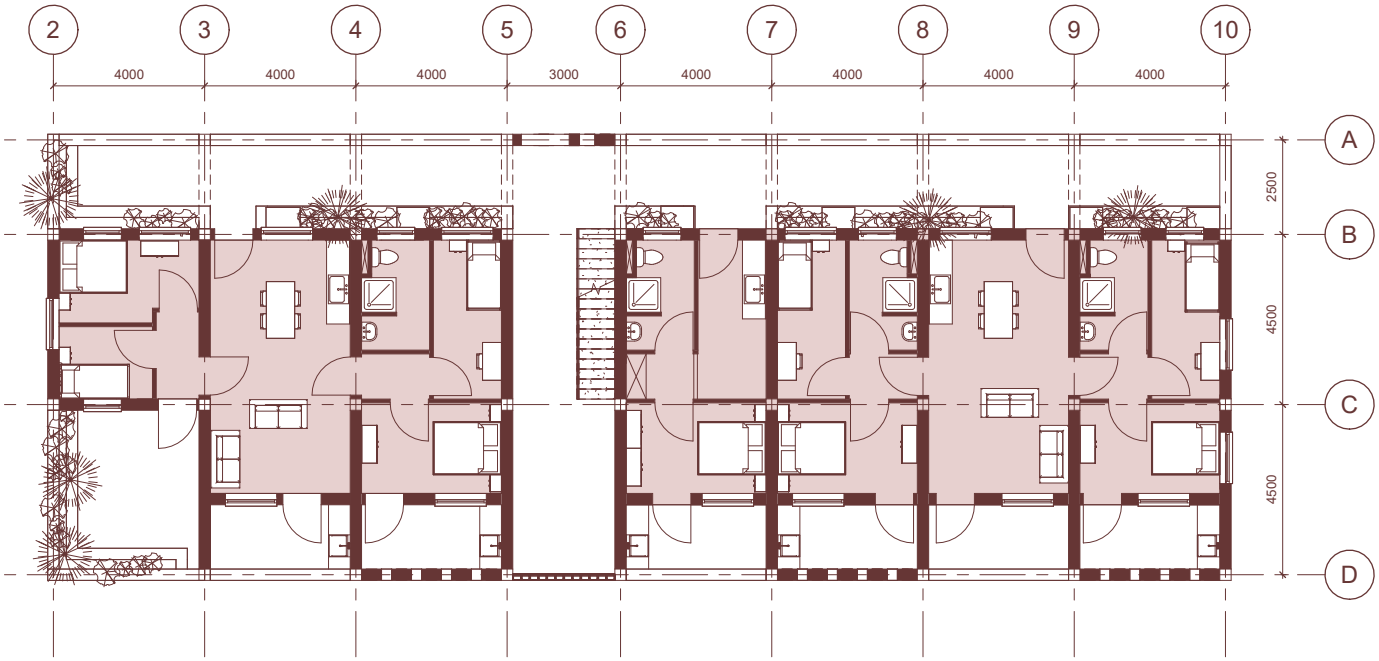


FLOOR PLANS

ground floor

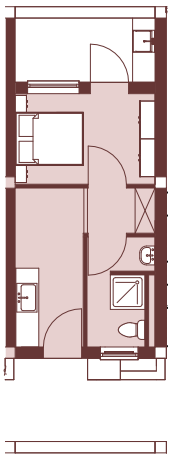


2nd floor

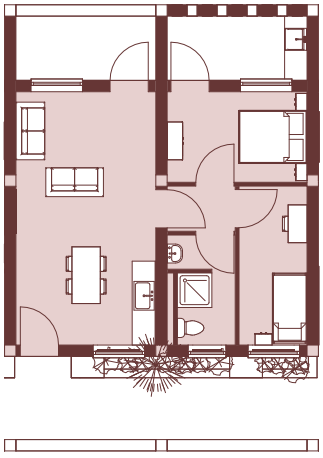


1:200

single unit appartment

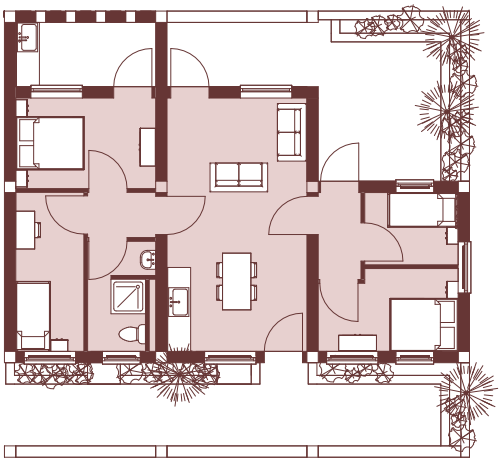


2 units appartment



1:200

2,5 units appartment



3 units appartment

1:200

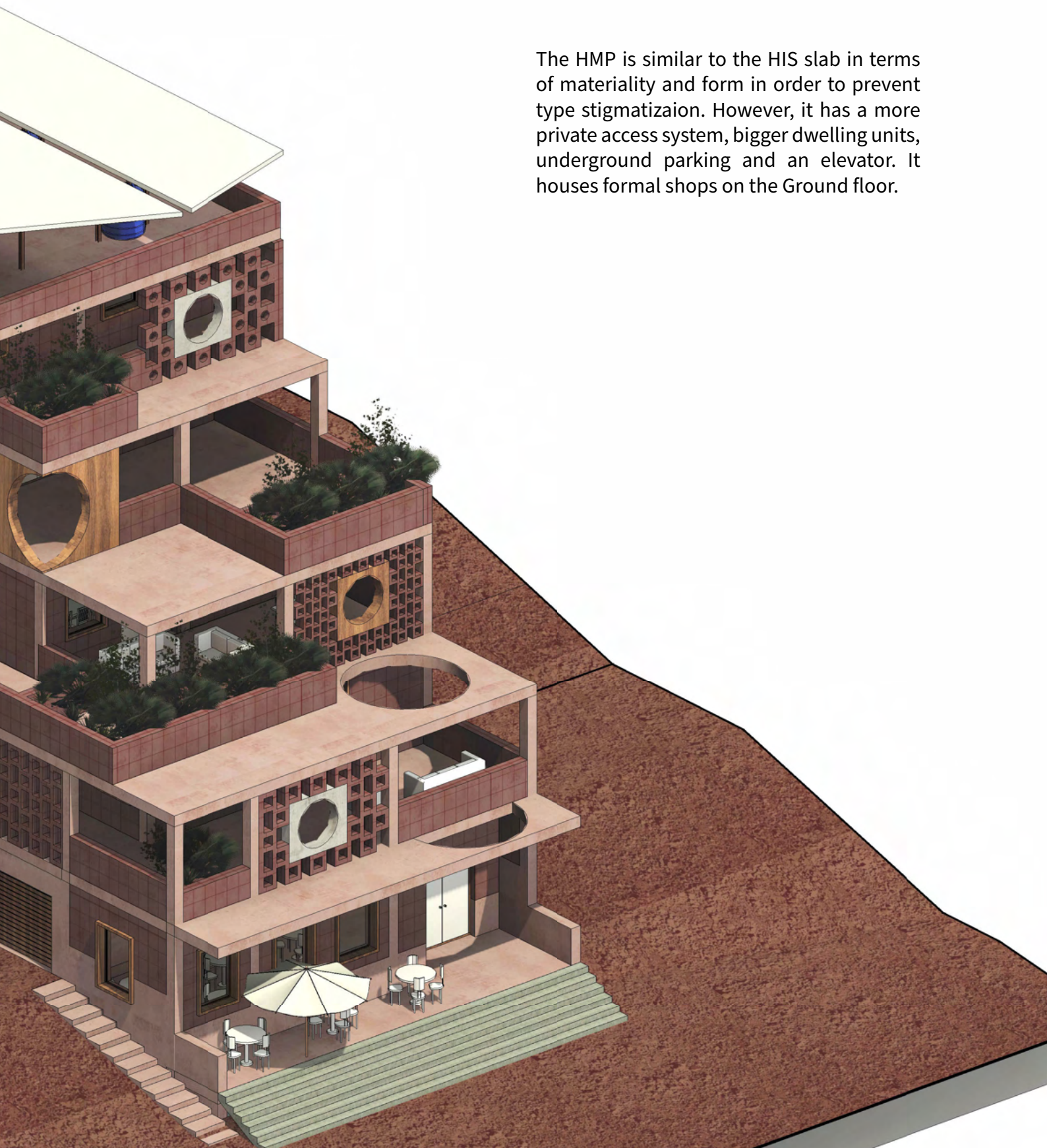
SECTION

- Water tank on beam linear to view
- Windows openings go up to floors

1:200

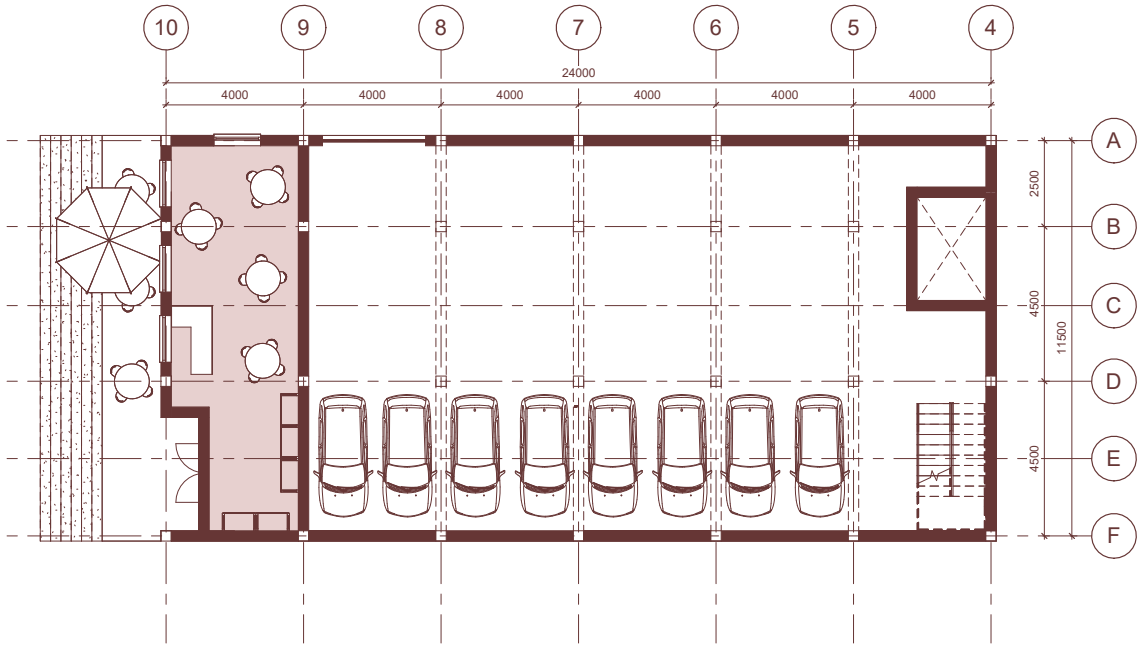
HMP SLAB

The HMP is similar to the HIS slab in terms of materiality and form in order to prevent type stigmatizaion. However, it has a more private access system, bigger dwelling units, underground parking and an elevator. It houses formal shops on the Ground floor.

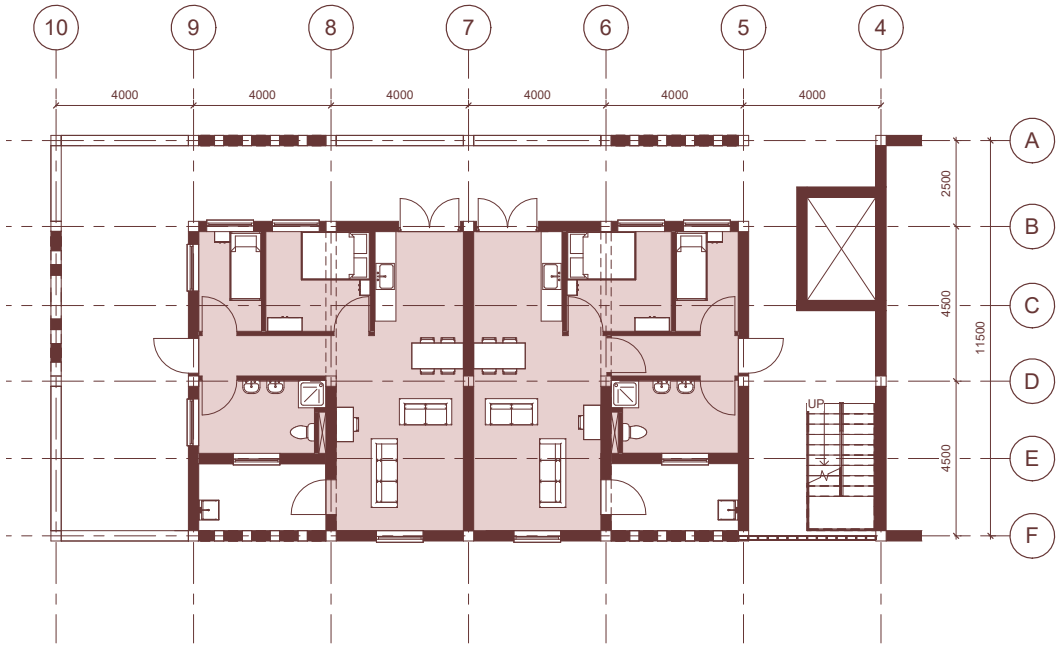


FLOOR PLANS

ground floor



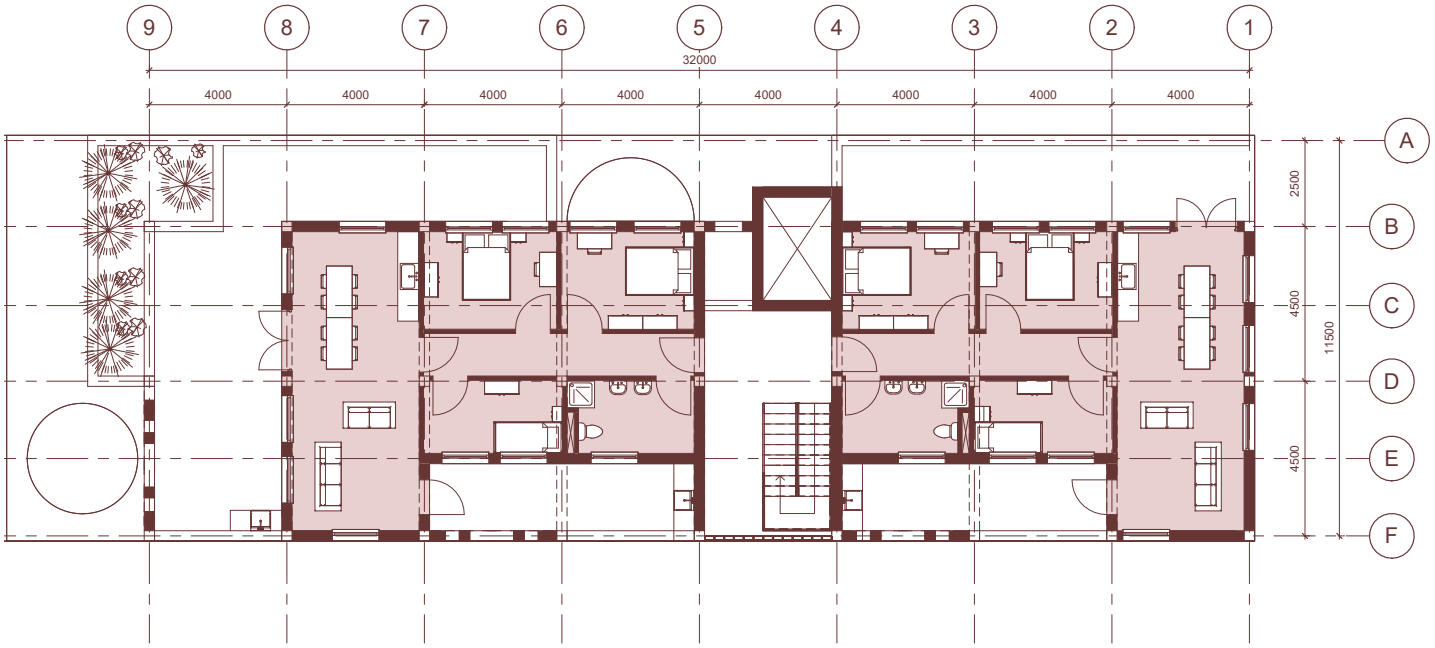
1st floor



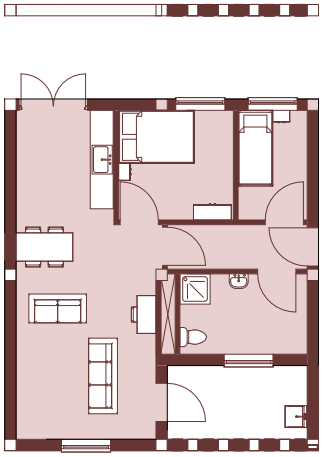
1:200

FLOOR PLANS

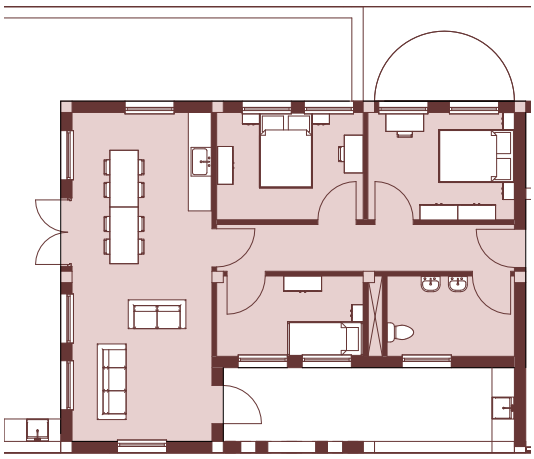
2nd floor



2 unit appartment



3 unit appartment



1:200

TYPES WITHIN TYPES

UNIT SIZES

EMBRYO

23 m² HIS 1

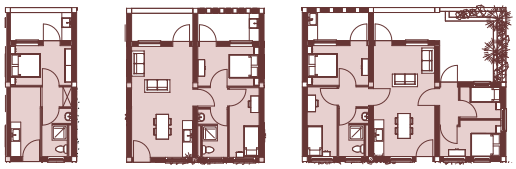
26 m² HIS 1

37 m² HIS 1

41 m² HIS 1

30 m²/family HIS 1
co-living

HIS SLAB



24 m² HIS 1

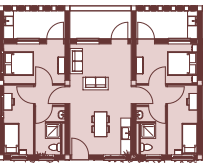
48 m² HIS 2

33 m²/family HIS 1 or 2
co-living

HIS 1

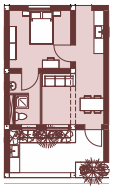
URBAN VILLA

HMP SLAB



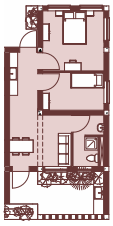
37 m²/family
co-living

HIS 1 or 2



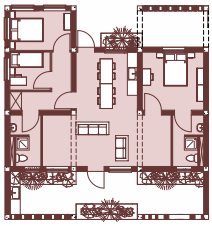
36 m²

HIS 1



44 m²

HIS 2

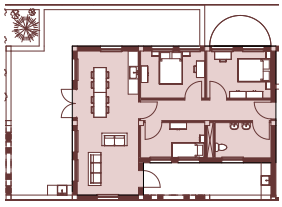


42 m²/family
co-living

HIS 1 or 2

64 m²

HMP

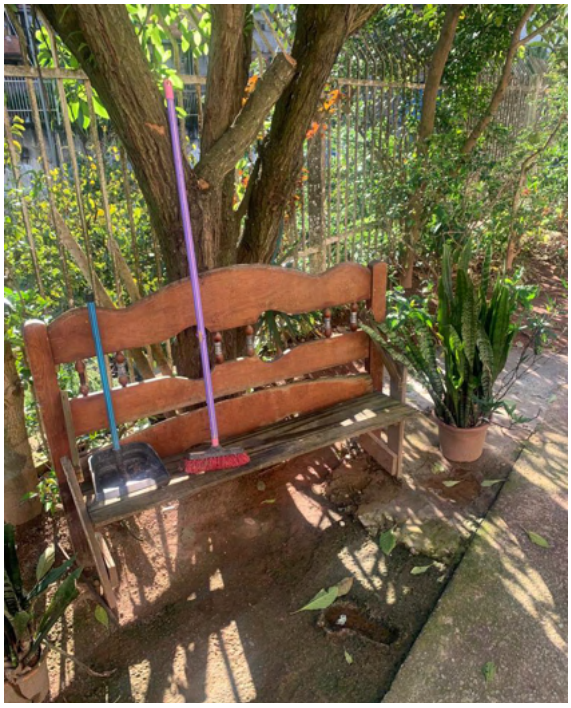


92 m²

HMP

HMP

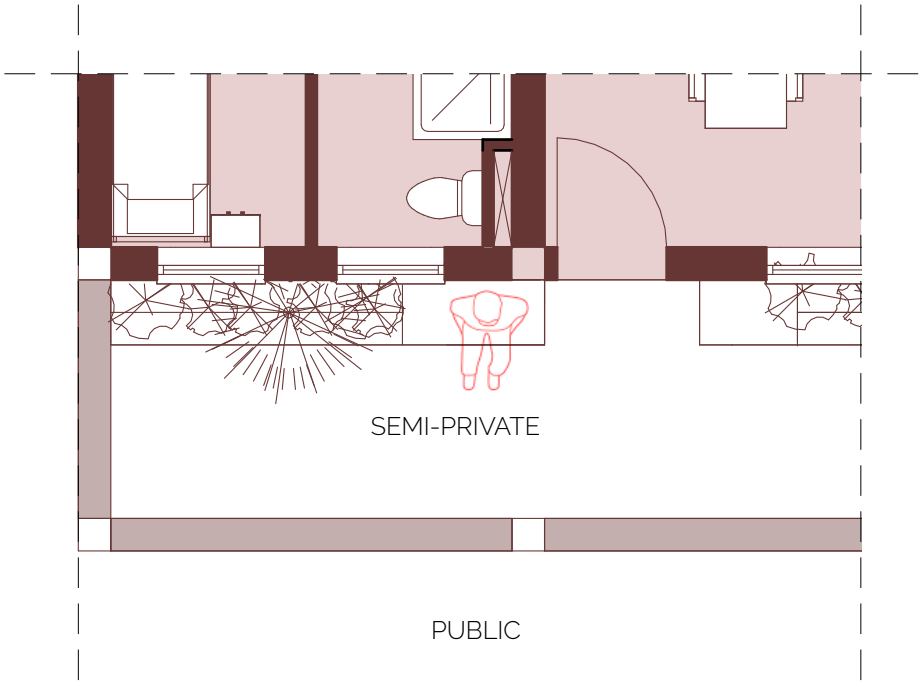
NATURE CULTURE ASSEMBLAGE



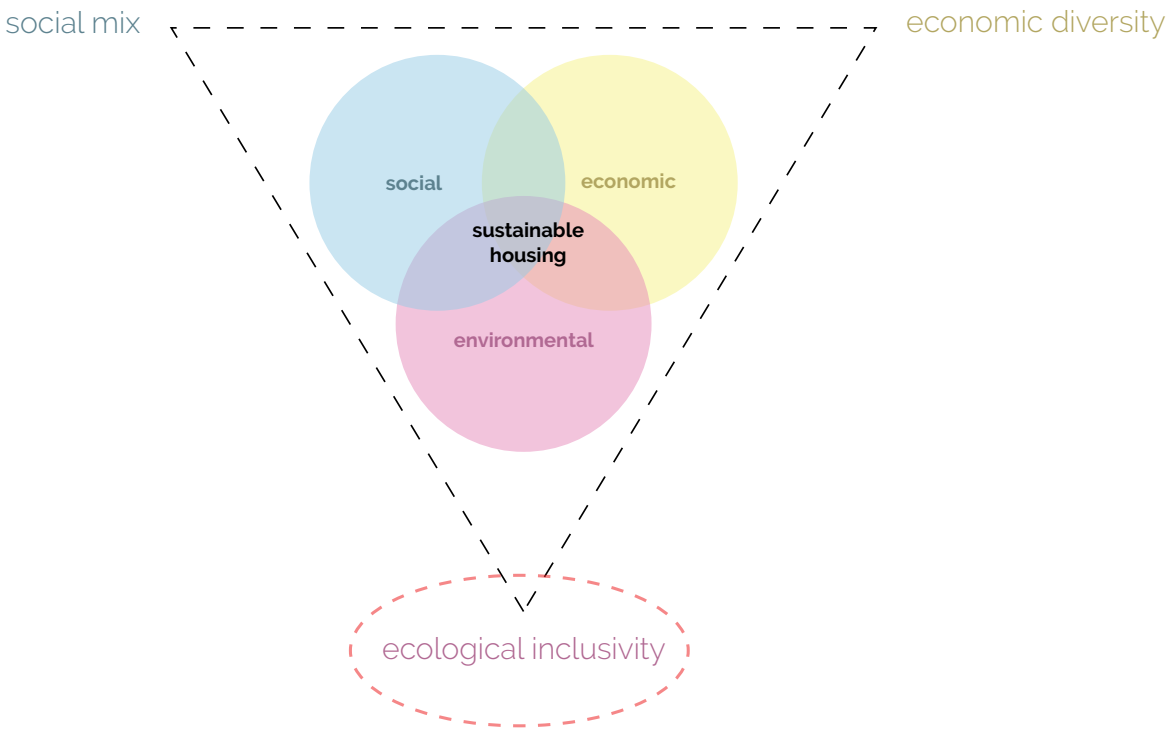
An important afro-brazilian religious practice: the plant espada-de-são-jorge is a sign of being at peace with the spirits. (Image taken by author at Santo Amaro V).

The semi-private space becomoes a place for interaction with other vegetal, animal, technological and spiritual entities.

Local practices implemented in design



NATURE CULTURE ASSEMBLAGE



URBAN STRATEGY

density currently: 84Dw/ha

density Peabiru: 84Dw/ha

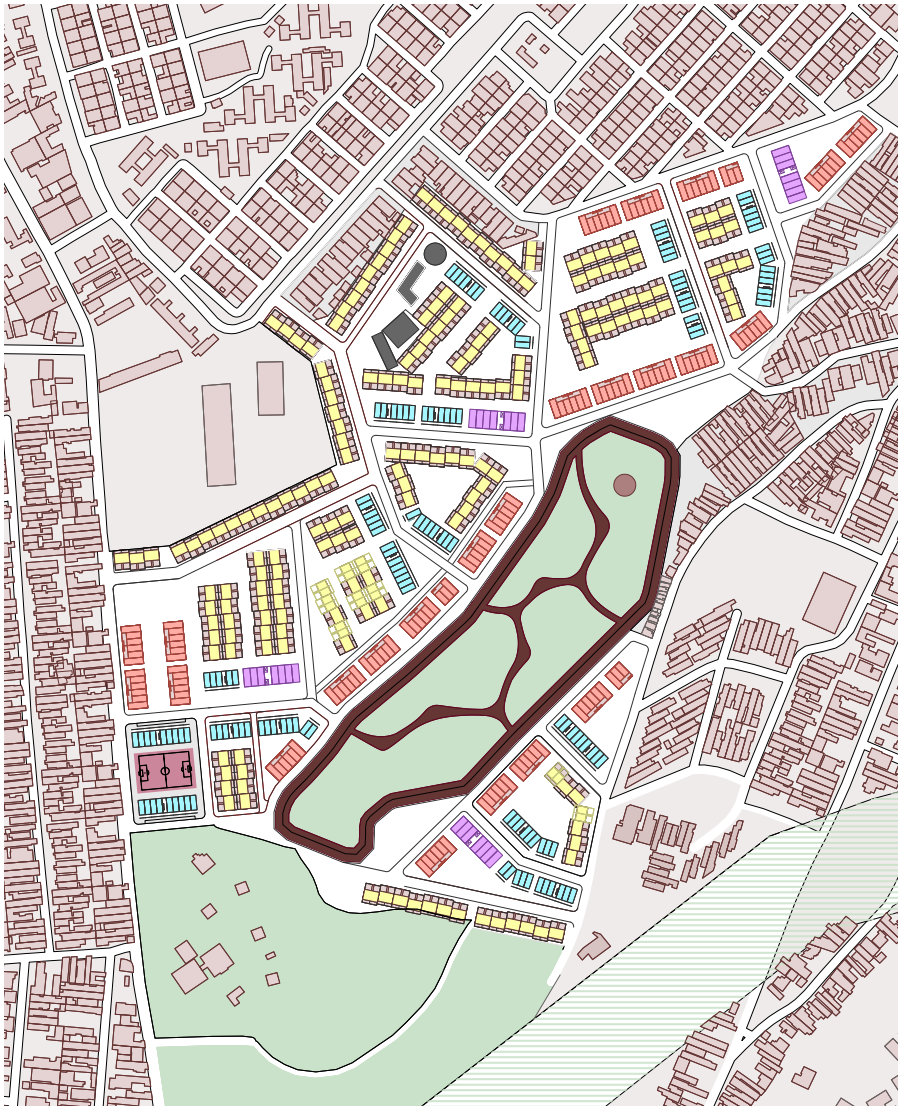
Preserve
- community centre
- church
- football court

Add:
- Playgrounds
- Circular park
- Market square
- Construction workshop
- Unprescribed public spaces

Roadpattern and types logic.

Distribution of the types:
- Urban villa at edge conditions for porosity.
- Slabs and embryo houses densify.
- HMP type mixed with HIS types.

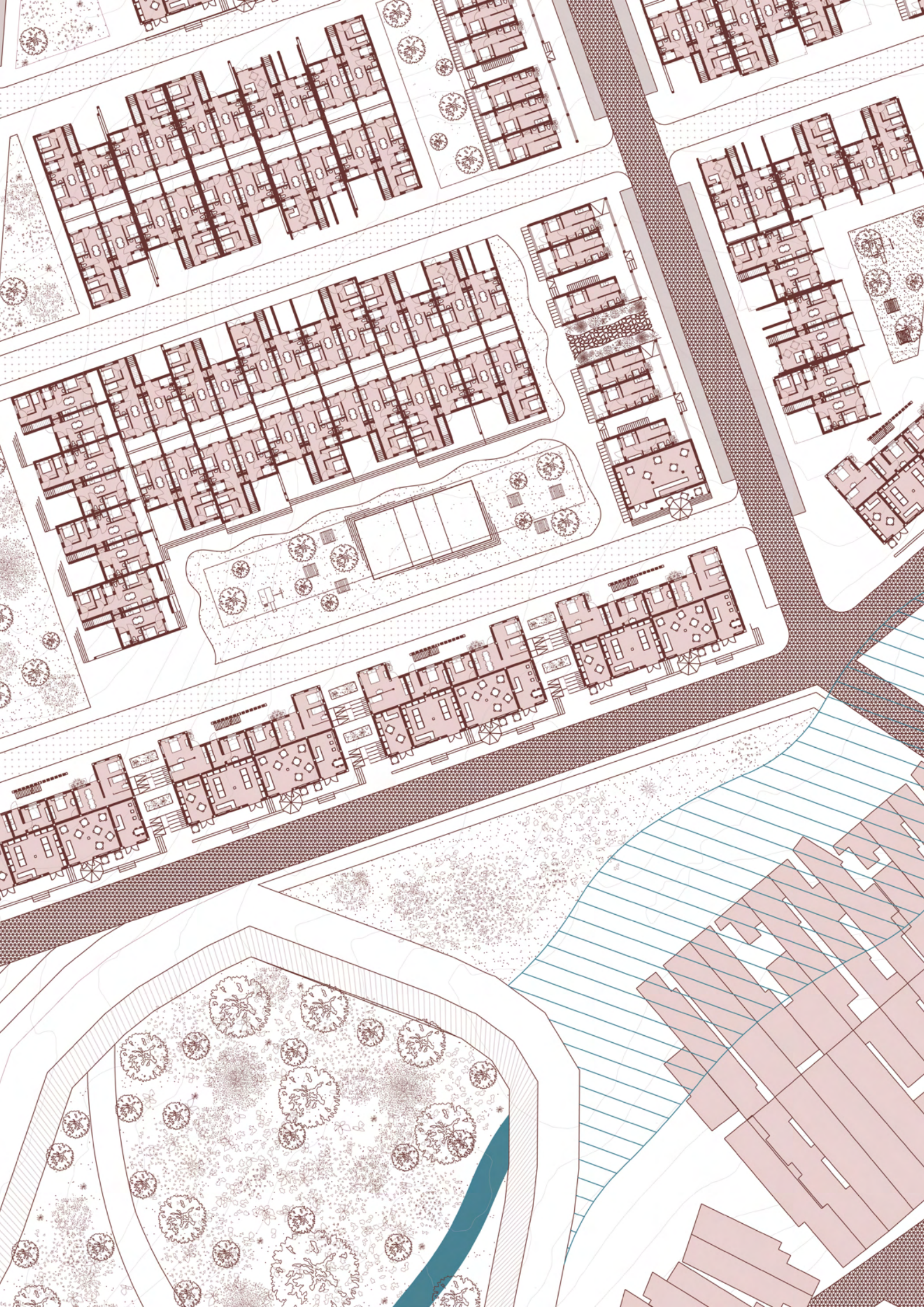
Activate the ecological edge with economic activity.

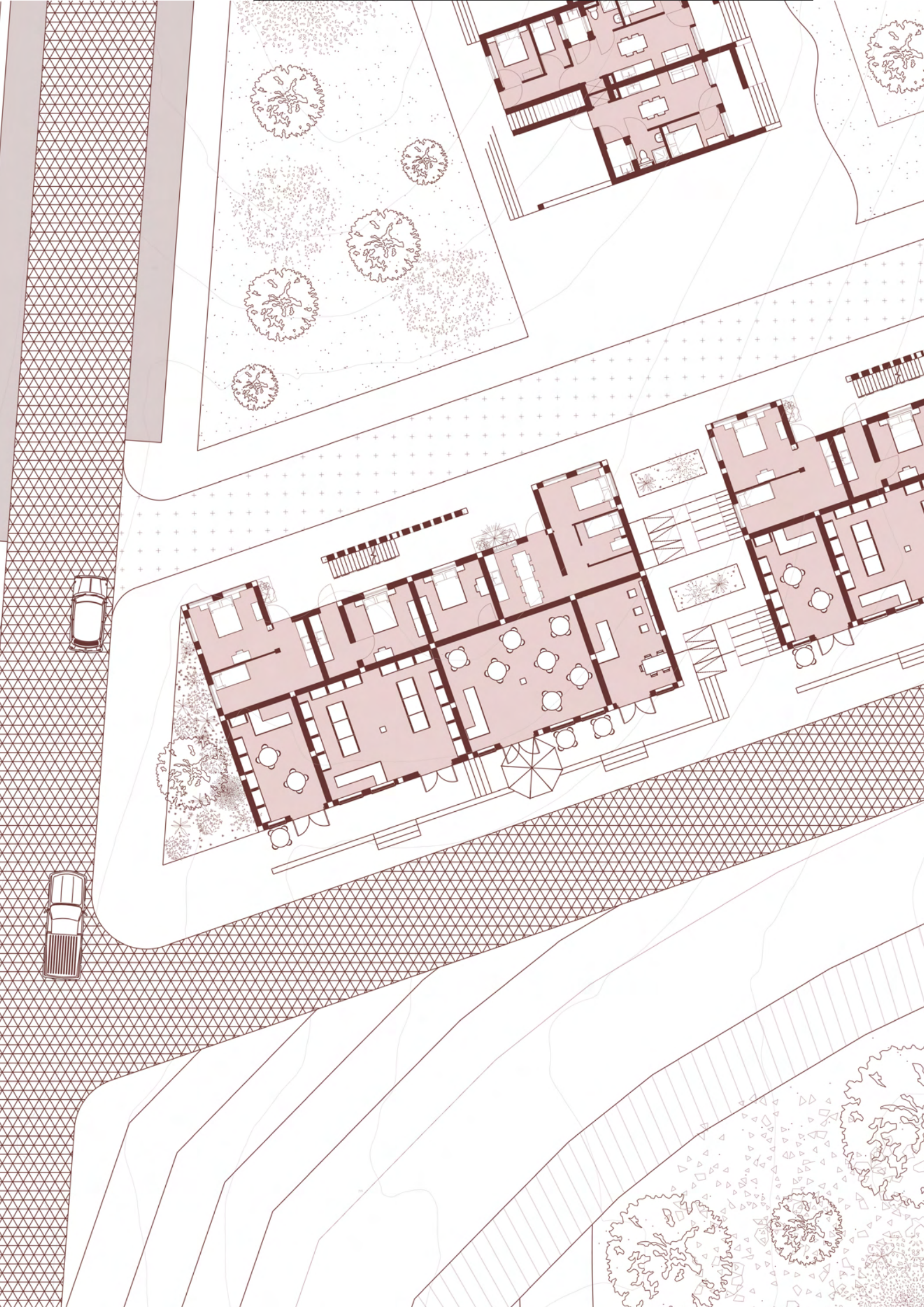


DENSITY: 110 Dw/ha

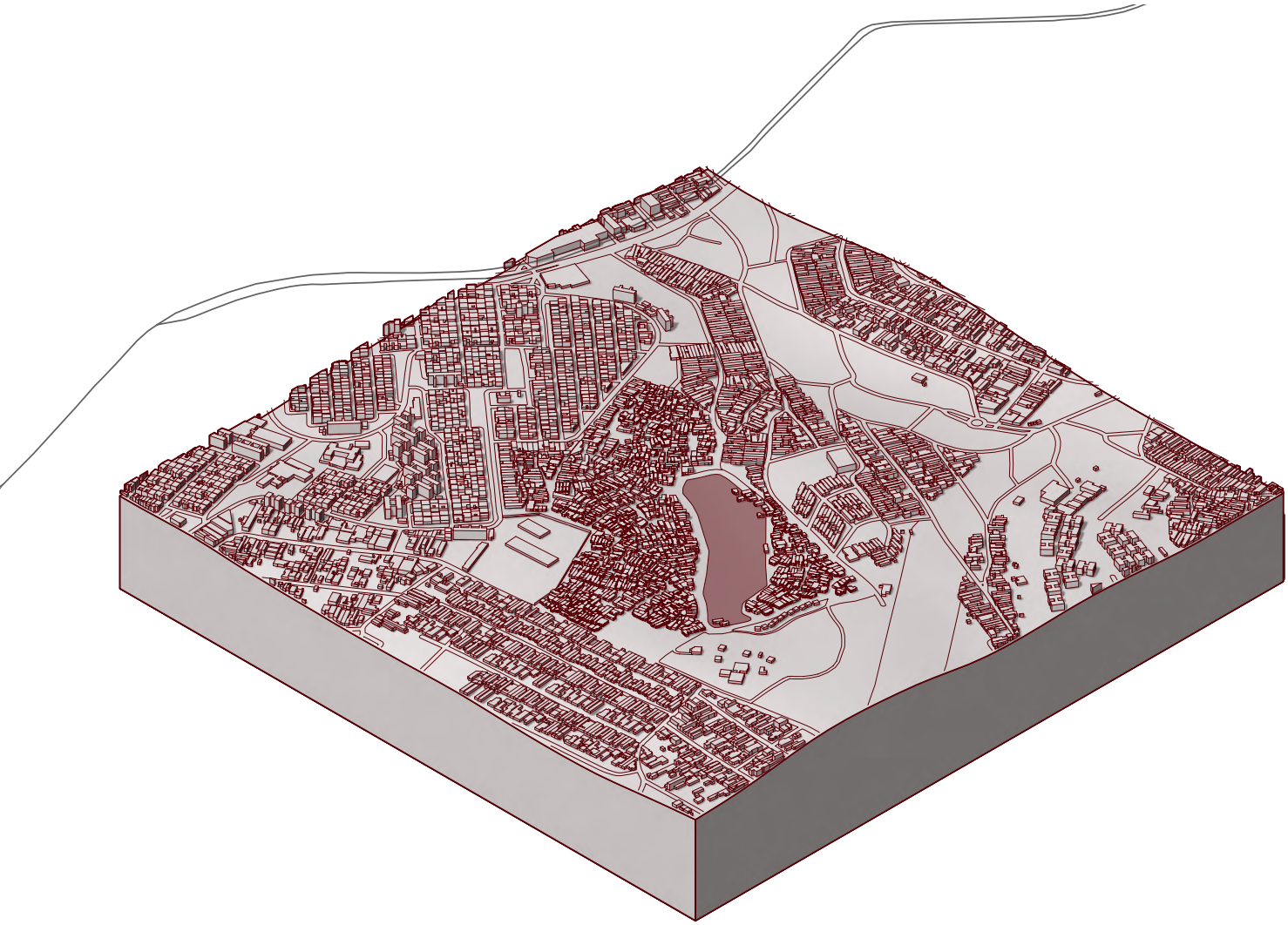
dwellings HIS: 1332
dwellings HMP:36

m^2 HIS 1: 61%
m^2 HIS 2: 15%
m^2 HMP: 4%
m^2 amenities: 20%



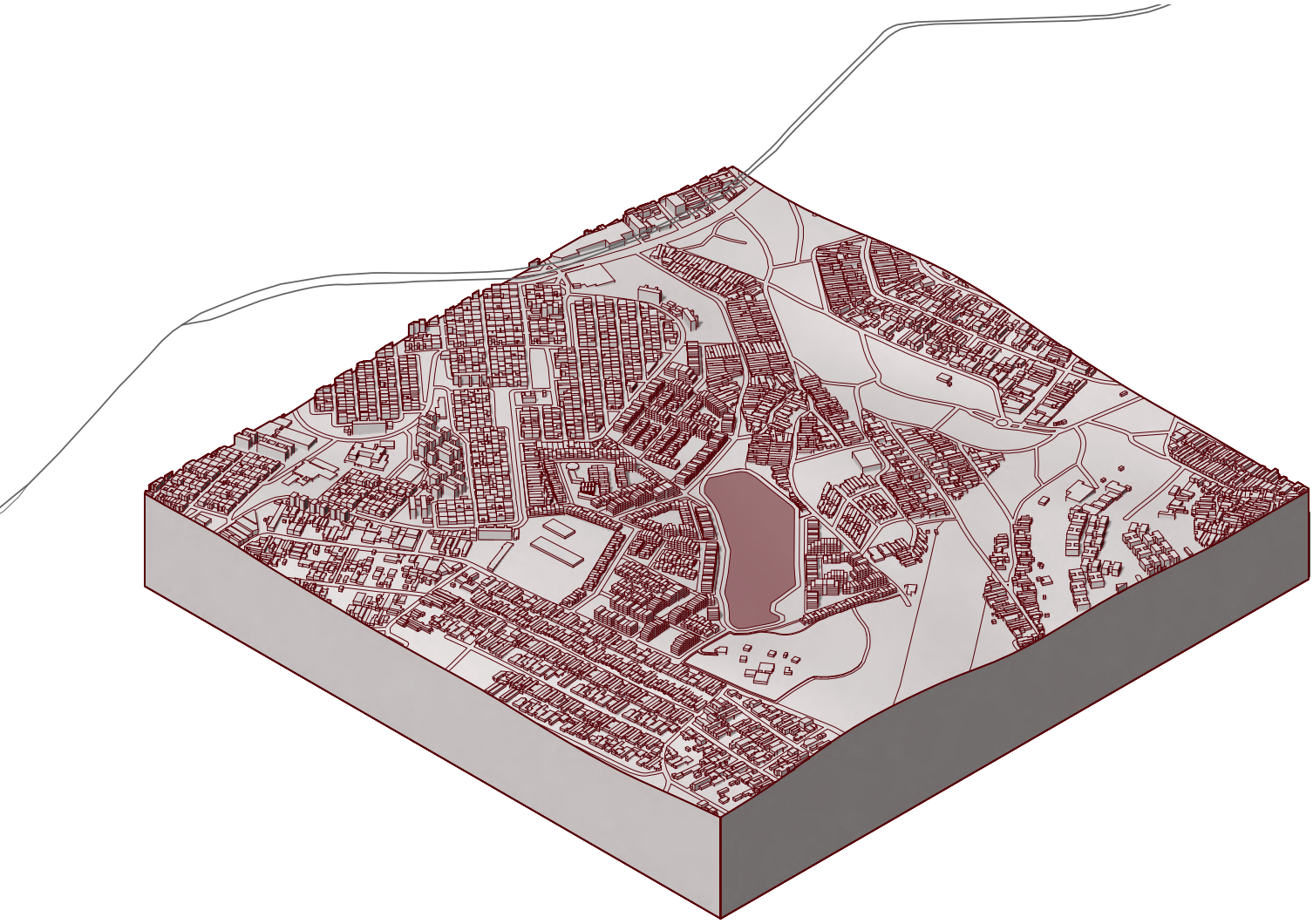


DENSITY ANCHIETA



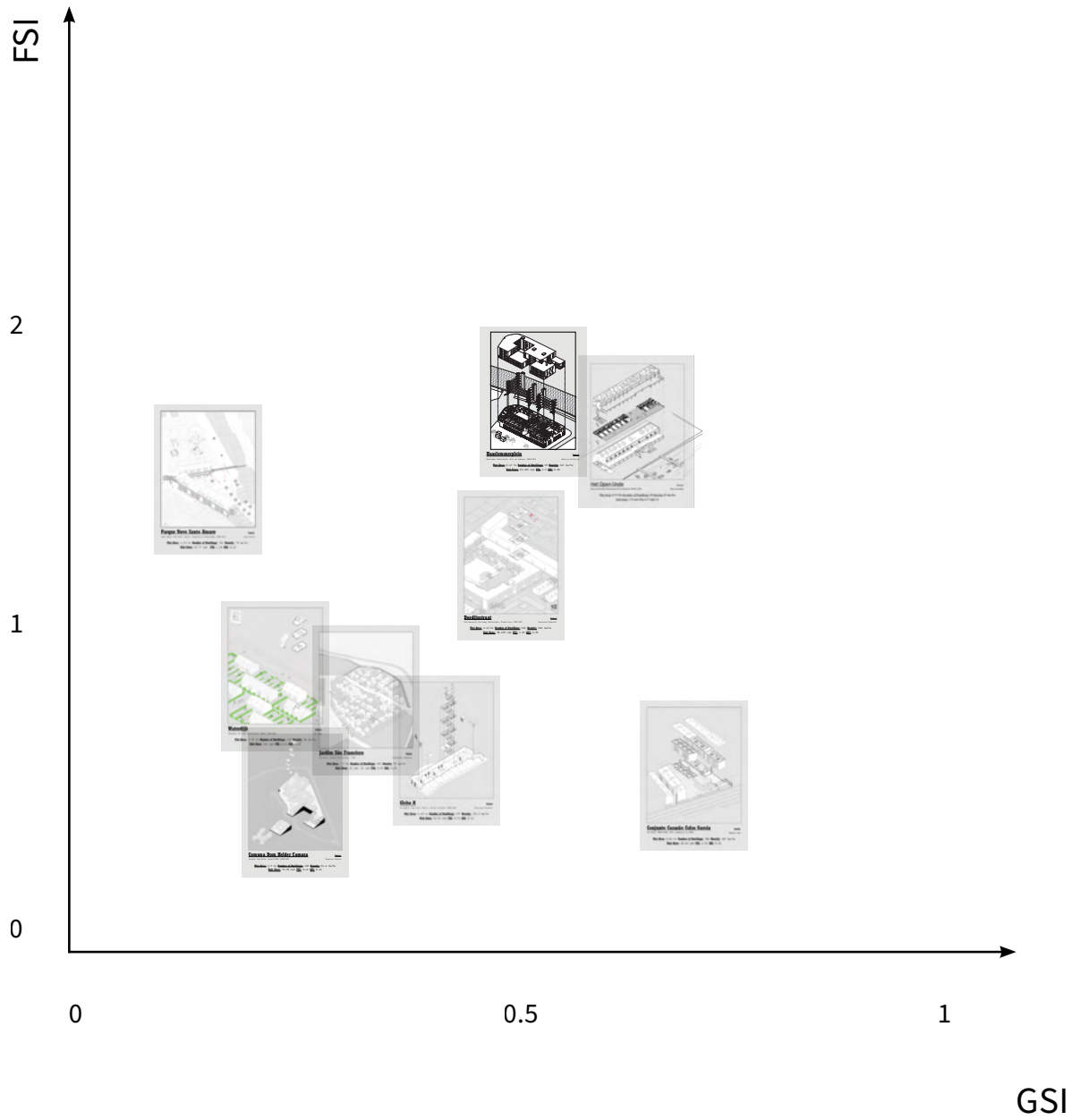
85 Dw/ha

DENSITY NEW PROPOSAL

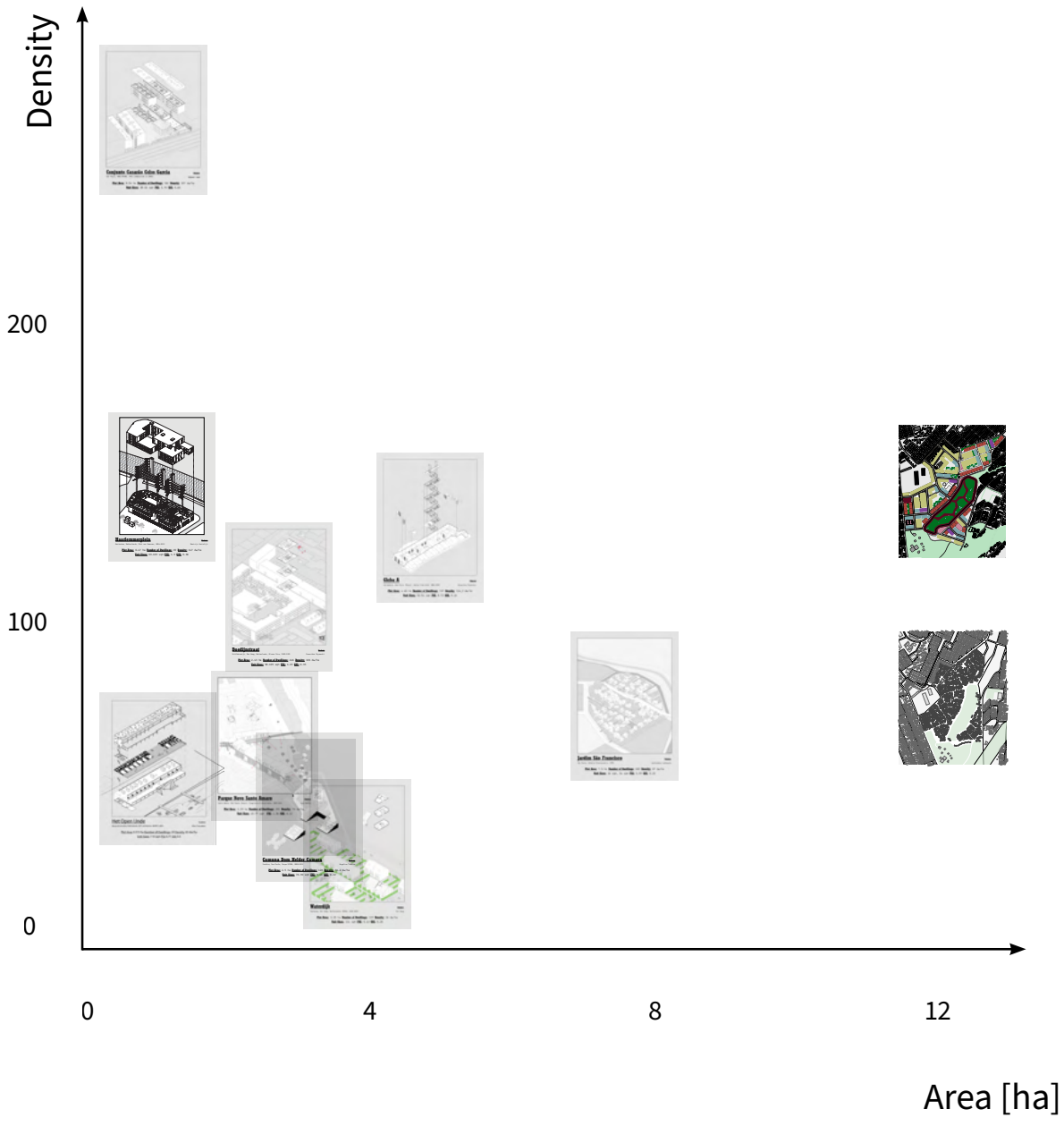


111 Dw/ha

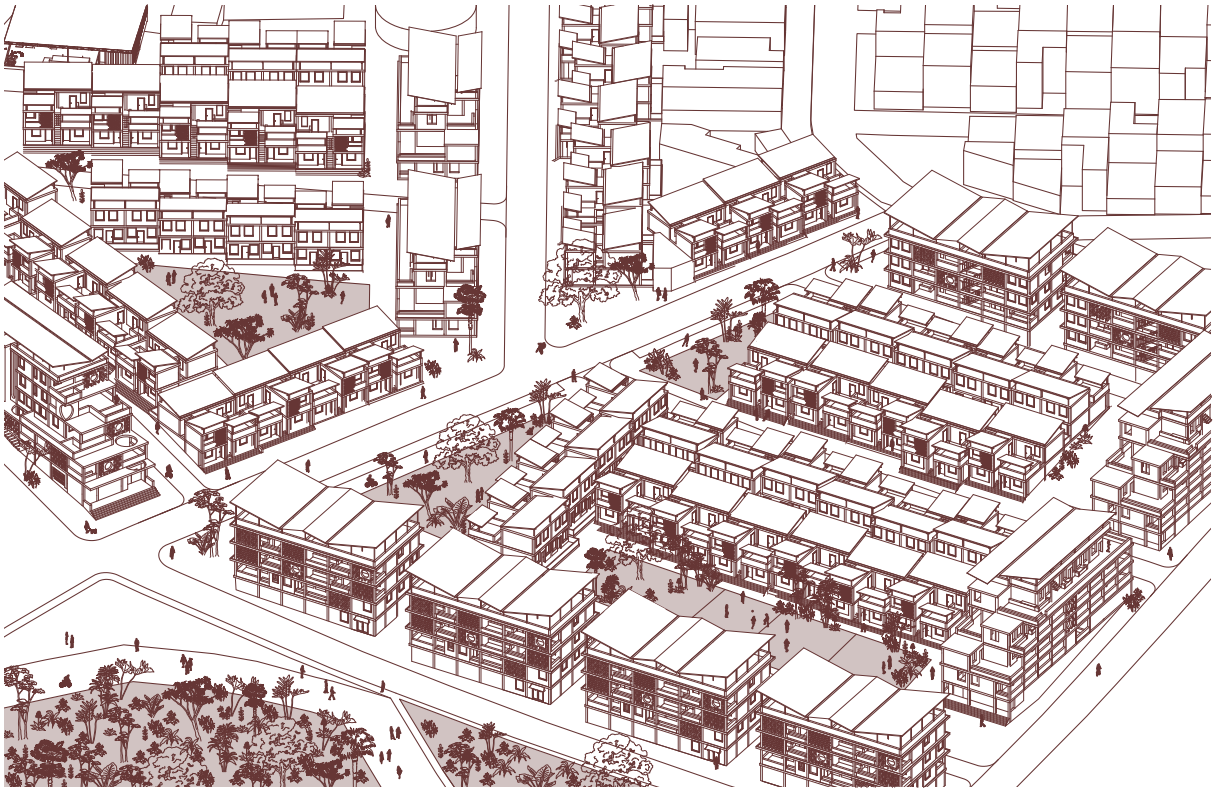
FSI VERSUS GSI

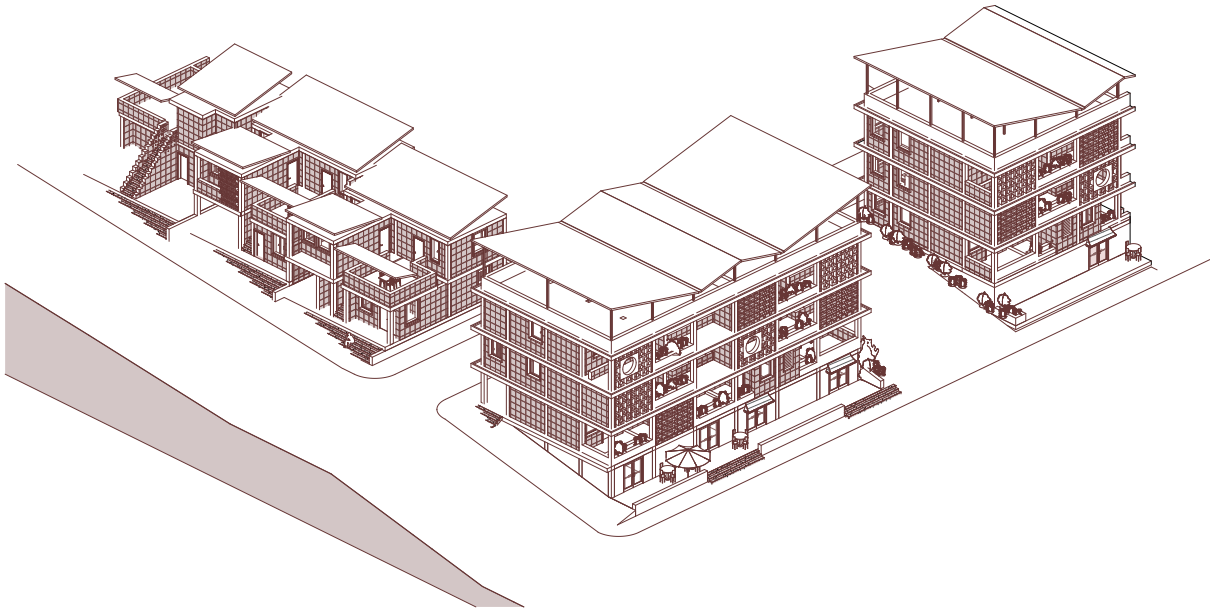


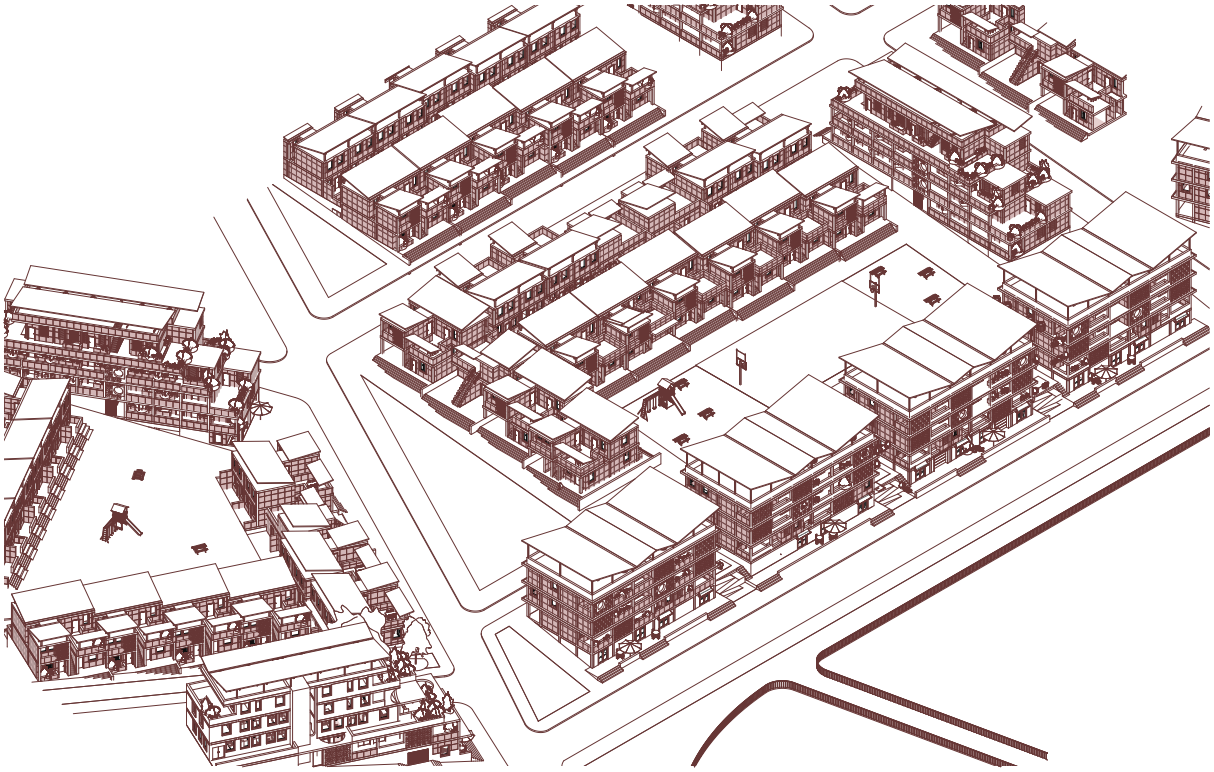
AREA VERSUS DENSITY



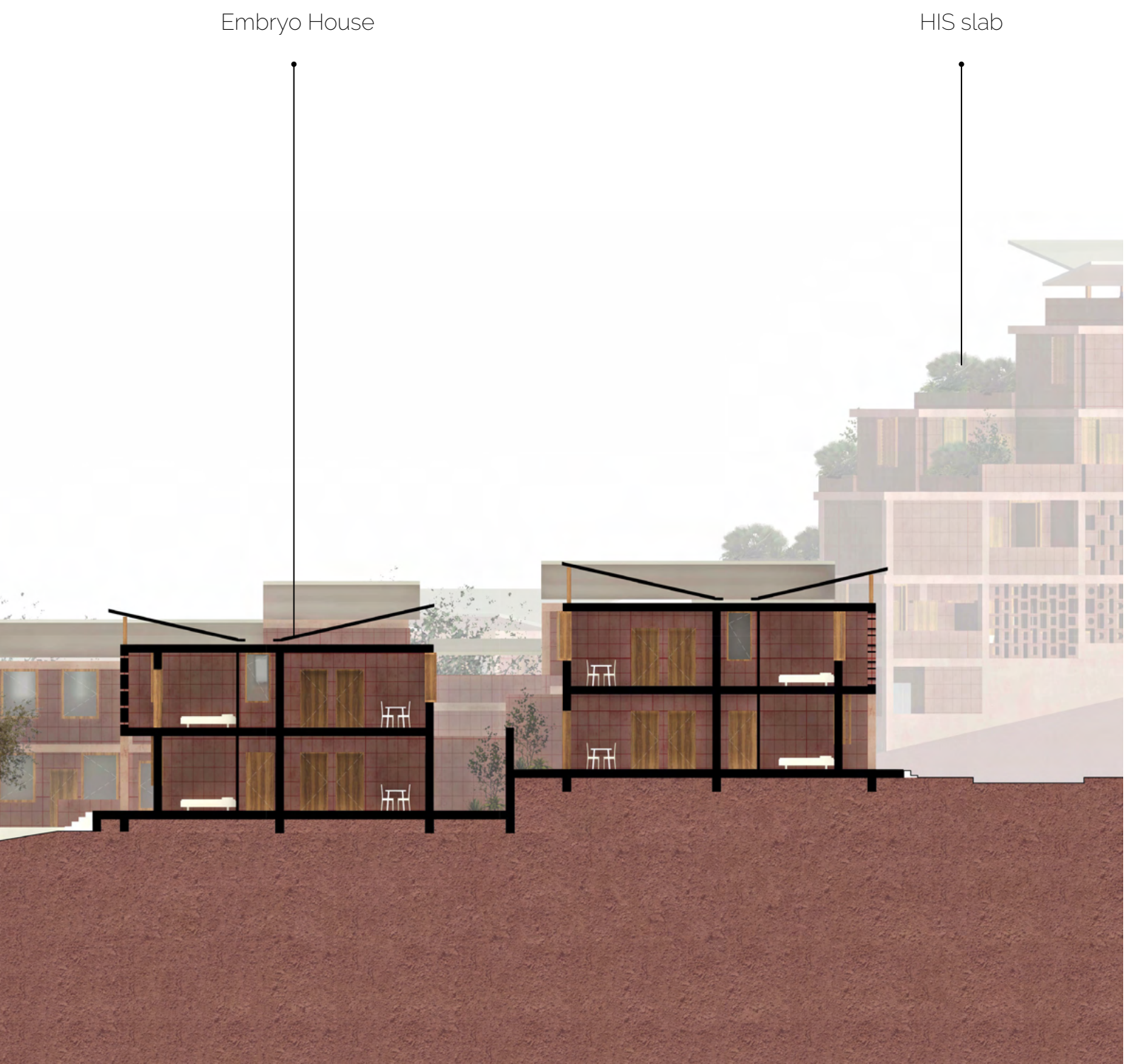
CLUSTER STRATEGY







URBAN SECTION


Embryo House
HIS slab

PART IV: BUILDING TECHNOLOGY

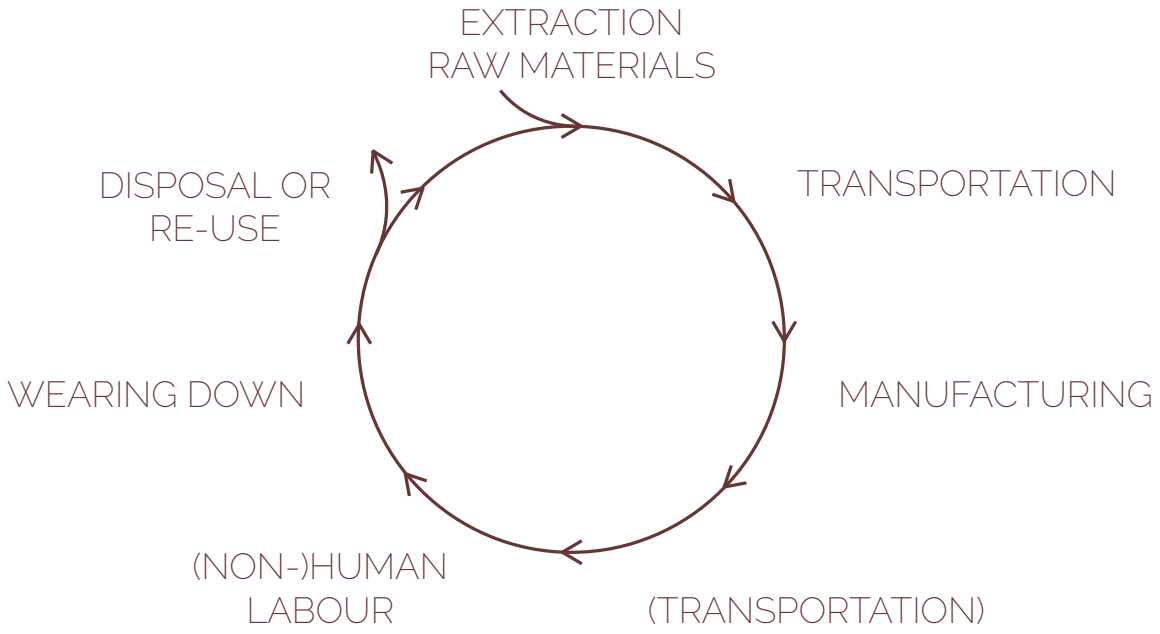
MATTER AND MATERIALITY

FOLLOW THE MATERIAL

The ethical question of how to *follow the material* :

"*Following* the flow of matter.."
- Deleuze and Guattari (1987, p. 373)
"

"The ethical gesture to *follow the material* in the field of architecture is recognise the economies, the labour, the handling and shaping, the wearing down and final disposal of all those goods and services we comfortably enfold ourselves in."
- Thomas (2007, p.2)

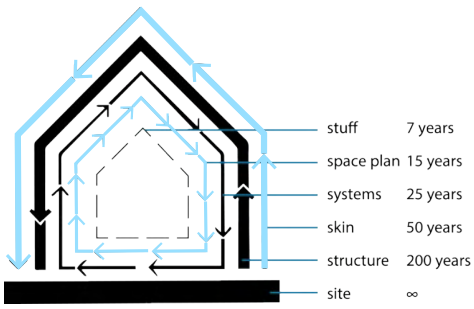


"Allowing material to have a say in the structures we create"
- DeLanda (2004, p. 21)

"..move toward novel combinations of *material expressivity* and *formed materiality*"
- Hélène Frichot (2013, p 91)

FLOW OF WOOD

OPEN BUILDING PRINCIPLE

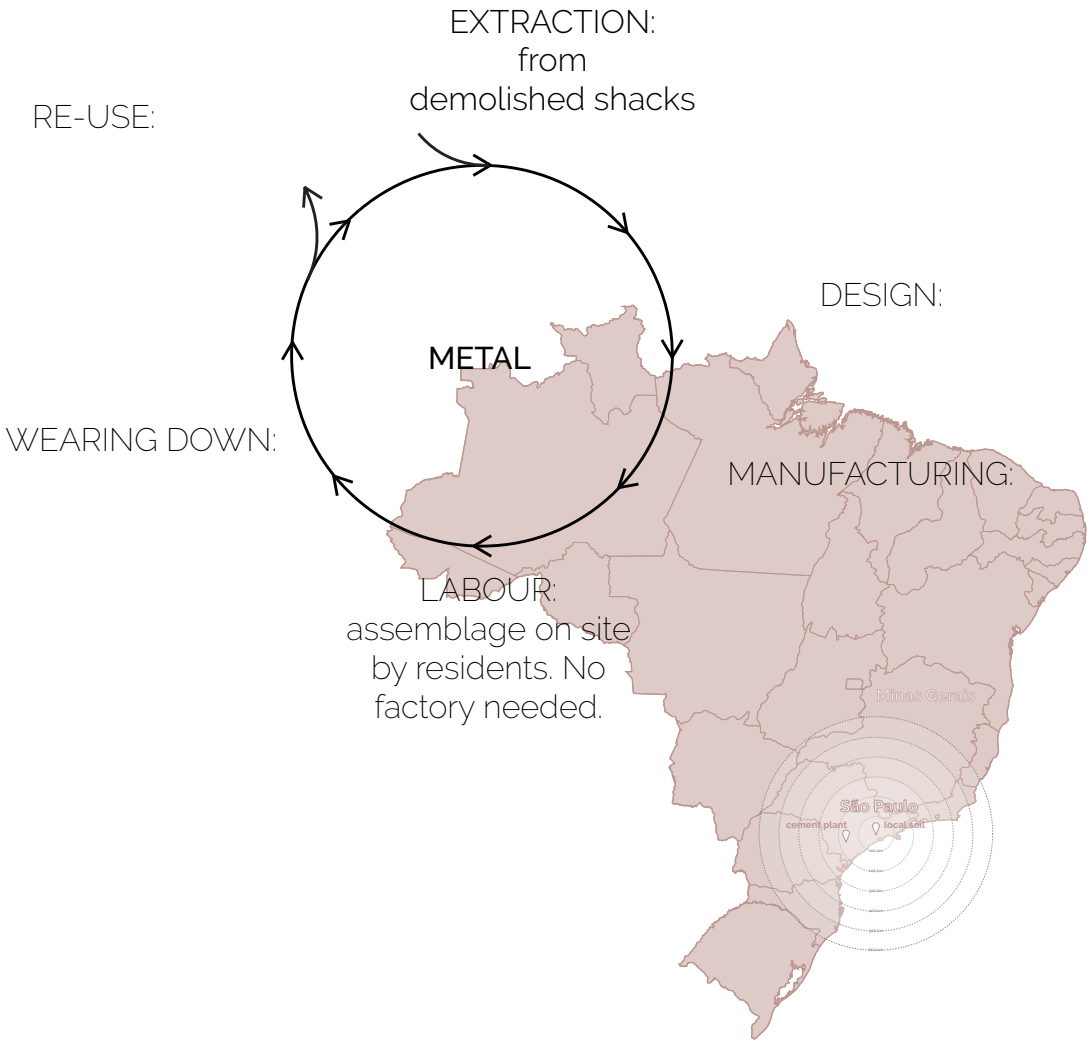


MATERIAL EXPRESSIVITY OF WOOD

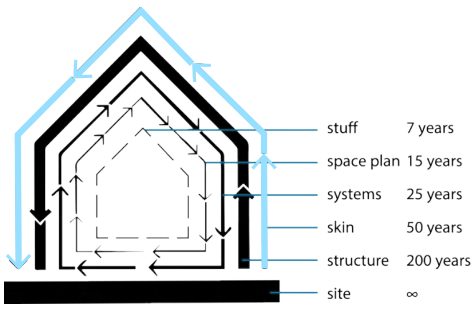
source: author's images

shading made from waste wood source: archdaily (2022)

FLOW OF CORRUGATED METAL SHEETS

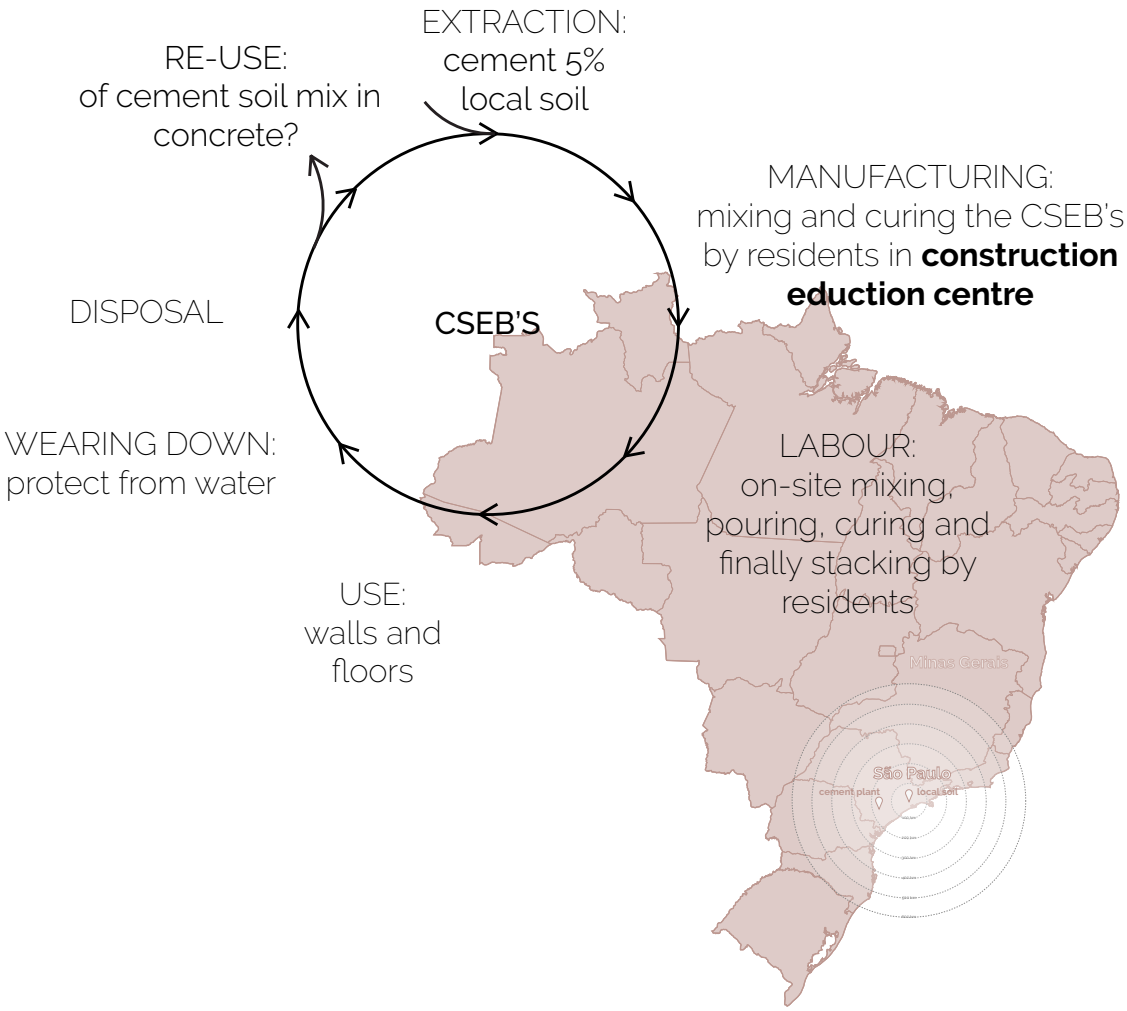


OPEN BUILDING PRINCIPLE

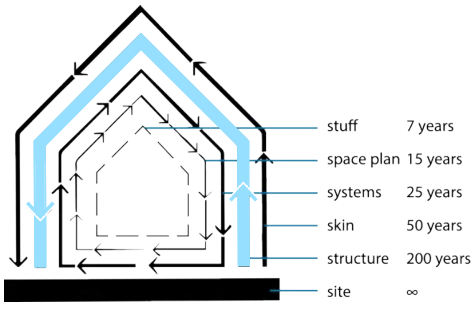


source: author's images

FLOW OF CSEB'S



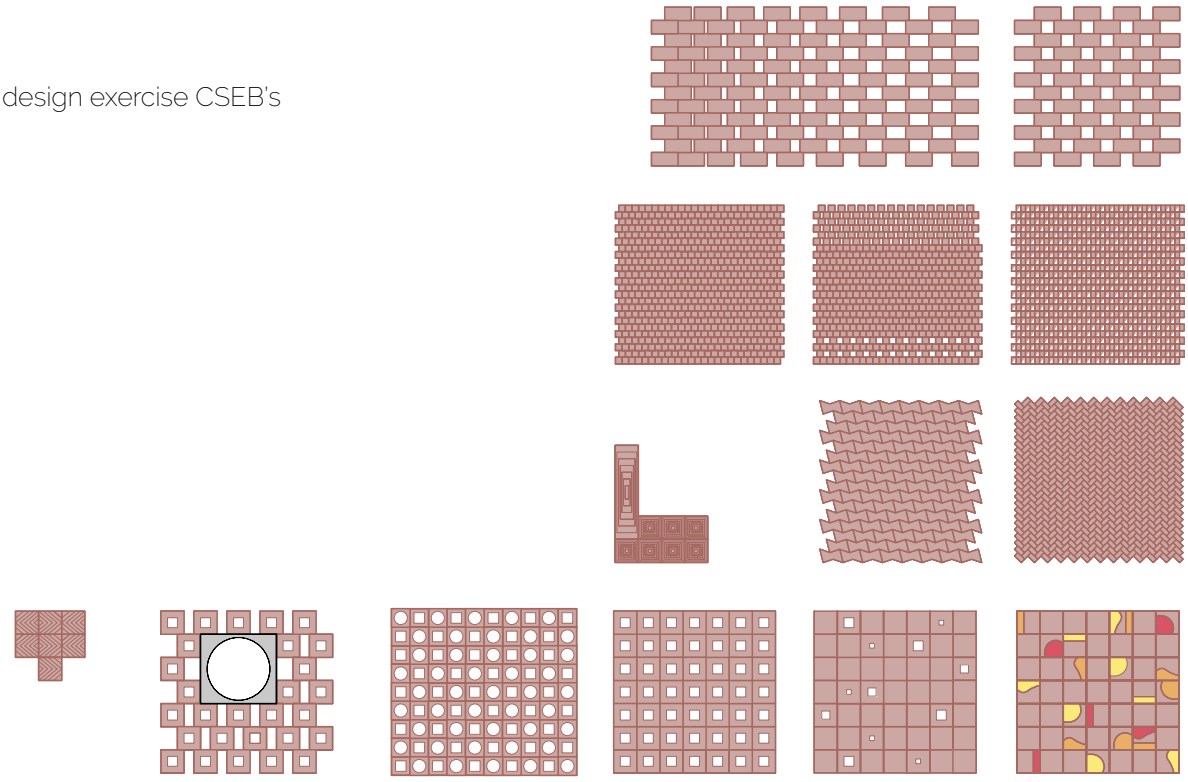
OPEN BUILDING PRINCIPLE



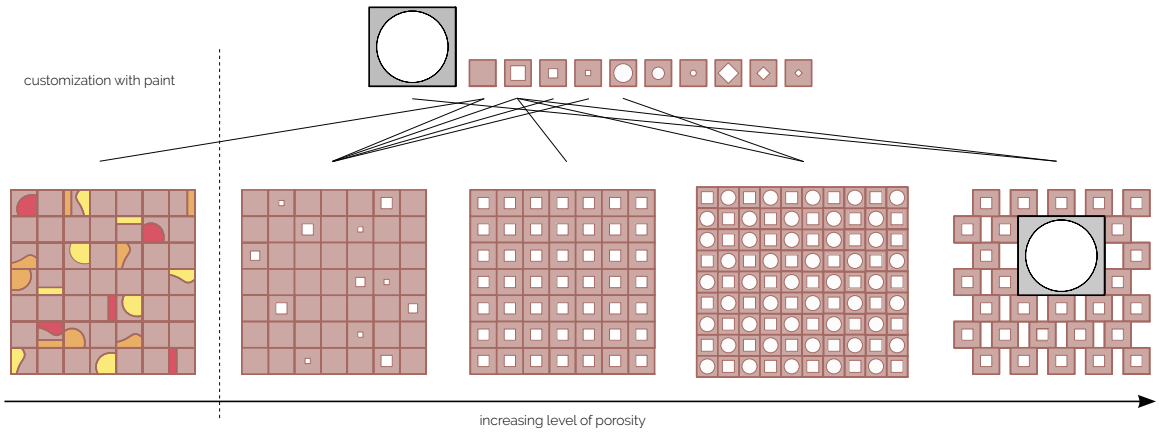
MATERIAL EXPRESSIVITY OF CSEB'S

source:

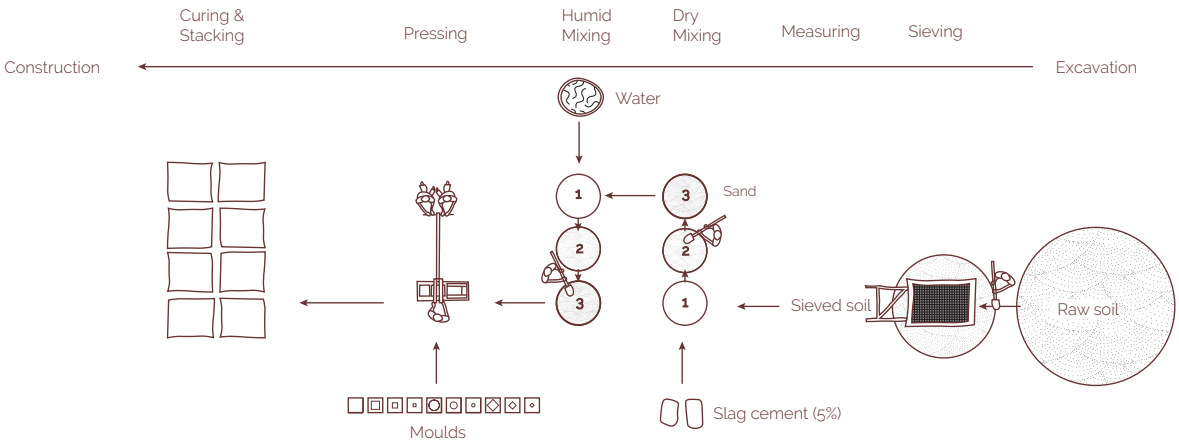
design exercise CSEB's



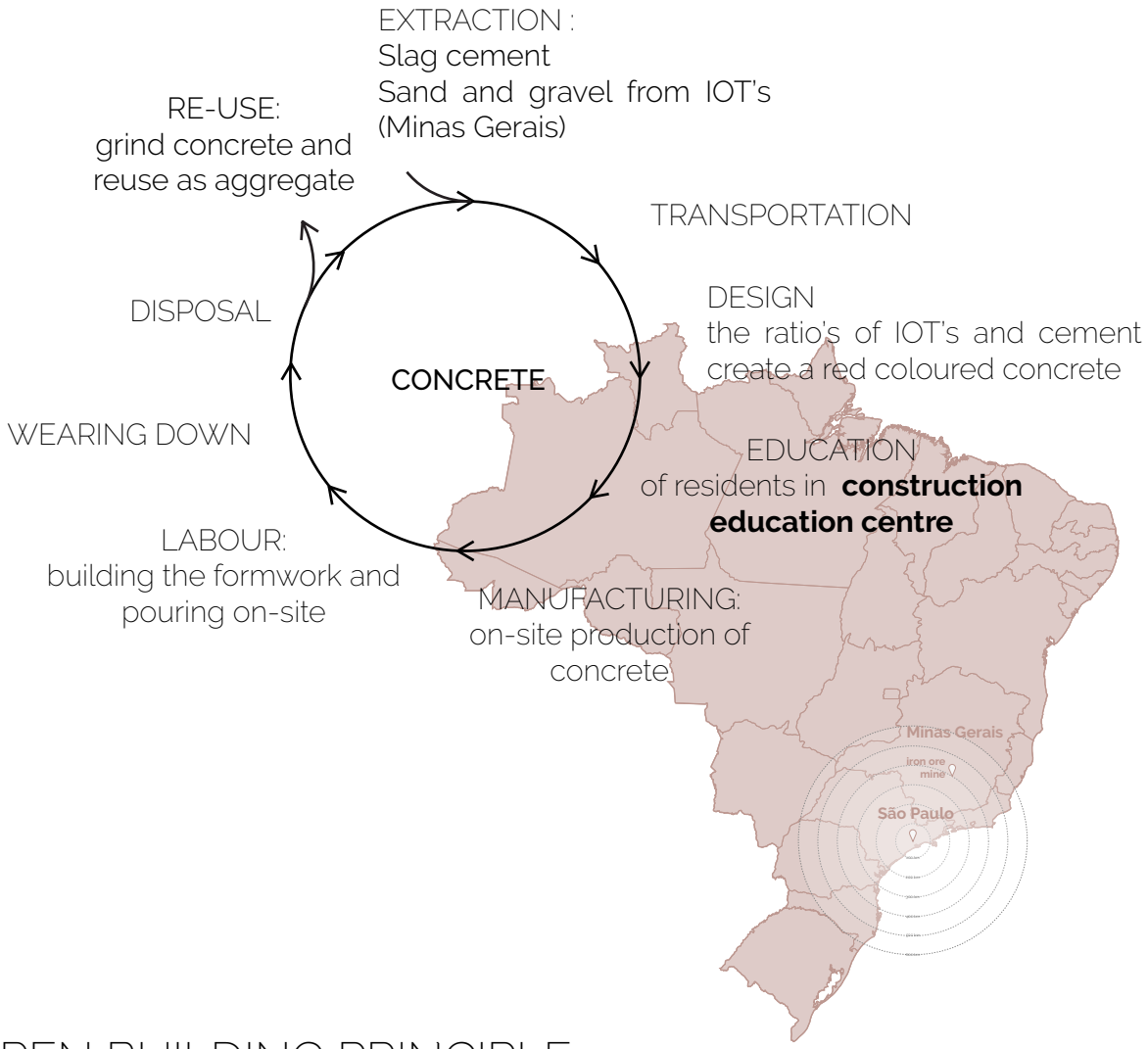
BUILDING ELEMENTS



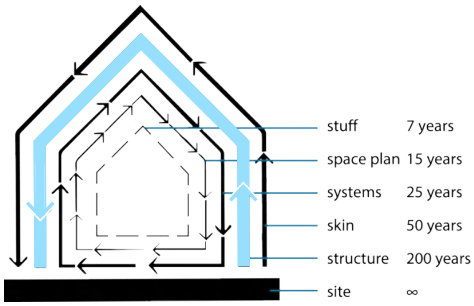
TECTONICS CSEB'S



FLOW OF CONCRETE



OPEN BUILDING PRINCIPLE



MATERIAL EXPRESSIVITY OF CONCRETE

source

IOT's contain high levels of **iron oxide**, causing a **red colour**.

WASTE MANAGAMENT

Usually, mining waste is disposed of in dams, but this often causes environmental and security problems.

Mariana dam rupture in 2015:

“The waste - a liquid mix of water, sands and clays – killed 19 people, destroyed villages, left hundreds homeless, and killed fish and aquatic life as it flowed on down the bigger River Doce to the sea more than 600km away.”

The use of mining waste in construction can contribute to the reduction of environmental impacts caused by the mining industries in Brazil.

If used in construction on a large scale, it tackles the 8th, 9th, 11th, and 12th sustaintable goals: providing clean water and sanitation, make cities more sustaintable, and preserve the life on land and below water.

MATERIAL ASSEMBLAGE

Assembling the materials in such a way that their conception will be reterritorialized.

Masonary means you can employ a local contractor and empower the people to build with their own hands: sweat equity.

Materiality to emancipate and innovate.
Mitigate the stigmatized use of earthen materials and aesthetical quality.

- Craftmanship and tacit knowledge of dealing with specific techniques.
- Education on how to use rammed earth through the embryo house.
- Pilot project on site to use this material and empower them with knowledge of a new construction method.

- Trade-off between time/cost and efficiency/expensive: amenities can have more distinctive tectonics bc they are one-offs.

- Not going with a one-size-fits-all but suggesting how the assemblage of different techniques/tectonics are integrated within the project.

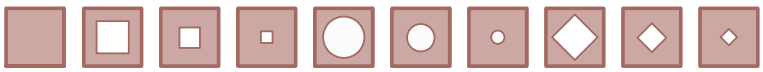
- Think of how it actually is going to be built (diagrammatic). and try to understand in each phase what kind o labor is implicit to that moment and who could carry it out. Need for a man/machinery/tools/ specialized labor.

- Follow the material in terms of handling, maintenance, use, wearing down, and disposal.

MATERIAL ASSEMBLAGE EMBRYO HOUSE

In-situ red pigmented IOT concrete

Waste wood shading

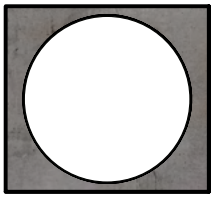


Stabelized Compressed Earth Blocks

MATERIAL ASSEMBLAGE HIS SLAB

In-situ red pigmented IOT concrete

Precast concrete



Precast concrete element

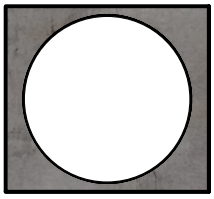
Waste wood shading

Stabelized Compressed Earth Blocks

MATERIAL ASSEMBLAGE URBAN VILLA

In-situ red pigmented IOT concrete

Precast concrete



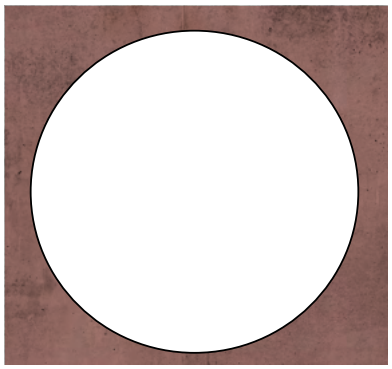
Precast concrete element

Waste wood shading

Stabelized Compressed Earth Blocks

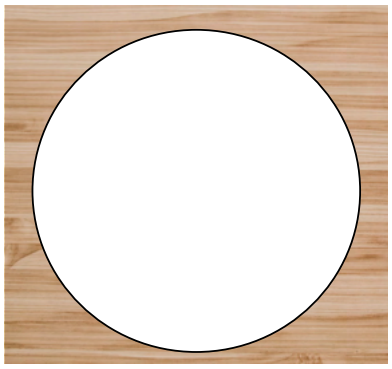
MATERIAL ASSEMBLAGE HMP SLAB

In-situ red pigmented IOT concrete

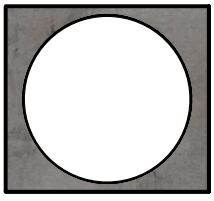


Precast IOT concrete elements

Precast concrete



Wooden pine (endemic to brazil) elements



Precast concrete element

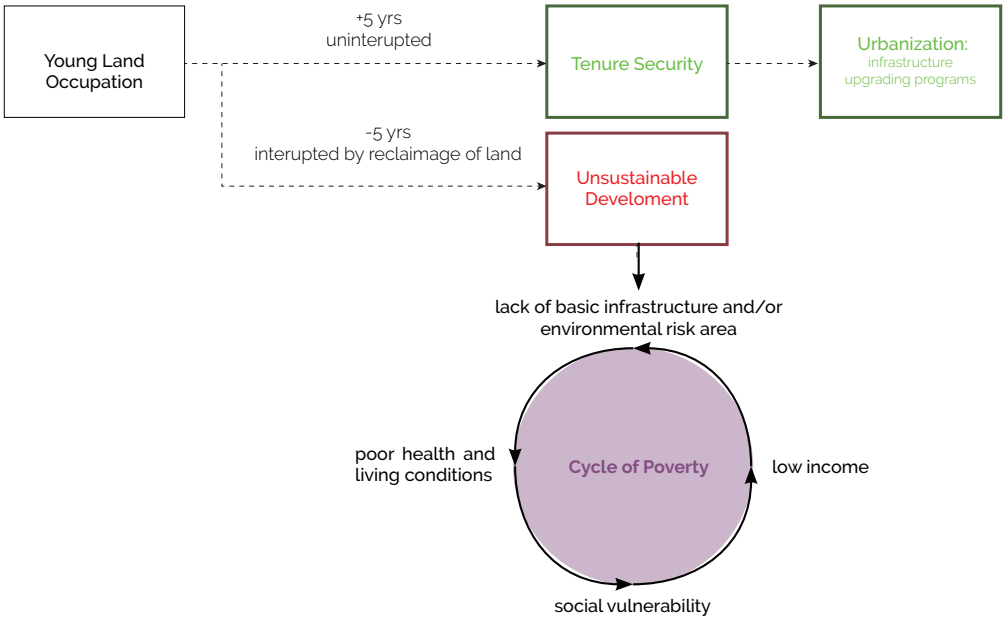
Waste wood shading

Stabelized Compressed Earth Blocks

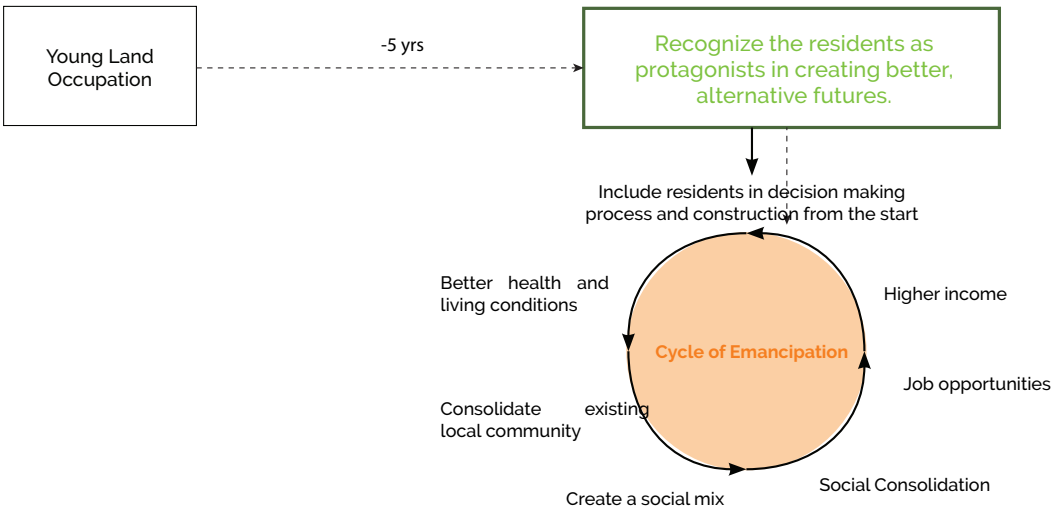
DEVELOPMENT PROCESS

CURRENT WAYS OF DEVELOPMENT

Brazil's urban policy prioritises the upgrading of informal settlements and tenure security over land titling programs. Municipal governments tend to wait until residents acquire tenure security (not private property rights) before they launch infrastructure upgrading programs. As a result, favelas that are more consolidated receive municipal services, whereas young favelas at the stage of land occupation continue to develop in an unsustainable fashion. During the first five years of a land occupation, either the landowner, if the land is private, or the government, if the land is public, can claim repossession of the property (Brazilian Federal Constitution, art. 183; Civil Procedure Code, art 561). .. Land occupiers can become publicly recognised protagonists in creating better, alternative futures for themselves. ... during the first five years of an occupation, land occupiers have no hope of tenure security

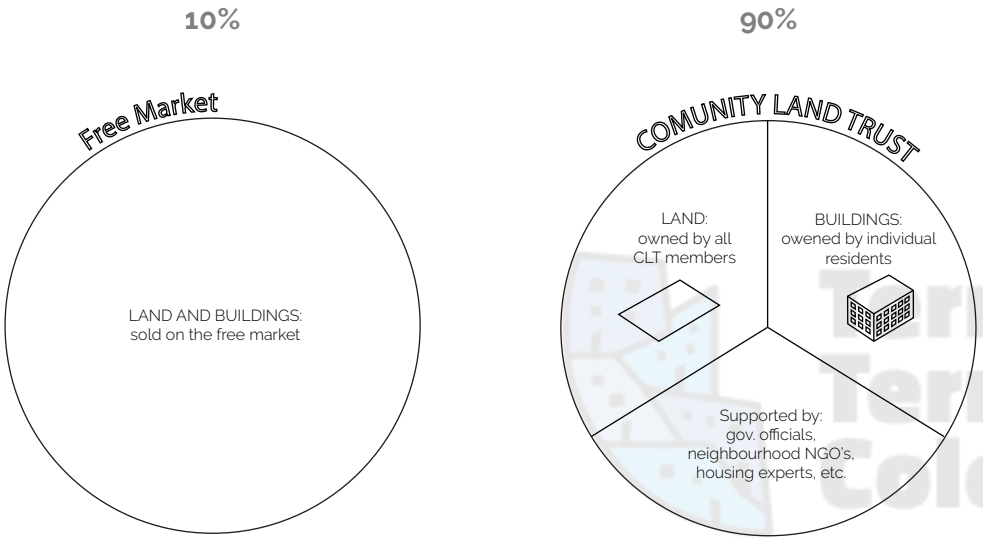


SUSTAINABLE DEVELOPMENT



MANAGERIAL STRATEGY

OWNERSHIP



Create Social Mix

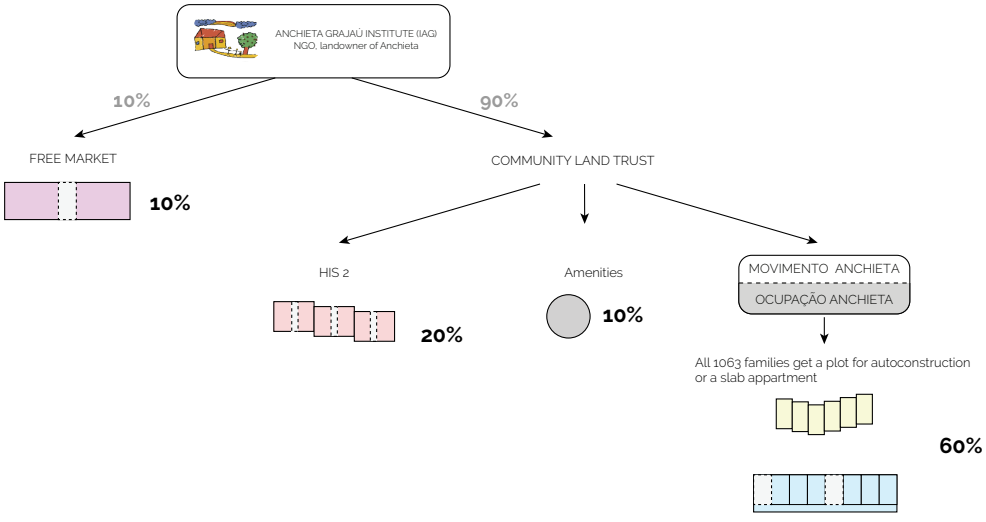
Use profit for Cross-subsidization

Prioritise the wellbeing of the local community

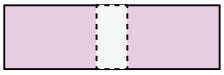
Decommodification of affordable housing

Preserve natural habitat.

LAND DIVISION

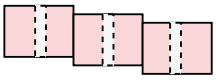


TYPOLOGICAL OWNERSHIP



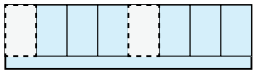
Buy

on free market



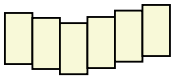
Buy

on Community Land



Rent-to-own

on Community Land



Built with sweat equity

on Community Land

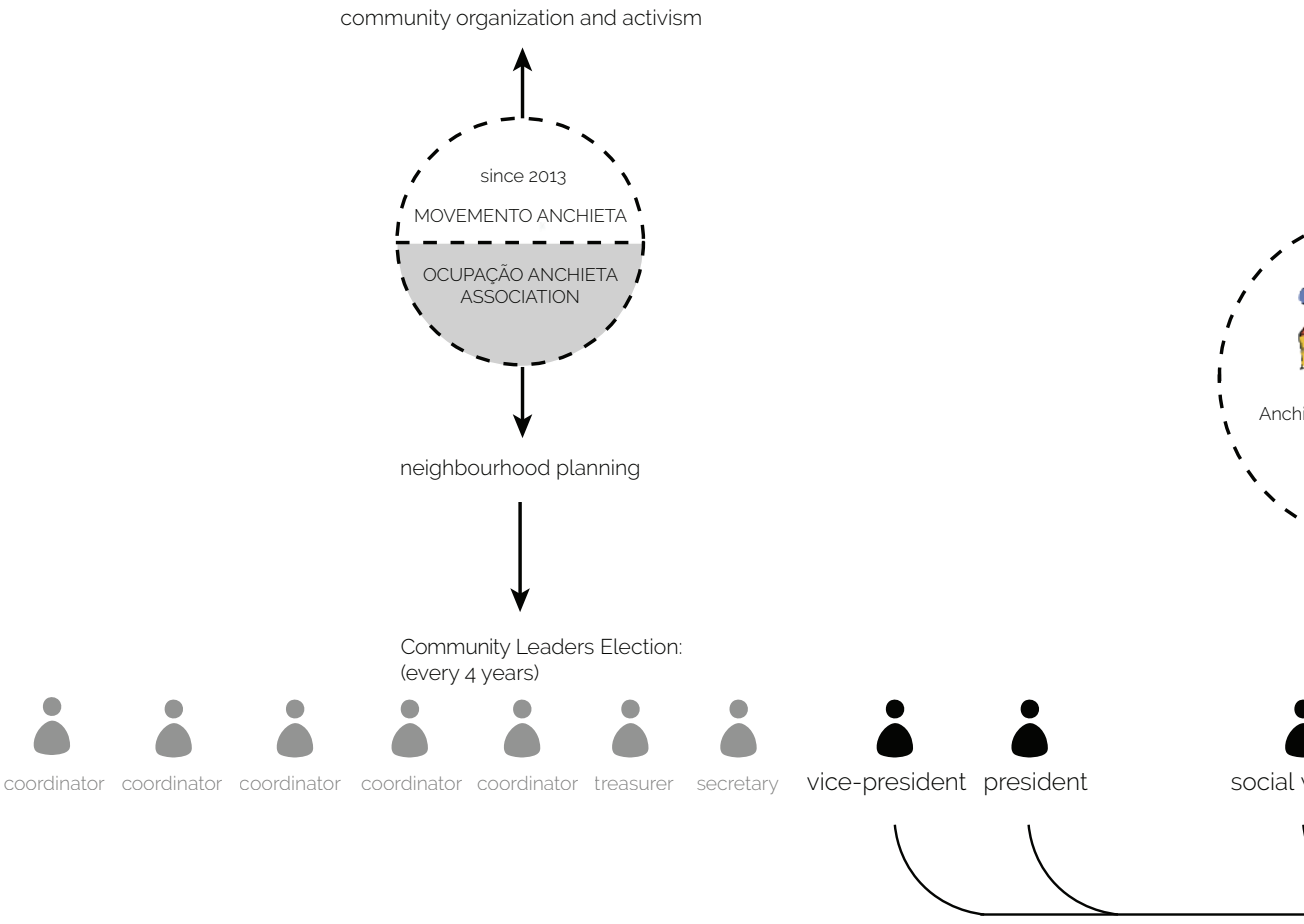
Sweat equity:
increase in value, that is created as a direct result of hard work by the owner(s). It is the preferred mode of building equity for low-income residents, since they may be unable to contribute much financial capital.

construction education centre

Giving the residents of Anchieta **tacit knowledge** of new construction methods in order to: emancipation of the low-income groups

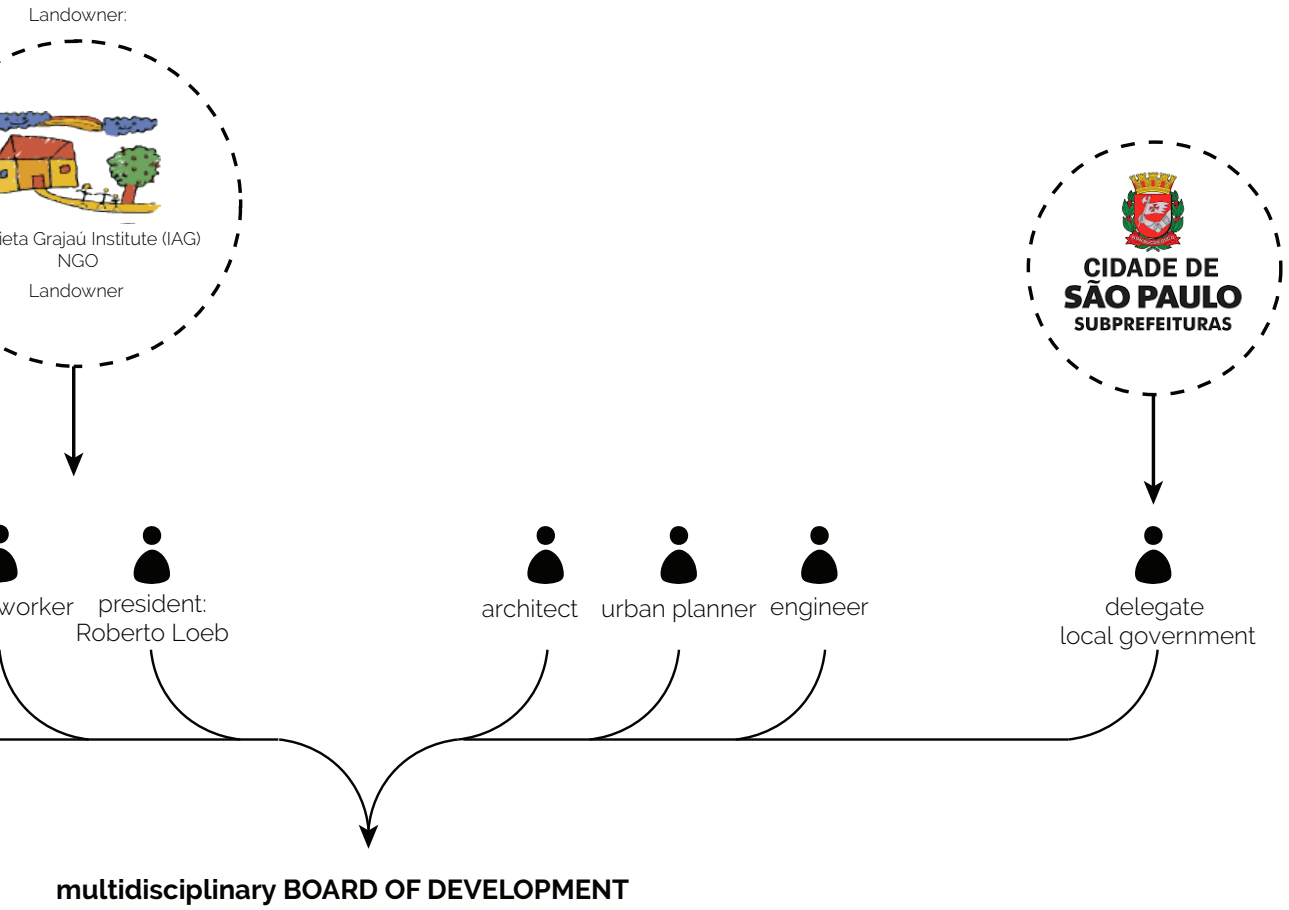
Manage Housing Development in the c

grassroot organis
the right to adequate hous



case of a Young Informal Land Occupation

ation: community based planning
sing and the right to a healthy environment



PHASING

Preserve
- Community centre
- Church
- Soccer court
- Atlantic forest

 # dwellings
- 1063 shacks

PHASING

Add
HIS slab: 68 dwellings

PHASING

Available
68 units

Demolish
-56

PHASING

PHASING

Add

- Construction workshop
- Embryo: 76 units

PHASING

Available
88 units

Demolish
77 shacks

PHASING

PHASING

Add
Embryo: 160 units

PHASING

Available
171 units

Demolish
170 shacks

PHASING

PHASING

Add
Roads
87 HIS slab units
112 embryo units
10 urban villa units

PHASING

Available
205 units

Demolish
-200 shacks

PHASING

PHASING

Add
Roads
129 HIS slab units
152 embryo units
20 urban villa units

PHASING

Available
300 units

Demolish
-282 shacks

PHASING

PHASING

Add
159 HIS slab units
132 embryo units
55 urban villa units

PHASING

Available
364 units

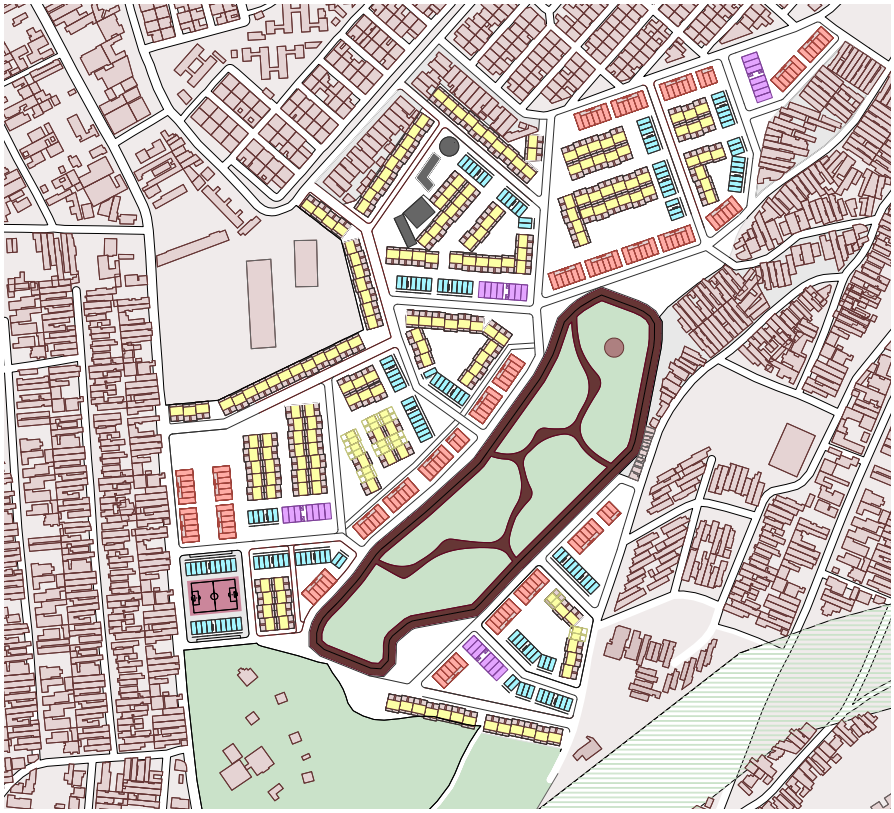
Demolish
-347 shacks

PHASING

PHASING

Add
24 HIS slab units
84 embryo units
180 urban villa units

PHASING

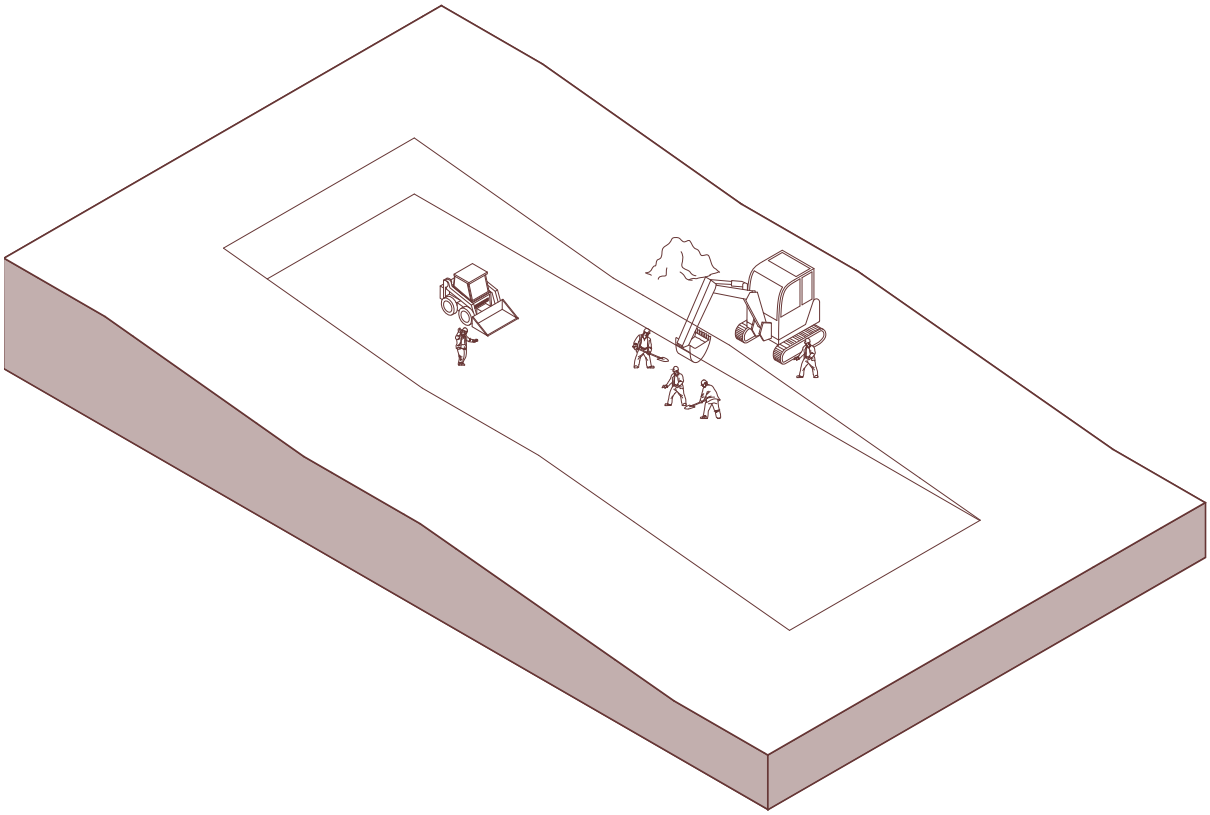


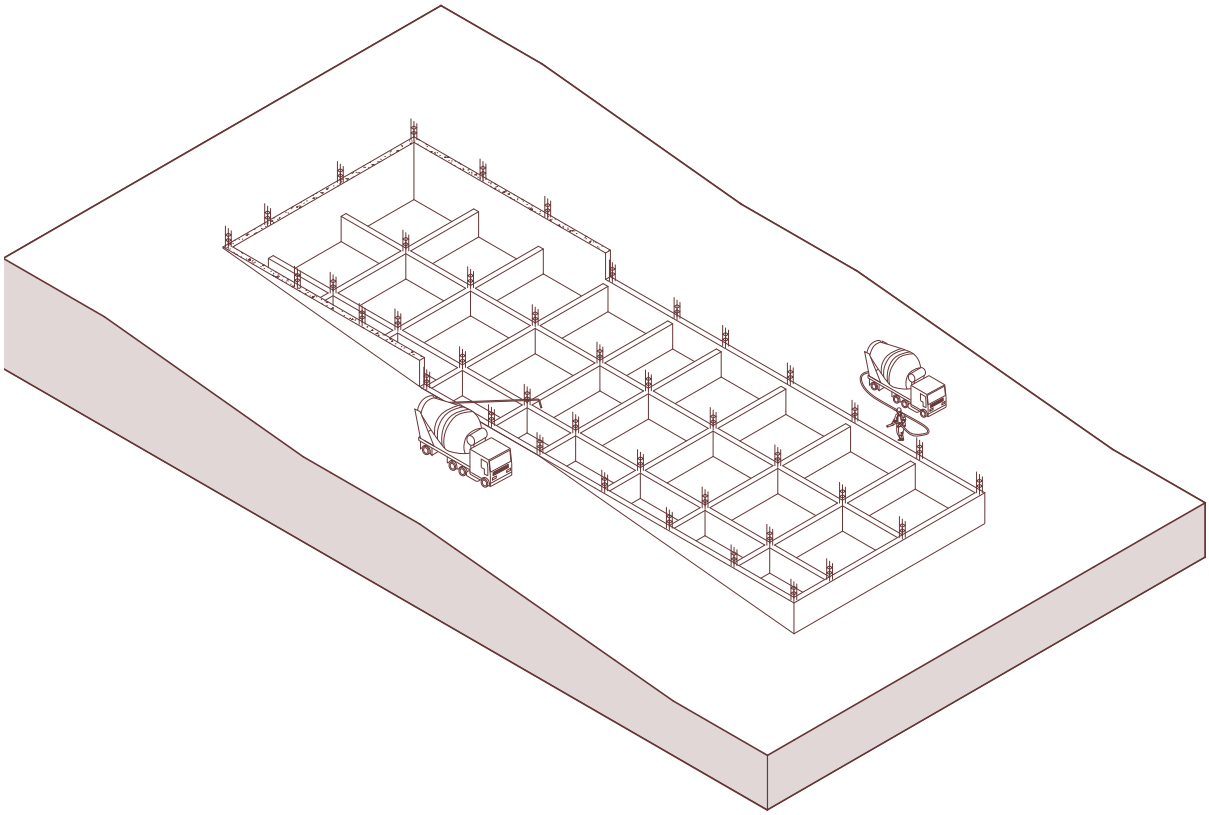
Add
36 HMP units

TOTAL
1485 units

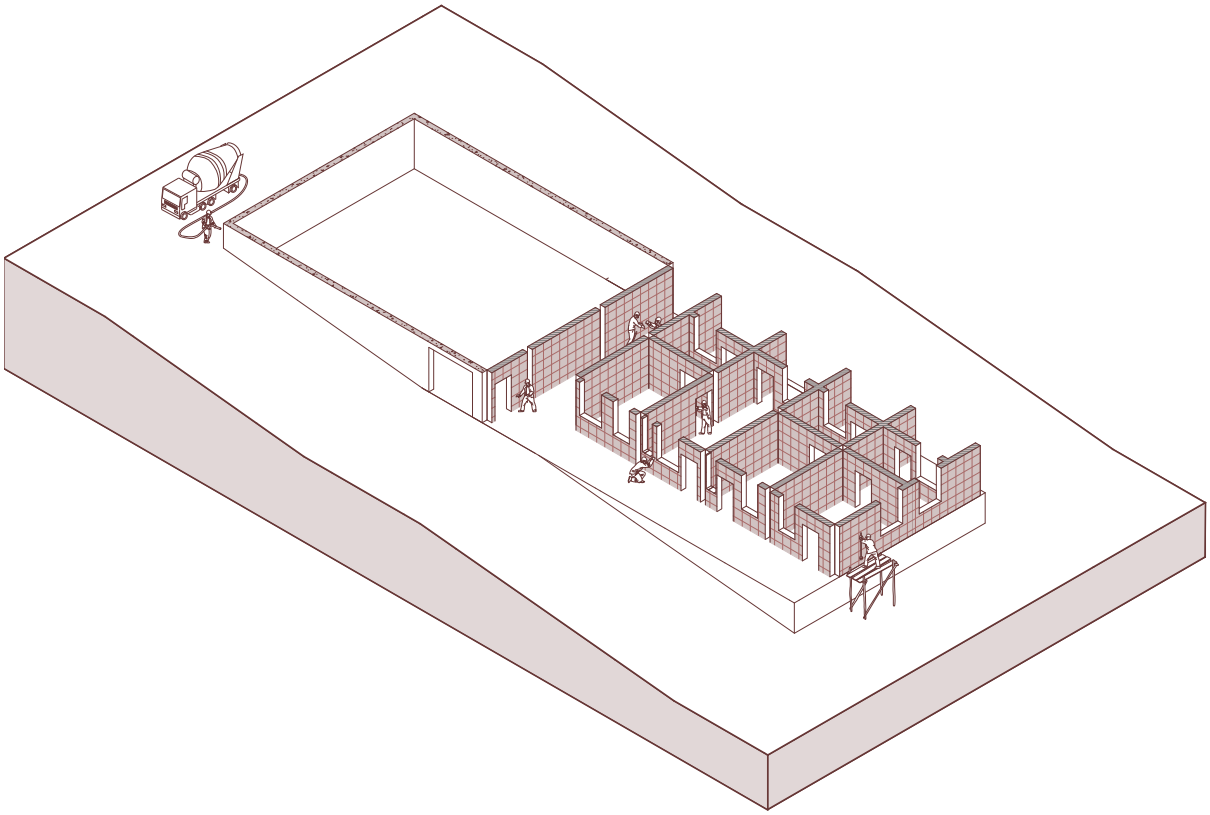
BUILDING TECHNOLOGY

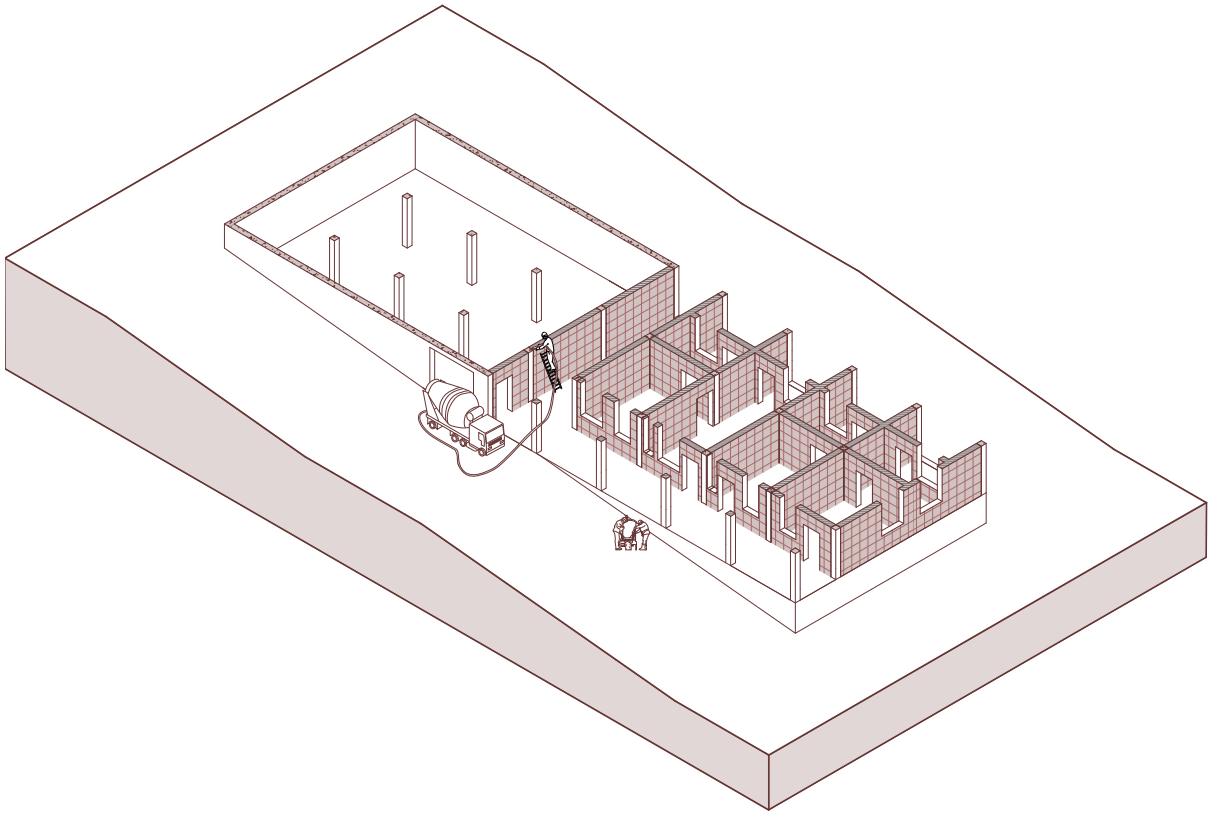
CONSTRUCTION PROCESS



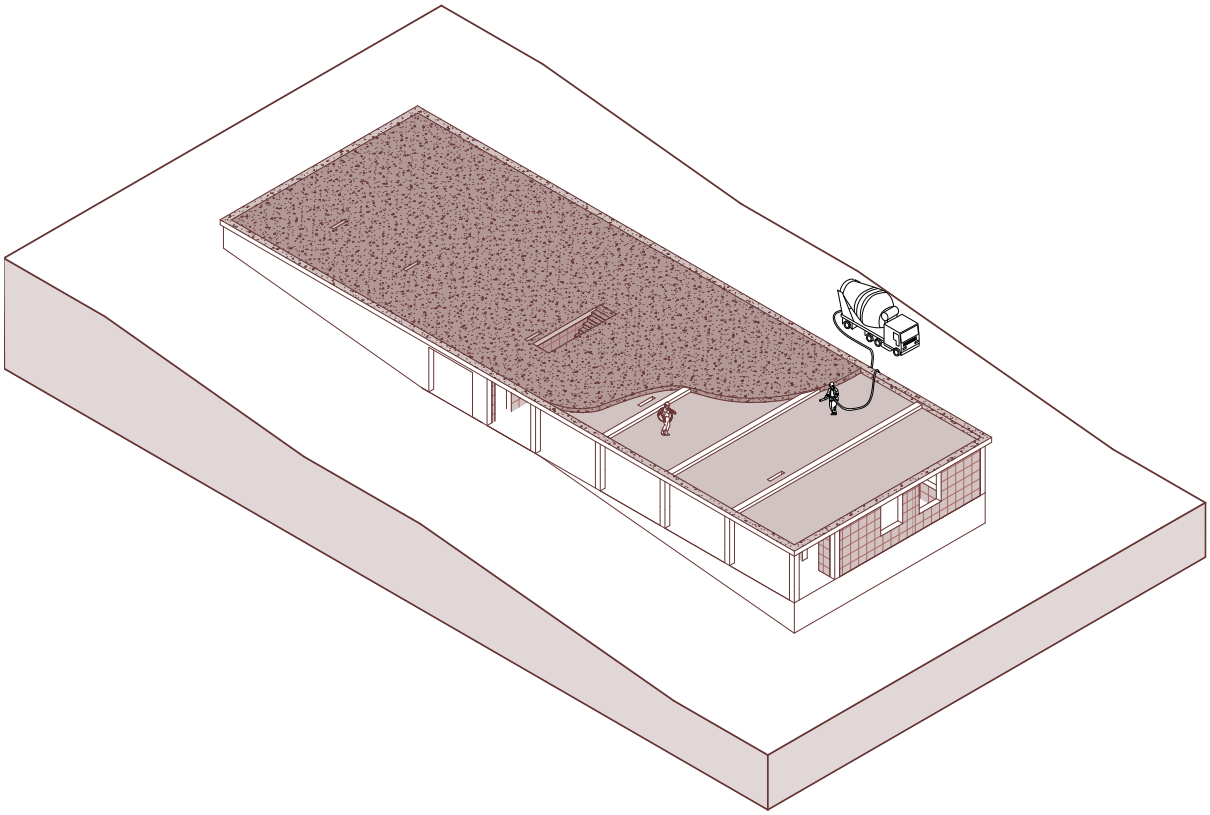


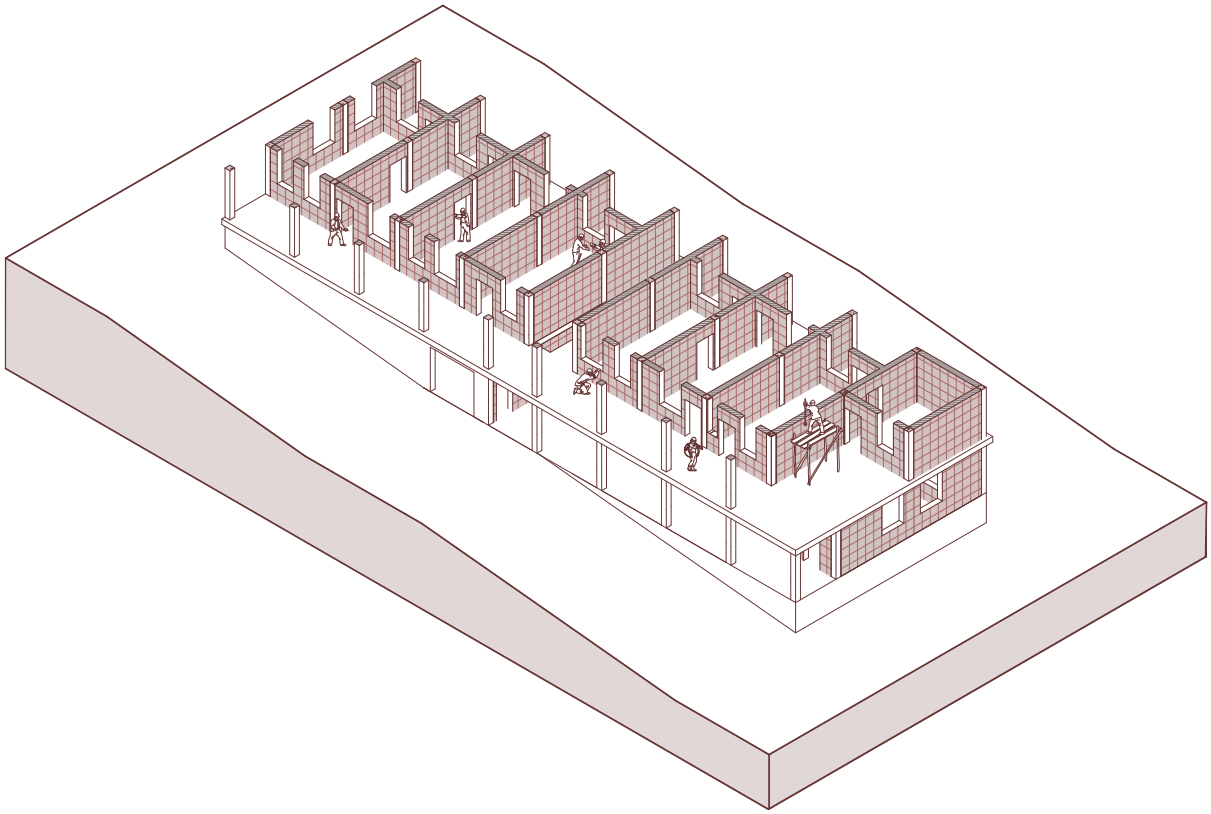
CONSTRUCTION PROCESS



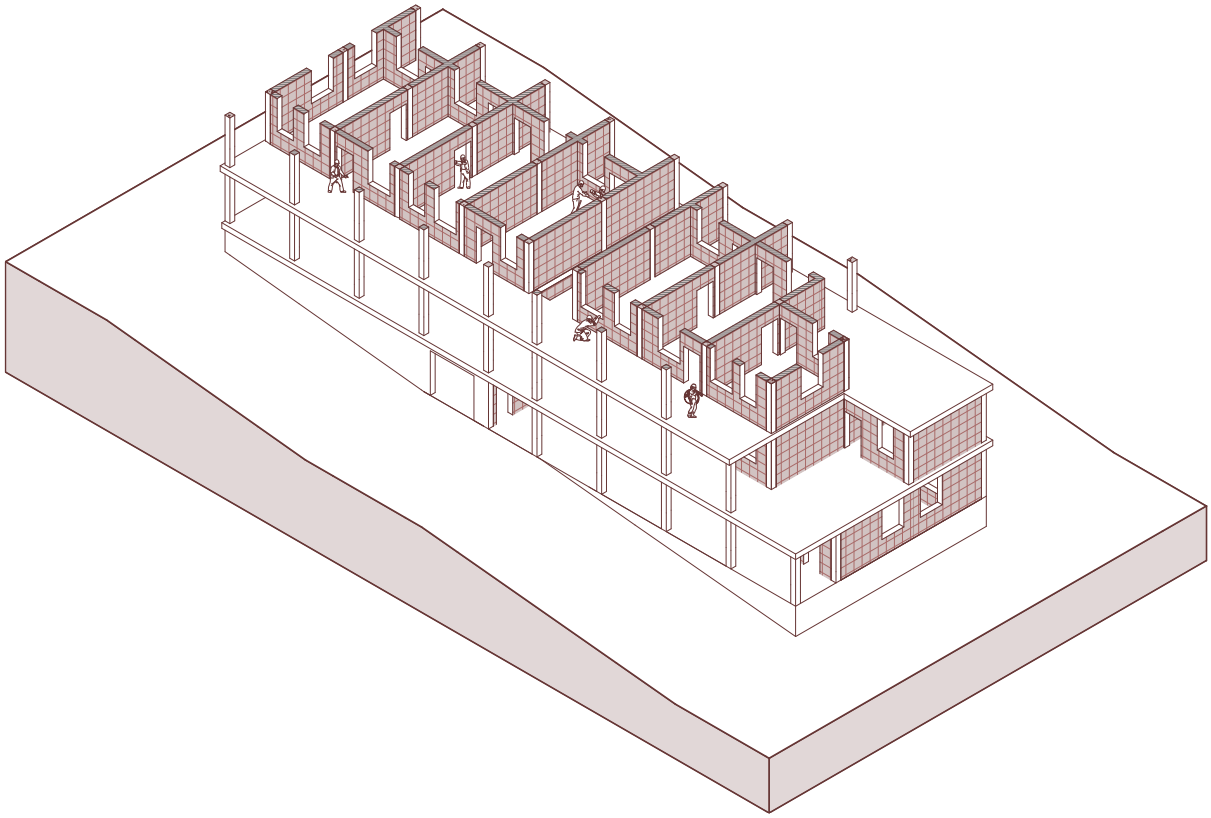


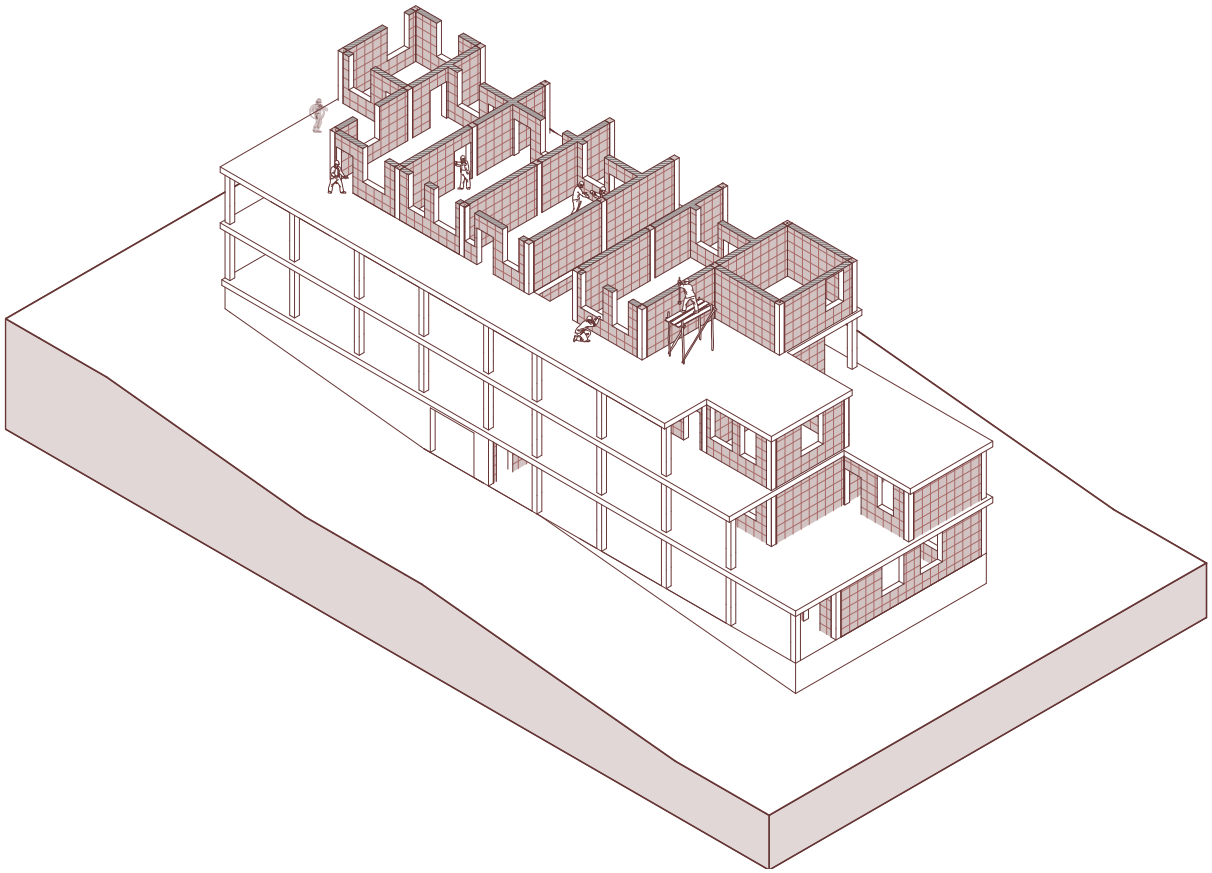
CONSTRUCTION PROCESS



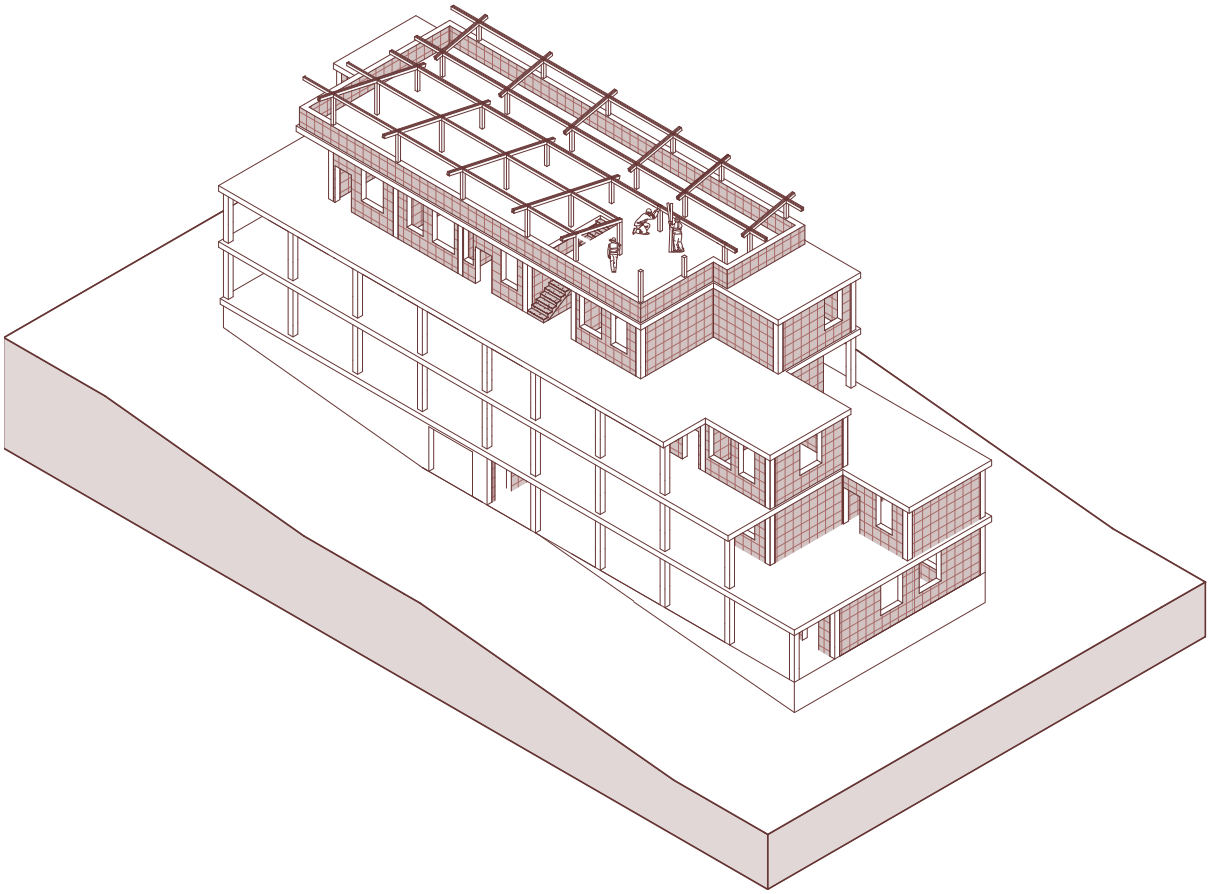


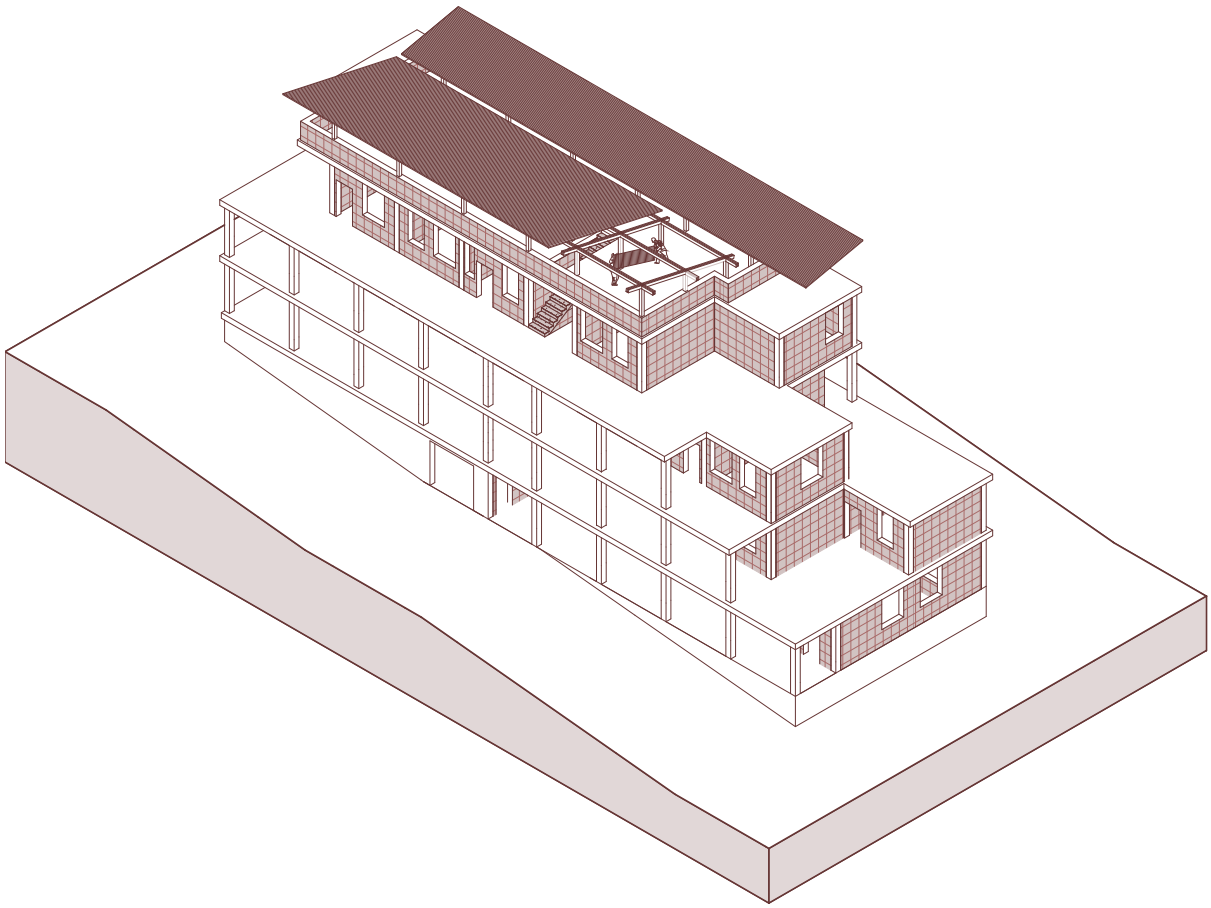
CONSTRUCTION PROCESS



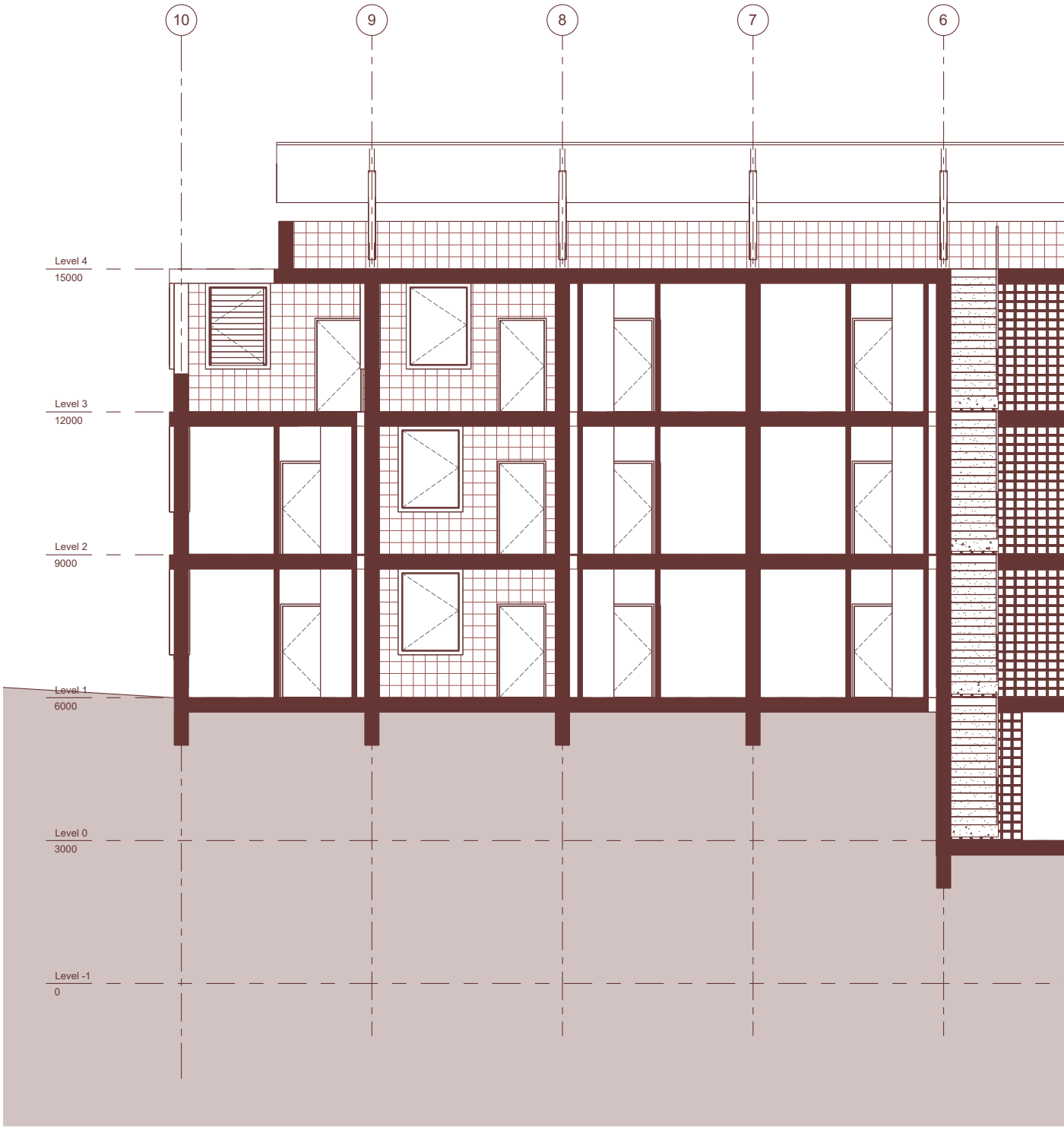


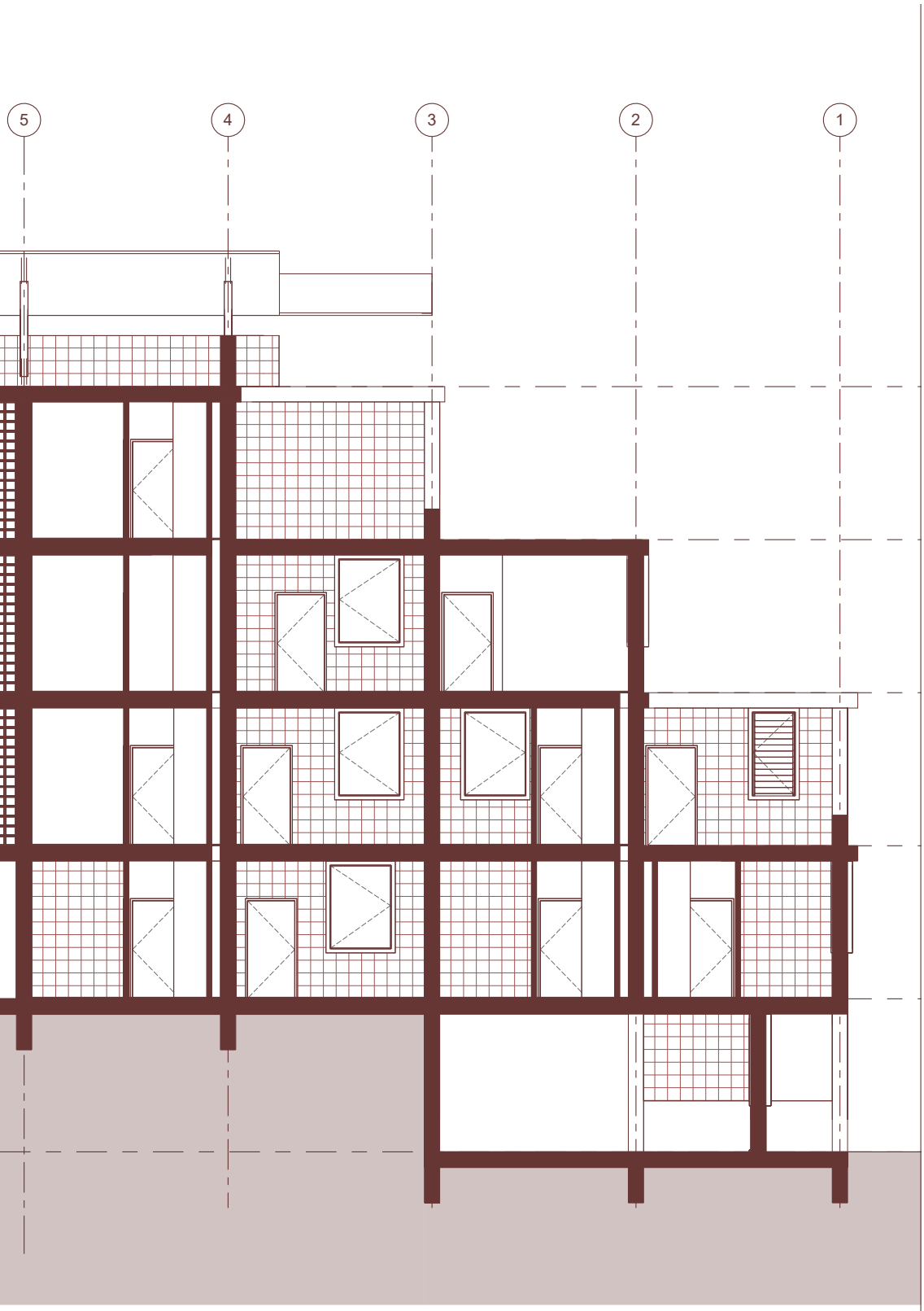
CONSTRUCTION PROCESS



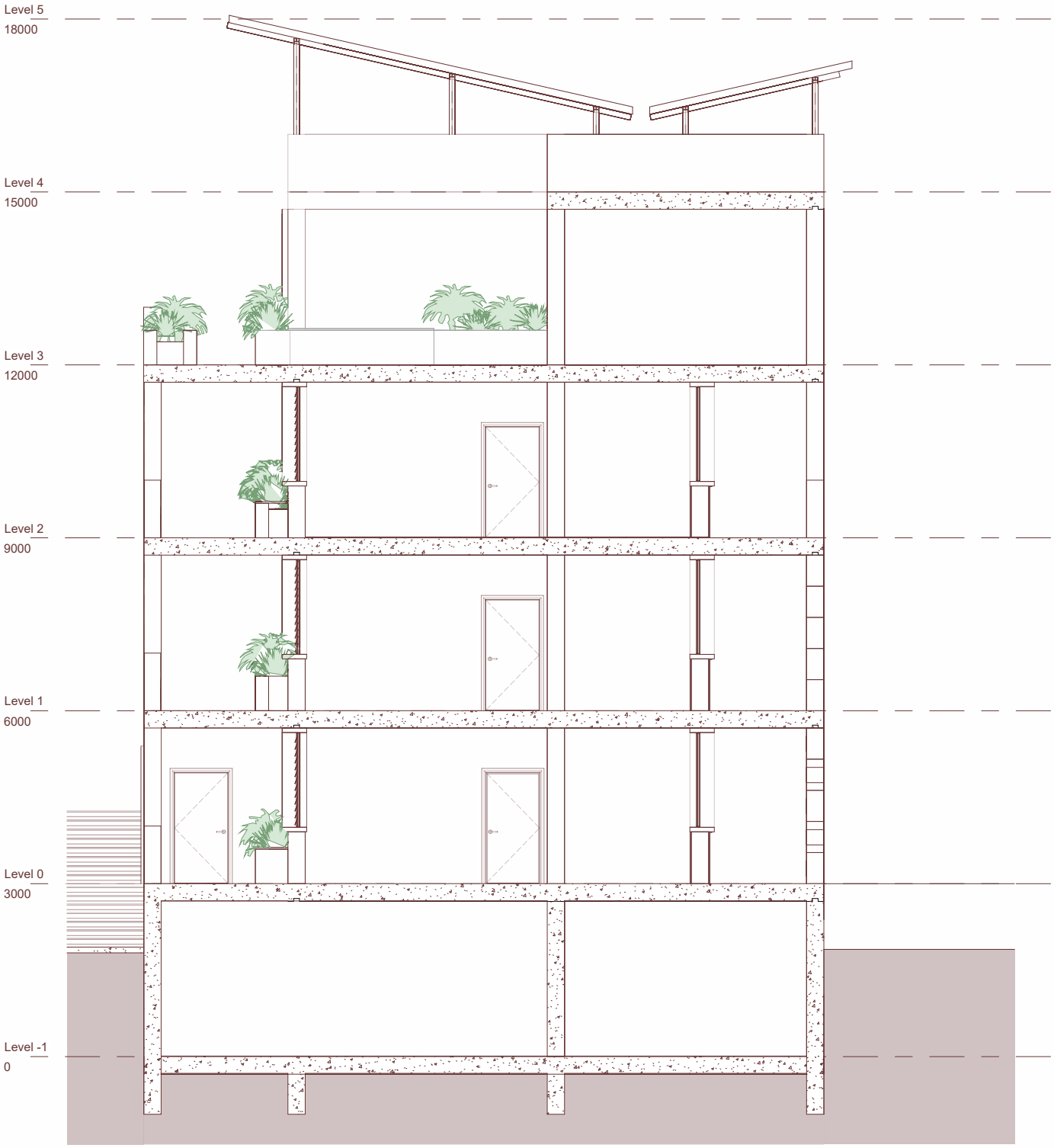


HIS SLAB SECTION

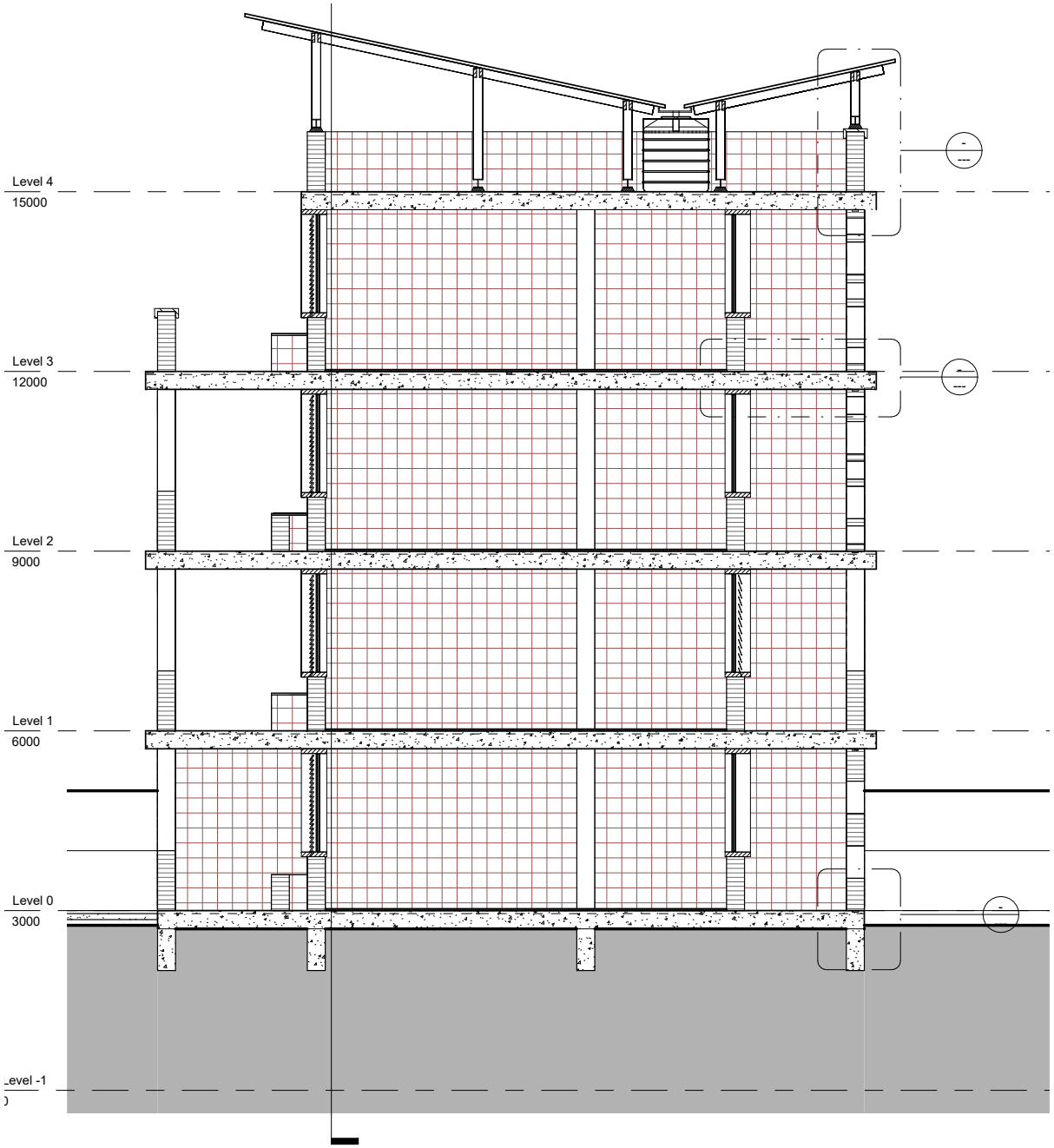



5
4
3
2
1

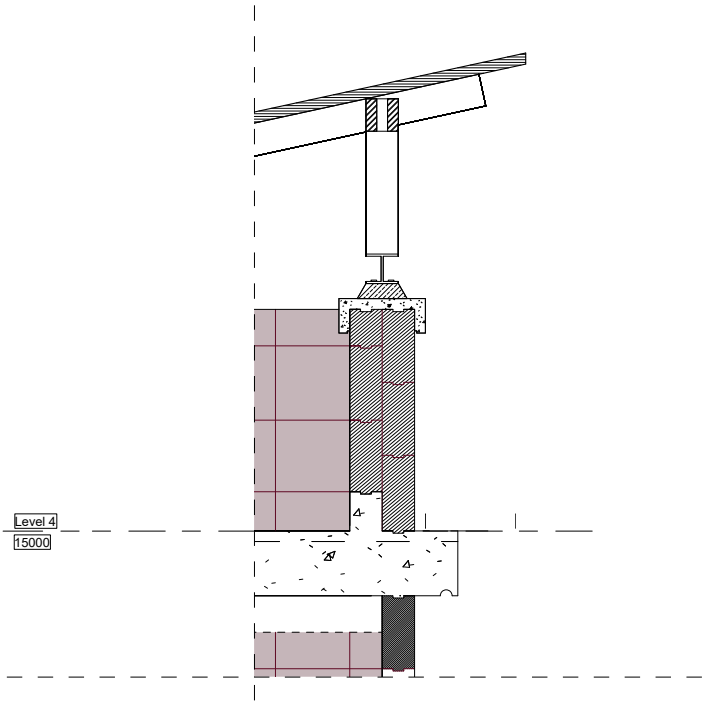
HIS SLAB SECTION



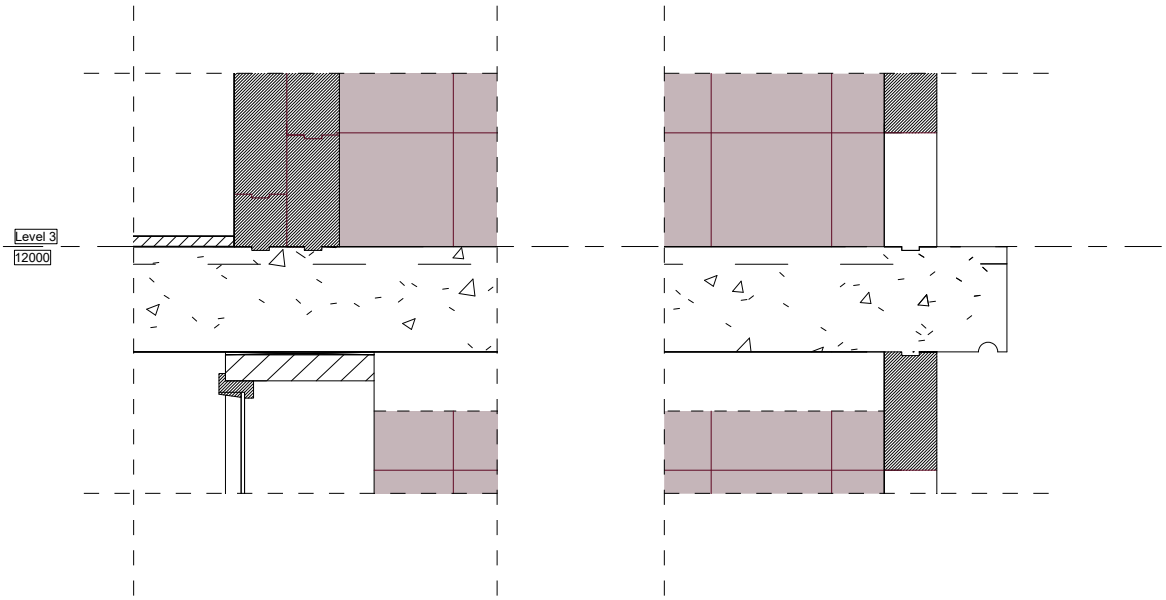
HIS SLAB SECTION 1:20



ROOF SECTION 1:5



FLOOR SECTION 1:5



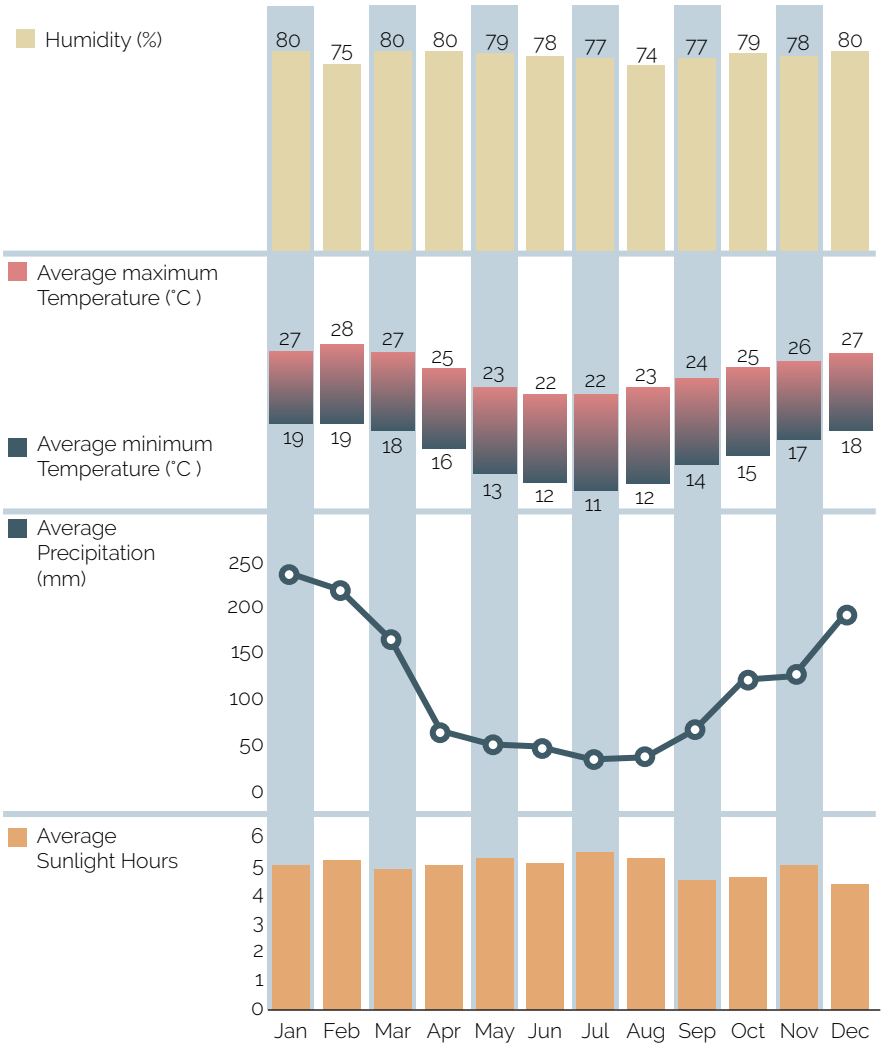
CLIMATE MANAGEMENT

LOCAL CLIMATE

São Paulo: humid subtropical climate (Cfa)

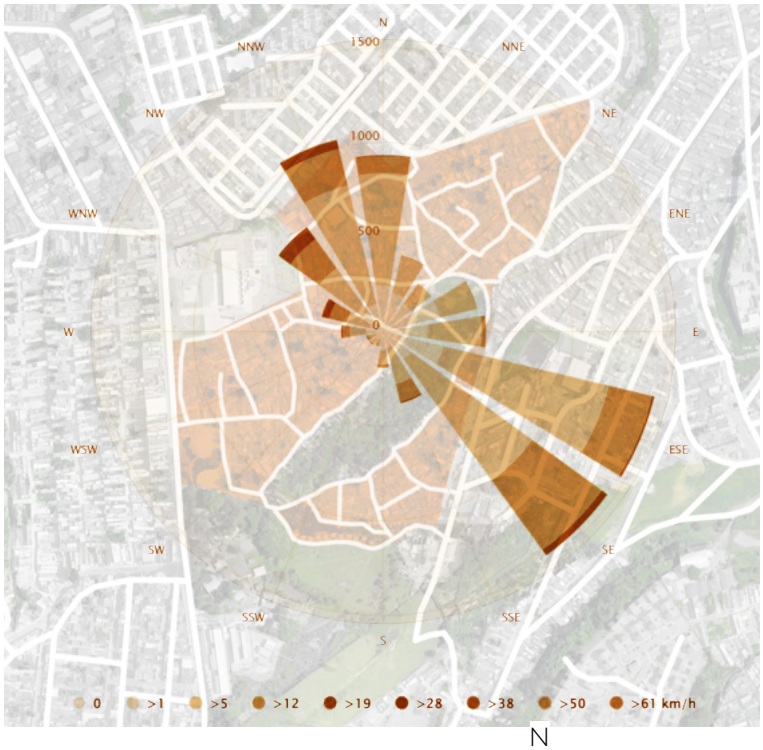
hot and humid summers, and cool to mild winters
Elevation: 760 m

Main factors to take into consideration: heat and humidity

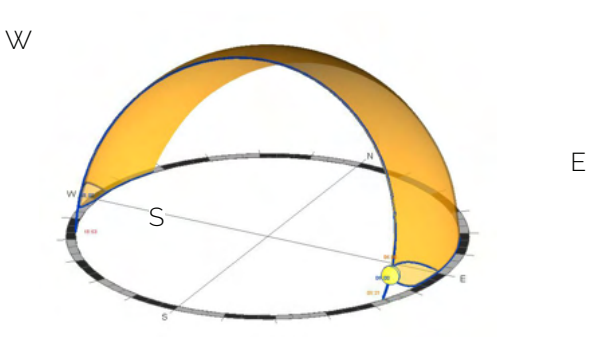


(Source: aventuradobrasil, 2022

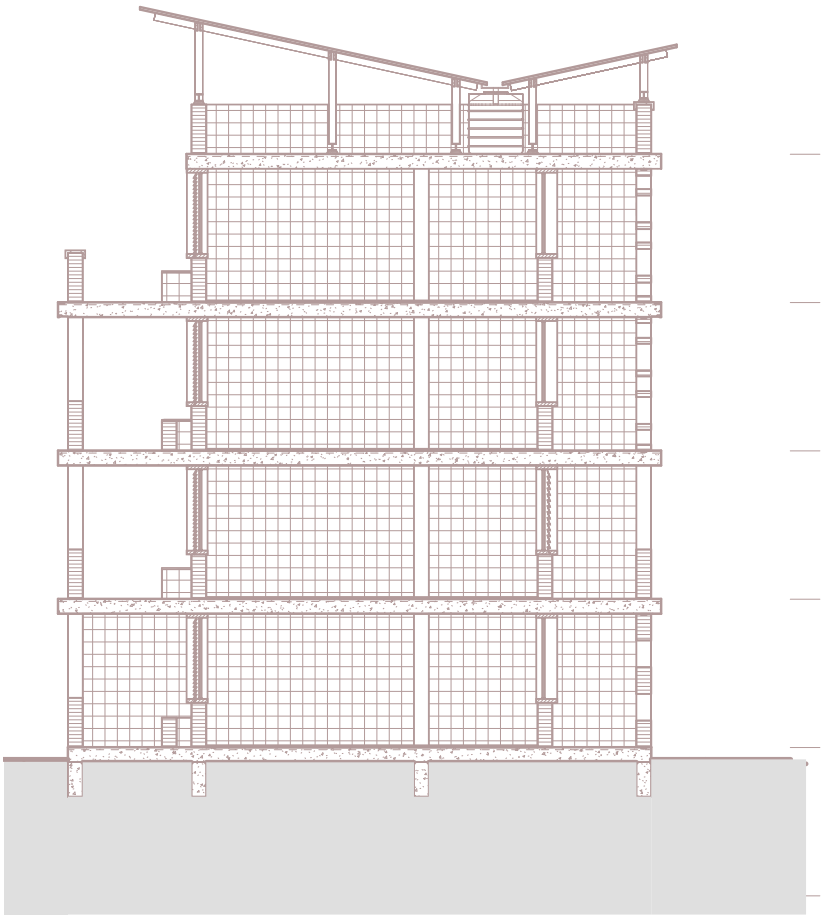
Windrose São Paulo, wind coming mainly from the south-east. (Source: meteoblue, 2022).



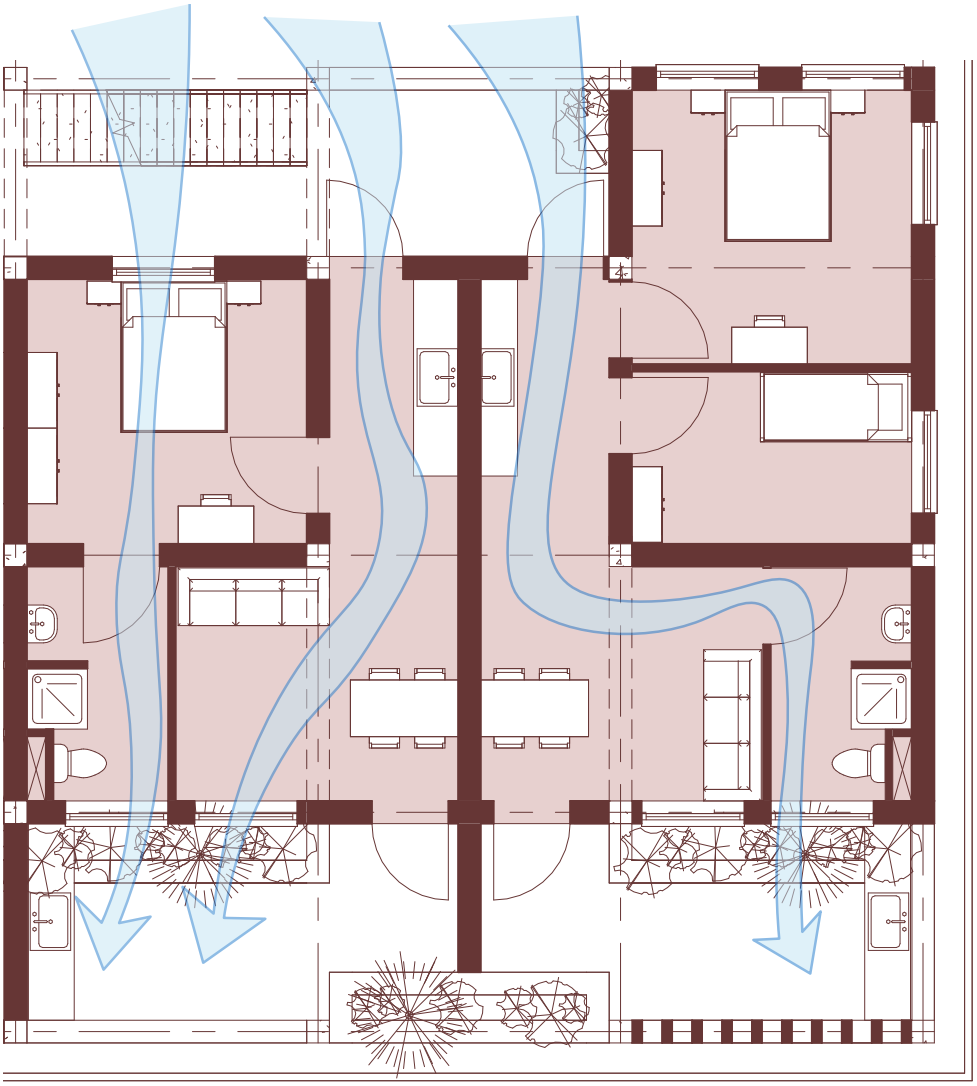
Solar path São Paulo. (Source: Revit, 2022)



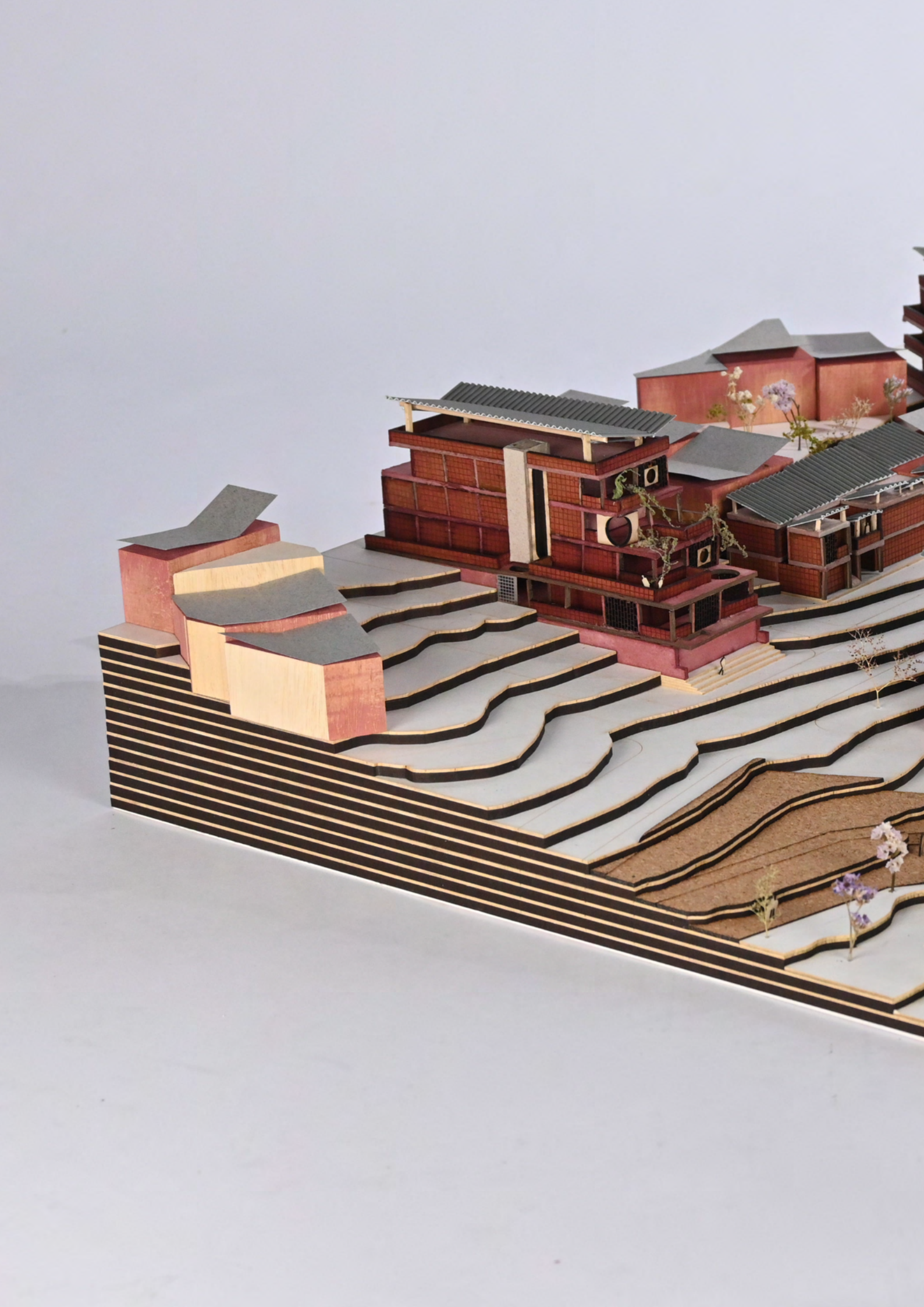
WATER MANAGEMENT

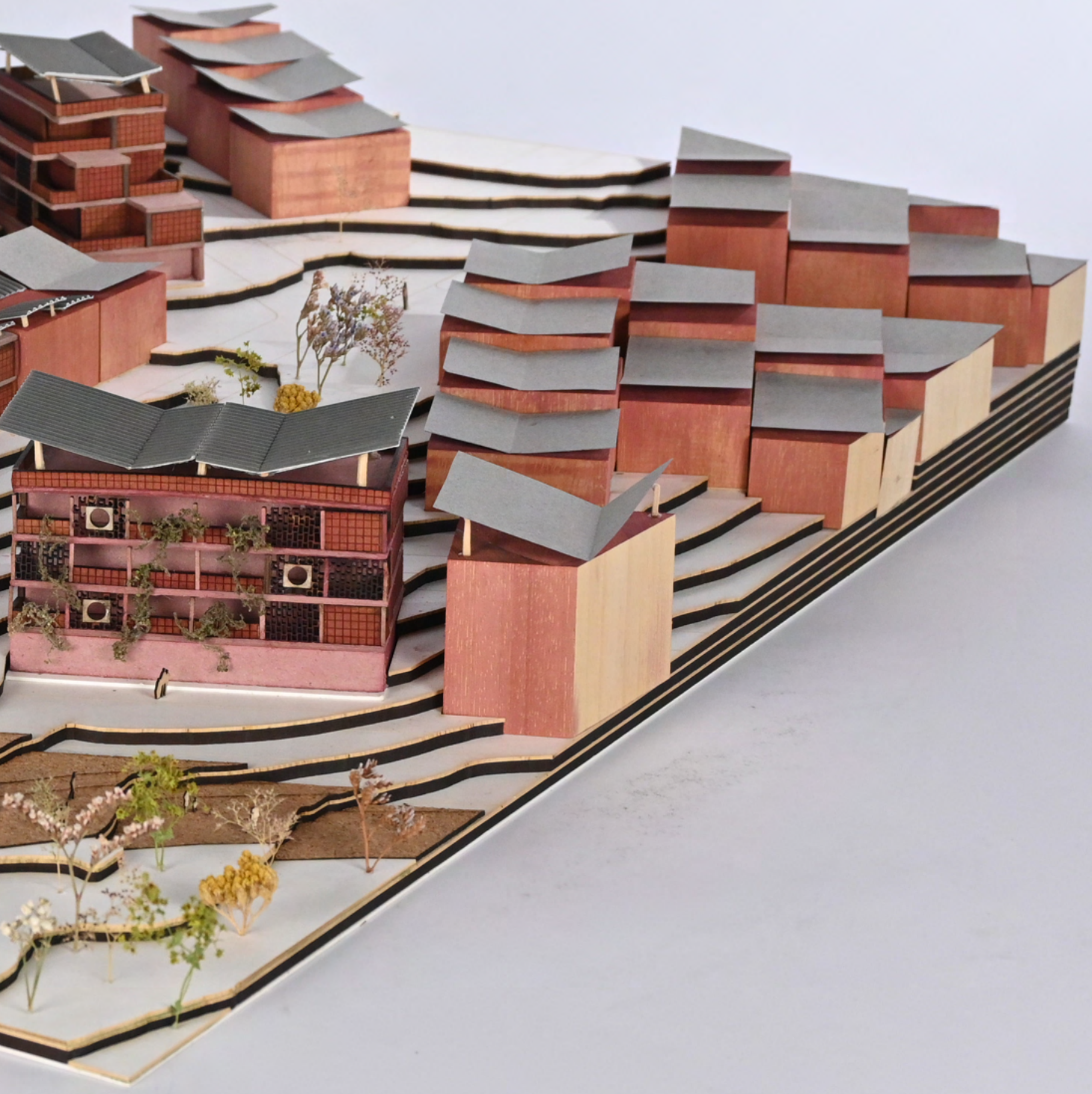


CROSS VENTILATION



IMPRESSIONS





PART III: CONCLUSION

CONCLUSION

DICHOTOMIES

POOR		RICH
PUBLIC	COLLECTIVE	PRIVATE
BOTTOM-UP		TOP-DOWN
FIXED		ADAPTABLE
LOW-RISE		HIGH-RISE
INTERIOR		EXTERIOR
TRADITIONAL		MODERN
EFFICIENCY		RESILIENCE
NATURE		CULTURE
NEIGHBORHOOD	BLOCK	UNIT

Co-existence of Difference
Diversity in built form on all scales
Common ground public spaces
Community engagement
Economic diversity
Biodiversity

A REFLECTION

PERSONAL AND INSTITUTIONAL LIMITATIONS TO RELATIONAL PRACTICES

From the beginning, the aim of my project was to think relationally about affordable housing design in order to create a co-existence of heterogeneous elements. Through this relational approach, using assemblage theory as a theoretical framework, I tried to acknowledge that housing is not merely a physical structure but a system in which social, cultural, environmental, and economic dimensions are entangled through time and space. An assemblage approach to affordable housing in an economically, ecologically, and socially precarious setting helps to see that these precarities don't stand on their own but are entangled and complex issues. I shifted the emphasis of my project towards creating a coexistence of different socio-economic groups, without losing sight of the network of relations they are situated in. Although my focus has been on integrating diverse socio-economic groups within the project, at the same time it tries to address the impact of socially polarized groups on the ecological systems they dwell in, as well as their cost-effectiveness, adaptability, and resource efficiency which all contribute to promoting sustainable ways of living and overcoming the many polarities that characterize the city of São Paulo.

Obviously, there were some limitations to this approach. Thinking relationally about affordable housing design for marginalized groups requires a comprehensive understanding of the historical, social, and environmental context of the project. Centering the voices and perspectives of local human and non-human actors, particularly those who will be directly impacted by the housing project, and recognizing local knowledge, practices, traditions, and ways of living is crucial as they hold immense value for the design. That is why the field trip to Grajaú was extremely important for the development of my project, as I had the opportunity for a limited amount of time to live the Brazilian culture and climate, visit case studies, and engage with the local residents in these projects. I also engaged with a group of architecture students and teachers from FAUUSP, from whom I learned a great deal about Brazilian cultural practices and systems at work in the development of housing in Brazil.

However, the vast majority of this project has been developed from a place very far from its actual location, which meant not being able to engage directly in dialogue with diverse stakeholders and not being receptive to feedback that could have addressed blind spots or made the design process inclusive and respectful of the local context of Anchieta. Besides, I am not just physically distant from the project site. Culturally, my point of departure is a Western one. This raises the question of how I, as a white Western woman, can decide what good housing design for vulnerable communities in the Global South, such as the Anchieta occupation, is. Isn't that approach just again, trying to force the Western hegemony onto communities with different histories, backgrounds, and stories? Designing housing for marginalized

groups in the Global South from a Western point of view requires cultural sensitivity and humility towards the design process. This means recognizing the historical and power dynamics at play in order to dismantle any preconceived notions or assumptions that might inadvertently perpetuate colonial or neo-colonial attitudes.

I tried to do so by tracing the different entanglements at play in Anchieta, which I documented in an assemblage map. After having made this map, I used the ties I had with the FAUUSP students to reach out to the Peabiru Architecture firm that has been involved with the Anchieta community since 2019 and is currently developing the embryo housing project. They could provide me with a lot of useful documents on the development of their urbanization plan as well as several research reports, such as Beatriz Mendes' research on the collaboration between the Anchieta community and Peabiru TCA and a research report from a group of students from Michigan University. These reports not only contain historic and demographic research but also interviews with the residents of Anchieta. They were extremely helpful in supporting my relational approach, as they expressed the desires of those who would be directly impacted by my project.

The relational approach to my research gave me more freedom I allowed myself mentally in the connections I established between my experiences on the field trip, my research, and my design. For example, Lina Bo Bardi's philosophy and view on architecture have had a major influence on my design process, as she doesn't strictly distinguish between or stick to polarities but allows for a mix of them in her designs. Also, during the past year I have followed Anchieta's occupations Instagram page and Facebook page, and Grajaú Institute's social media channels. These social media channels helped me give insight into the current developments on the site, and the community's organizational structures. The comparative analysis and typological mapping exercises set by my mentors were very helpful in learning the local Brazilian practices, architecture, and urban planning models that address affordable housing challenges in the city of São Paulo.

I struggled to apply the relational approach to the design process most. This is also where the main disconnection lies between my research and my design. The main methods to design were 3D modelling and 2D drawing on the computer, which I find easiest. Looking back, I could have used more alternative methods for cultivating a position of being open to *becoming* and establishing new relations through unconventional design methods. As I've been looking into the different case studies and precedents, I got influenced by the current ways and practices of housing development in Brazil. It was easier to criticize these ways and point out what is wrong with them than to come up with correct alternatives. This is why, in the beginning of the project, I was hesitant to make any design decisions, as

adopting a humble and sensitive attitude towards the Anchieta occupation made me very self-aware.

The main theme question I got from my mentors as feedback was: 'How will you attract the different socio-economic groups?' and 'How will you mix the different socio-economic groups?' This made me question on what scale I, as a designer, can organize a harmonious co-existence without forcing the co-existence too much, which may result in backfiring and even promoting the polarization that the project criticizes. With every design decision, I was encouraged to consider this balance of mix. Also, my mentors were critical of the tectonics of the materials I employed. This resulted in the development of a toolkit of building parts, which can be produced, used, and customized by the residents themselves, empowering the local community with skills and tacit knowledge of sustainable construction methods and employing local residents, fostering economic empowerment and ownership of the project.

Having said that, the project still operates within systems of rationalization and extractivism, both in terms of resources as well as knowledge. The architectural profession is an extractive practice, and I haven't been able to dissociate the design from the extractive economy it is set in. Also, this project has been developed at an institute that is driven by the idea of science as an ever-expanding ability to observe, know and decodify. The rationalization of scientific institutions may limit the openness to experimentation, resulting in the loss of serendipity. Focussing on empirical and measurable aspects of phenomena or reducing complex phenomena down into smaller problems, often means leaving out subjective or qualitative elements. Although my intention was to have a relational approach to the project, I sometimes felt restricted by the request of narrowing down my topic at the beginning of this graduation year. Throughout the project I have struggled to find a balance in focusing on the one aspect of socio-economic mix, all the while not trying to neglect the intricate interconnectedness and holistic nature of my approach.

Another danger of working within a scientific setting of rationalization lies in employing extractive methodologies. When doing research on marginalized communities, it is crucial to adopt and attitude of reciprocity and interdependence. This resonates with Donna Haraway's notions of *making kin* and *response-ability* (Staying with the trouble), which means '*to cultivate care-full engagements and the capacity to acknowledge and respond in caring ways to injustices inflicted on human and nonhuman others towards ways of living well together.*'[1] [2] I learned from my work that architecture should always first and foremost be a response-ability.

About halfway through the development of the project, ChatGPT came to life. First,

I wanted to refuse the use of this AI tool, as I was sceptical that this man-made tool would be able to provide me with unbiased and objective information. Out of curiosity, I put my research question into the chatbot, which lead to an answer that I can't describe other than extremely general. This was proof for me that the use of this chatbot is exactly the object of criticism of my work and wouldn't be useful in cultivating new relations in order to reorient current unsustainable practices. However, I have found ChatGPT can be useful in phrasing ideas already established and structuring my writings, as it follows a very clear introduction-body-conclusion formula.

This project has been an exercise in alternative methods and methodologies that can establish new relations and perspectives on housing design. It is not easy to simply establish whether the relational approach "worked", but I believe much of its value lies in attempting to approach a site that is home to a marginalized community more considerate of its complexity and vulnerability. To organize the urbanization process of an occupied site from a symbiosis of both *top-down* as well as *bottom-up*, is an approach that is very useful when trying to sustainably urbanize disputed sites. On the one hand it takes into consideration the well-being, social cohesion, cultural preservation, economic stability, and environmental considerations of existing communities. That is why the managerial scheme starts with the grassroots acupunctural approach in which the residents are included in the development process. On the other hand, to meet the city's needs and requirements such as density and diversity, there is also a need for some *top-down* influence. That is why the scheme gradually incorporates the development of slabs and urban villas, which represent these needs and requirements while at the same time involving the community in their development.

This symbiotic approach is useful in the urbanization process of other occupied and ecologically precarious sites. However, the project is specifically developed for the Brazilian context of São Paulo, as it takes into consideration local needs, practices, histories and stories as well as locally available resources. It is not universally transferable, which is precisely one of the objects of criticism of my project. Instead, it suggests a position that is cultivated through being open to *becoming*, blurring boundaries and allowing its entanglements to mediate new relations.

1. Haraway, D. (2016). *Staying with the Trouble: Making Kin in the Chthulucene*. https://en.wikipedia.org/wiki/Staying_with_the_Trouble
2. Shaw, K. (2020). Going beyond extractive methodologies to research extractivism. *WEGO-ITN*. https://www.wegoitn.org/going-beyond-extractive-methodologies-to-research-extractivism/

LIST OF REFERENCES:

Arendt, H. (1958). *The Human Condition*. University of Chicago Press.

Bhan, G. (2019). Notes on a Southern urban practice. *Environment and Urbanization,* 31(2), pp. 639–654.

Caldeira, T. P. R. (1998). Fortified Enclaves. *Cities and Citizenship,* pp. 114–138.

Caldeira, T. P. R. (2016). Peripheral urbanization: Autoconstruction, transversal logics, and politics in cities of the global south. *Environment and Planning D: Society and Space*, 35(1), pp. 3–20.

Carmignano, O., Lago, R. M., Teixeira, A. M., Lameiras, F. S., Brandão, P. E., & Lago, R. M. (2021). Iron Ore Tailings: Characterization and Applications. *Journal of the Brazilian Chemical Society*. https://doi.org/10.21577/0103-5053.20210100

de Certeau, M. (1984). *The Practice of Everyday Life.* University of California Press, Berkeley.

Deleuze, G., Guattari, F., & Massumi, B. (1987). *A Thousand Plateaus: Capitalism and Schizophrenia* (First edition). University of Minnesota Press. p. 373.

Deleuze, G., & Patton, P. (1995). *Difference and Repetition* (Revised ed.). Columbia University Press.

DeLanda, M. (2004). 'Material Complexity' in N. Leach, D. Turnbull and C. Williams (eds), *Digital Tectonics*. London: Wiley Academy. p. 21.

Dovey, K. (2013) 'Assembling Architecture', in Frichot, H. & Loo, S. (eds) Deleuze and Architecture, Edinburgh: University of Edinburgh Press. pp.131-148.

Dovey, K., & Ristic, M. (2015). Mapping urban assemblages: the production of spatial knowledge. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, 10(1), pp. 15–28.

Frichot, H., Loo, S. (2013). *Deleuze and Architecture.* Edinburgh University Press. p. 91.

Goto E. A., Suarez A. M., Ye H. (2022). *Spatial analysis of social vulnerability in São Paulo city, Brazil.*

Heidegger, M. (1971). Building, Dwelling, Thinking. In *Poetry, Language, Thought.* Harper Colophon Books, New York.

Latour, C., LaTour, C. D. S. D. L. B., & de Sociologie de l'Innovation Bruno LaTour,

C. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford University Press.

Lefebvre, Henri, & Nicholson-Smith, D. (1992). *The Production of Space* (1st ed.). Wiley-Blackwell.

Mendes, B. (February 12, 2021). *Ocupação Anchieta: Conflitos e experiências na luta por moradia*. Issuu. https://issuu.com/beatriz.mendes/docs/tfg_caderno_final_rev_issu

Peabiru TCA. (2022). Plans and documents Auto-urbanization plan.
Phillips, D. (2016). *Samarco dam collapse: one year on from Brazil's worst environmental disaster*. The Guardian. https://www.theguardian.com/sustainable-business/2016/oct/15/samarco-dam-collapse-brazil-worst-environmental-disaster-bhp-billiton-vale-mining

Plano Director Estratégico do Município de São Paulo. (2014).

Rawes, P. (2013). *Relational Architectural Ecologies.* https://doi.org/10.4324/9780203770283

Santin, E. (2021). Use of acidic slags as constituents of cements produced by Votorantim Cimentos in Brasil. *PORTAL ABCP*. https://abcp.org.br/11h25-use-of-acidic-slags-as-constituents-of-cements-produced-by-votorantim-cimentos-in-brasil/
https://twitter.com/worldsteel/status/1179391899465109506

Sennett, R. (2018). *Building and Dwelling: Ethics for the City* (First American Edition). Farrar, Straus and Giroux.

Shafique, T. (2021). Re-thinking housing through assemblages: Lessons from a Deleuzean visit to an informal settlement in Dhaka. *Housing Studies*, 37(6), pp. 1015–1034.

.: Sistema de Consulta do Mapa Digital da Cidade de São Paulo:. (n.d.). Prefeitura De São Paulo E PRODAM. https://geosampa.prefeitura.sp.gov.br/PaginasPublicas/_SBC.aspx

Taubman college. (2017). *inFORMA Ocupação Anchieta!* Student's master thesis Urban Planning.

Thomas, K. L. (2007). *Material Matters: Architecture and Material Practice*. London: Routledge. p. 2.

Weber, E. (2012). *Living Together: Jacques Derrida's Communities of Violence and Peace* (1st ed.). Fordham University Press.