



Segregation and accessibility: process of shaping urban spaces in the medium-sized city of Campos dos Goytacazes, RJ, Brazil

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ABSTRACT

Brazilian medium-sized cities, like Campos dos Goytacazes, have within them peculiarities that enlighten their own process of urban expansion. In this paper, we aim to discuss the articulation between two conditions that broadly guide it. Socio-spatial segregation, a process characterized by the concentration of certain social segments in different regions or neighbourhoods (VILLAÇA, 1998), and accessibility, a crucial dimension of sustainable urban mobility that enables urban activities to be reached by certain individuals or group of individuals from different locations in the city (PEREIRA et al., 2017). Through the analysis of location, shape and frequency of large horizontal housing isolated polygons in the urban fabric of Campos dos Goytacazes, in the state of Rio de Janeiro, Brazil, and the expansion of the road network since 1980, we aim to develop spatial correlations to contribute to a critical review on the conflicting ability to move around the city depending on the social group of origin. Thus, we hope to highlight the radical spatial detachment of segregated social groups from parts of urban space.

Keywords: Accessibility, segregation, medium-sized city, Campos dos Goytacazes.

INTRODUCTION

Brazil's medium-sized cities have gained prominence in terms of production of urban space and urbanization. A comparison between the 2010 and 2022 Censuses shows that of the 12 million increase in the Brazilian population, 8.3 million people are concentrated in medium-sized cities. In addition, 278 Brazilian municipalities have a population between 100 and 500 thousand inhabitants and are classified as medium-sized cities, an increase of 12% compared to the 2010 Census, when there were 245 Brazilian municipalities with a population between 100 and 500 thousand inhabitants (IBGE, 2023).

Although it is still too early to define the data from the 2022 Census as a trend towards the re-spatialization of the population across Brazilian territory, it is undeniable that medium-sized cities play a specific role in the country's urban arrangement. Driven by the migration caused by the global Covid-

19 pandemic in 2020, the more widespread possibility of remote working, the constant increase in the cost of living and the perception of violence in the metropolis, medium-sized cities have been consolidating themselves as a representative space in the process of urban expansion in Brazil. The medium-sized city of Campos dos Goytacazes (Figure 1), in the north of the state of Rio de Janeiro, has a prominent regional political and economic position, given that its territory is home to the second largest oil and natural gas producing basin in the country, the Campos Basin. It is the largest municipality in the state of Rio de Janeiro, with a territorial unit of 4,032.487 km², 13 districts plus the central district and a population, according to the 2022 Census, of 483,540 inhabitants, approximately 90% of whom are urban.

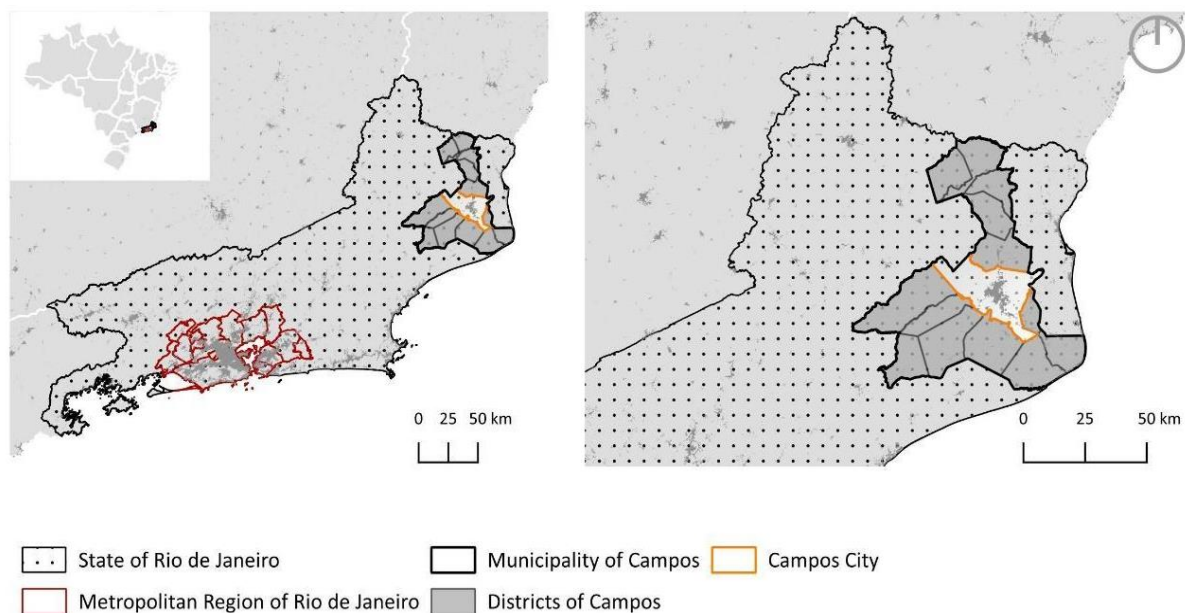


Figure 1 - Location of the Municipality of Campos dos Goytacazes in the State of Rio de Janeiro.

Source: Author, 2024.

In the 1980s, the process of shaping the urban space of Brazilian cities was crossed by the proliferation of what we call horizontal housing isolated polygons (Hhip's), a phenomenon in which Campos dos Goytacazes was no exception. This new housing typology is essentially characterised by grouping residential units on a vast portion of land with its perimeter surrounded by ostentatious boundaries separating inside and outside, highlighting the dynamics of the city's spatial control, which segregates and limits the equal use of urban spaces by all city dwellers.

Hhip's reinforce a discontinuous mode of urban growth, disconnected from the city's main historical and consolidated centrality. The demand for large tracts of low-value land as a criterion for this real estate product drives the displacement of the Hhip's to the edge of urbanisation, promoting fragmented urban expansion. What's more, to transfer the housing of high-income social segments from the central area to the edges of the urban perimeter, it was necessary to double down on the expansion of urban mobility based on the private automobile matrix.

This article seeks to analyse the distribution of Hhip's in the territory and their relationship of dependence on road infrastructure and the predominance of individual motorised transport, which reproduce the historical process of segregation in Campos dos Goytacazes, Rio de Janeiro. The first

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part of the article discusses the emergence and consolidation of closed horizontal residential spaces in Brazilian cities, urban mobility policy in Brazil and the preponderance of road mobility infrastructure production aimed at individual transportation.

In the second part, we present the methodology that was developed using a multi-scalar and multivariate qualitative and quantitative approach to analyse the phenomenon articulated between the real estate production dimensions of the Hhip's and the structuring road axes of urban mobility. For data and information on the Hhip's in Campos de Goytacazes, primary data was collected in the archives of the Municipal Department of Urban Planning, Mobility and Environment of Campos dos Goytacazes City Hall. Socio-economic data was taken from the IBGE (2010) and vehicle fleet data from DETRAN-RJ (2024).

In the conclusions, we argue about the essential characteristics of this much desired and widespread real estate product, the Hhip's, which demand vast tracts of land on the edges of the consolidated urban fabric. By relying on road accessibility, they promote fragmented urban growth and accentuate the historic process of socio-spatial segregation which characterises the urbanisation of Brazilian cities.

Production of horizontal housing isolated polygons (Hhip's)

The study of horizontal housing isolated polygons as a housing typology (GOMES, 2024) has been recurrent in various scientific fields such as sociology, anthropology, geography and urbanism since its emergence in the mid-twentieth century in the USA. The concern that leads scholars to turn their attention to the phenomenon of the proliferation of Hhip's in the most varied cities around the world is due to one main cause: the suspicion that Hhip's symbolise a much more profound transformation in society than merely a new possibility for urban dwelling (BLAKELY and SNYDER, 1997).

The repeatedly disseminated ideal of living in privatised, homogenised, walled and mainly controlled spaces indicates that there is an articulated global movement that assumes and promotes this type of housing as the contemporary ideal of living. This urbanisation movement is based on the neoliberal logic that the qualities and benefits of the city, such as safety, accessibility, mobility, housing, education, health cannot be delivered and managed by the public authorities and must therefore be produced, offered and managed by the private sector.

Thus, like Sposito (2013), "...we have adopted the generic expression 'closed residential spaces'..." (SPOSITO and GOES, 2013) because we reiterate that more important than their legal status is the reality of their existence in the urban territory. We would like to point out that in the course of this work we will also frequently use the nomenclature 'polygons' followed by the adjectives 'isolated', 'housing' and 'horizontal'. As this work highlights the morphological analysis of the process of urban configuration promoted by the expansion of spaces for private housing use on the edges of the city of Campos dos Goytacazes, we emphasise the power of form in structuring the urban fabric, and for this reason, at certain point we have replaced the name 'space' by 'polygons'.

In Brazil, the most relevant path that studies the phenomenon of closed horizontal residential spaces, connects it with the significant increase in insecurity and the growth of violence in large cities. Caldeira (2011) and Sposito (2013) will focus their research by determining that the main cause of the advance of closed residential spaces as a mode of urban dwelling is urban insecurity.

According to Caldeira (2011), recent transformations in social dynamics, driven by technological revolutions, restructuring of the world of work, exhaustion of a model based on nationalism, and neoliberal postulates such as privatisation, individualism and inefficiency of public power, have reconfigured the way in which the dominant social segments permeate urban space and segregate themselves in closed residential spaces. This allows us to suspect that the self-segregation of the elites in the urban territory operated under the capitalist mode of production is still confirmed as a rule in the process of producing urban space and, therefore, merits analysis that identifies how this contemporary socio-spatial segregation is reflected in the daily lives of different social groups and their accessibility.

Urban mobility

Urban mobility has become a central principle of the urbanisation process, rather than one of its consequences (ASCHER, 2004; URRY, 2007; BERTOLINI, 2017). The sharp growth in the mobility of people and goods has been accompanied by a transformation in the size and shape of cities. Under the influence of new technologies, the dynamics are intensifying, and the processes of urban expansion and fragmentation are shaping urban centres, which are interspersed with both functionally specialised areas and natural areas, connected by transport infrastructure and the continuous flow of people, goods and information (ALVIM; IZAGA et al., 2024).

In Brazil, mobility conditions in cities with more than sixty thousand inhabitants (VASCONCELLOS, 2013) present a picture where journeys by public transport are longer and take longer on average than those made by individual transport, which are 62% shorter and spend 58% less time. Despite the advances represented by the National Urban Mobility Policy (Law No. 12,587/12) and its monitoring (BRASIL, 2018), a policy based on benefits and exemptions given to cars and motorcycles and inadequate public transport policies still prevail, which have increased its cost and decreased its reliability, generating many inequities.

Campos dos Goytacazes Sustainable Mobility Plan (2022), although it aims to “... incorporate the principles of sustainable mobility, with a focus on public transport and non-motorized transport, through the adoption of guidelines and measures oriented towards a safe, efficient and accessible urban transport system” (CAMPOS DOS GOYTACAZES, 2022, p. 4), privileges in its text the treatment of the infrastructure of the road system to the detriment of public transport planning.

In Campos dos Goytacazes, cars and motorcycles have increased by almost 174% in the last 20 years, while the population has grown by 18% (IBGE, 2022; DETRAN RJ, 2024). In other words, we've gone from a ratio of one vehicle for every 6 people in 2000 to almost half that in 2022, one vehicle for every 2.5 people. There was a vertiginous growth rate of 68% between 2000 and 2010 and it remained stable at 63% from 2010 to 2022, above the state average, which varied between 56.5% in 2010 and 51.6% in 2022.

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As far as public transport is concerned, the bus system is considered to have a lack of lines to certain regions, non-compliance with timetables and the scrapping of the fleet, providing a poor-quality service (ARAUJO, 2012; CRUZ, 2021; SILVA, 2022). The lack of open data on the structure of journeys highlights the operational and planning difficulties faced by the body responsible, the Municipal Institute of Traffic and Transport (IMTT). The City Council's policy of subsidising fares, with the implementation of the "Citizen Card", has had an impact on the increase in journeys since 2009 (ARAÚJO, 2012; p.52). The city has two terminals, the Roberto Silveira Bus Terminal, the departure point for all inter-district lines, and the Luiz Carlos Prestes Urban Terminal, which serves urban lines. The organisation of the lines is radial, from the centre to the outlying neighbourhoods, promoting little adherence to the territory, resulting in poor accessibility. With a predominantly flat configuration, organised by a central, historically established main district, with other nuclei configured in a dispersed manner, Campos has 55 km of cycling routes in place, with improvements and expansion of the network expected over the next few years. This situation means that the bicycle (MARINO, QUINTANILHA *et al.*, 2021) is the only remaining option for the population with lower incomes, who live in the outlying areas.



Figure 02 – Aerial photo of Campos dos Goytacazes.
Source: Author, 2022.

METHOD

The approach is based on studies of the urban morphology of the contemporary city (PANERAI, 2006; SOLÀ-MORALES, 1997; COSTA, 2015), where we seek to explore tools that allow us to think of the agglomeration as a whole, to identify its parts and describe its forms.

In line with Lefebvre's interpretation of the city as a projection on the ground of social relations, Panerai (2006) highlights elements that organise the territory. The road, the regular projected grid of extensions, to which are superimposed, with the development of means of transportation and communication, dynamics that produce fragmented and diffuse fabrics in the contemporary city. Based on this, he defines the constituent elements of the urban fabric as threefold: the road network, land parcels and buildings.

Likewise, for Solà-Morales (1997), the layout is the most permanent dimension of urban form, understood as a real and collective synthesis of existing and future built form. Solà-Morales develops an understanding of the temporal process of its constituent elements - subdivision, urbanisation and building - from which he lists six forms of urban growth in cities: i- grid extension, ii- suburban growth based on the logic of the road and in contiguity with the main urban nucleus, iii- peripheral urbanisation, in discontinuity with the main urban nucleus, iv- the garden city, v- informal urbanisation or favela and vi- monofunctional polygons.

We will adopt a multi-scalar and multivariate qualitative-quantitative approach to analyse the phenomenon articulated between the real estate production dimensions of the Hhip's and the structuring road axes of urban mobility in the municipality of Campos de Goytacazes. The analysis is based on the research carried out at the Municipal Department of Urban Planning, Mobility and Environment of Campos dos Goytacazes City Hall, where 42 Hhip's were found with approval licenses (Figure 03) (GOMES, 2023).

To map the urbanization growth, in the time frame between 1984 and 2024, the Google Earth mapping database was used. Socio-economic data was taken from IBGE (2010) and urban mobility data from DETRAN-RJ (2024).

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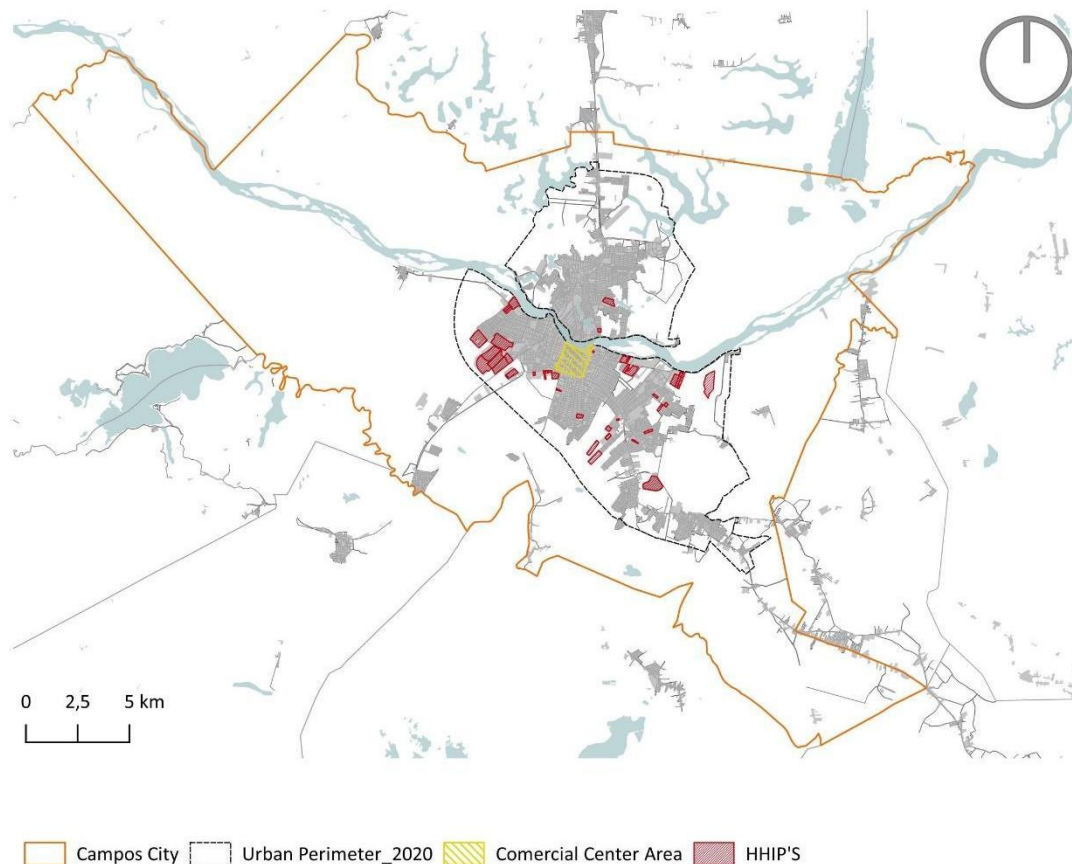


Figure 3 - Urban fabric of Campos dos Goytacazes and location of the 42 Hhip's
Source: Author, 2024.

RESULTS AND DISCUSSIONS

The occupation of the territory of Campos dos Goytacazes began on the right bank of the Paraíba do Sul River, with the urban core being established on the highest part, around the current Praça São Salvador. The direction of occupation is from the coast towards the interior, from Farol de São Tomé towards the Paraíba do Sul River, where sugar cane mills were installed in the 18th century. From 1837 to 1875, the urban area grew very little, but this changed with the arrival of the railroad in 1873. The vectors of the city's expansion until the mid-20th century were influenced by the 1902 Urban Plan, developed by Saturnino de Brito, and the 1944 Urbanization Plan for Campos, developed by Coimbra Bueno e Companhia Ltda.

At that time, three vectors of growth were identified: one in a westerly direction, another in a southerly/easterly direction, towards the coast and the appearance of the urban area of Guarus on the other bank of the river, to the north. In the middle of the 20th century, a quadrilateral is identified with dense occupation, defined by the river and the railroad beds, with some prominent nuclei to the south (Costa, 2005). At the end of the 20th century, there was a vector of growth towards the coast, as well as urban growth along the BR-101 towards Vitória.

Since the appearance of the first closed horizontal residential space, the Residencial do Horto condominium of single-family houses, in 1981, this form of housing has been proliferating assiduously in the urban fabric of Campos dos Goytacazes. The emergence of Hhip's largely depends on the availability of vast tracts of idle land that can be divided up into smaller plots for the development.

Thus, the very nature of the real estate business in terms of launching a larger number of condominiums requires the search for urban land of lower value, in order to maximise business profits. Historically, the urban land least valued by the real estate market has been located on the edges of the urban perimeter, i.e. on the limits of what is urban and what is rural. Generally, the further away from the centrality(ies), where access to urban facilities and infrastructures is greater, the lower the value of the land.

For this reason, the phenomenon of the proliferation of Hhip's takes place in a very specific part of the city's territory: on the edge of urbanisation, on the margins of the consolidated city, where the land is of low value, but where there is the possibility of access to the main urban centrality quickly and efficiently.

From an analysis of the city's urban growth, highlighted every 10 years since the first Hhip's appeared, the developments are set up exactly where the consolidated urban fabric meets the non-urbanized one (Figure 4).

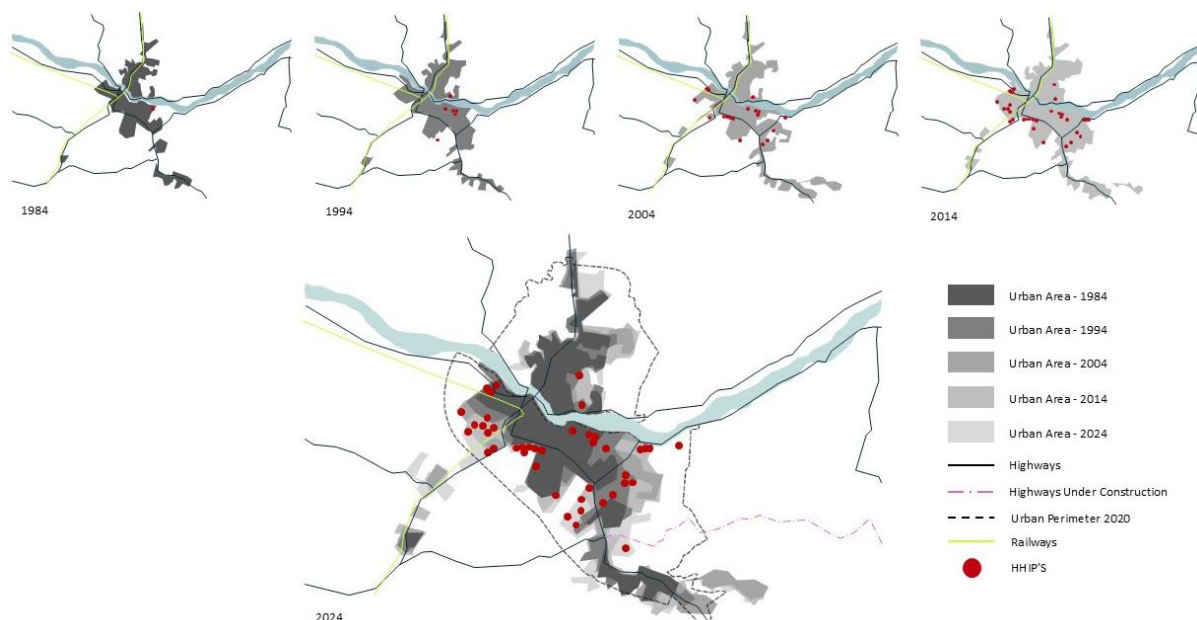


Figure 4 – Urban growth of Campos dos Goytacazes and the proliferation of Hhip's.
Source: Author, 2024.

CONCLUSIONS

Freed from dependence on the city, the Hhip's model gains autonomy in relation to urban space, detaches itself from complex urban issues and becomes independent to praise its original qualities. While the narrative of violence and urban insecurity is being inflated by the hegemonic media, the condominium offers control and harmony. While the public space is dirty, gray and chaotic, the condominium is immaculate, green and peaceful. While everyone circulates in the city, only a few circulate in the condominium. While in the city there is encounter, enjoyment and celebration, in the condominium there is isolation, apathy and boredom. In the city there is freedom, in the condominium there is domination.

Despite this, there is only one condition external to the Hhip's that still binds it to the urban space. Even if the horizontal condominium denies the qualities of concentrating the benefits of the city, its

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inhabitants still depend on the city for their daily living. In fact, it is undeniably included and participates in the urban organisation.

Although the trend towards the evolution of the programmatic content of the design of closed horizontal residential spaces aims for almost absolute independence from the city, including all these functions within its internal perimeter, there is still a dependence on a collective urban element that is essential for the implementation and survival of the condominium: the circulation routes that allow its residents access to the consolidated city. The transfer of housing from the city to the condominium is based on the ability of its future residents to afford the costs and time spent commuting between the city and the condominium.

Villaça's (1998) question as to what comes first - investment in urban infrastructure equipment or the need for infrastructure to meet an urban expansion already underway - is answered in this case. Hhip's operate like plugs, which basically need an efficient road network - a network that doesn't even depend on municipal investment, because they are usually state and federal highways - to connect and suck in the useful effects of agglomeration that have already developed and matured in that city. This way of fitting Hhip's typomorphology into urban dynamics, developed by urban space developers, alerts us to a mode of urban growth that is opportunistic and disconnected from the commitment to the city's community character.

The constant and frequent coupling of these fragments to the road network that connects them to the open city is structured in a powerful business model that, by maximizing the value of urban land and aligned with public interests, transforms the urban fabric, alters the usual events of urban expansion traditionally driven by more organic processes and disqualifies the open city as a public space and, therefore, to be watched over and cared for by a community.

The construction of Hhip's in areas close to the regional road system establishes itself as a belt around the central urban core. At the same time, detached from this, poorer centers are developing on the more distant outskirts (Figure 5). In other words, if on one hand we have the extensive use of cars by the inhabitants of the Hhip's, which are on average 6km from the central area, on the other hand we observe the fragility of the public transport that serves the more distant districts, which are organised in a discontinuous way in relation to the central urban core. This dynamic exacerbates the historical process of differentiated appropriation of space, with the discontinuous expansion of the urban sprawl resulting from the selective expansion of the city, in which differences in accessibility produce inequality and express the historical process of segregation of its organisation.

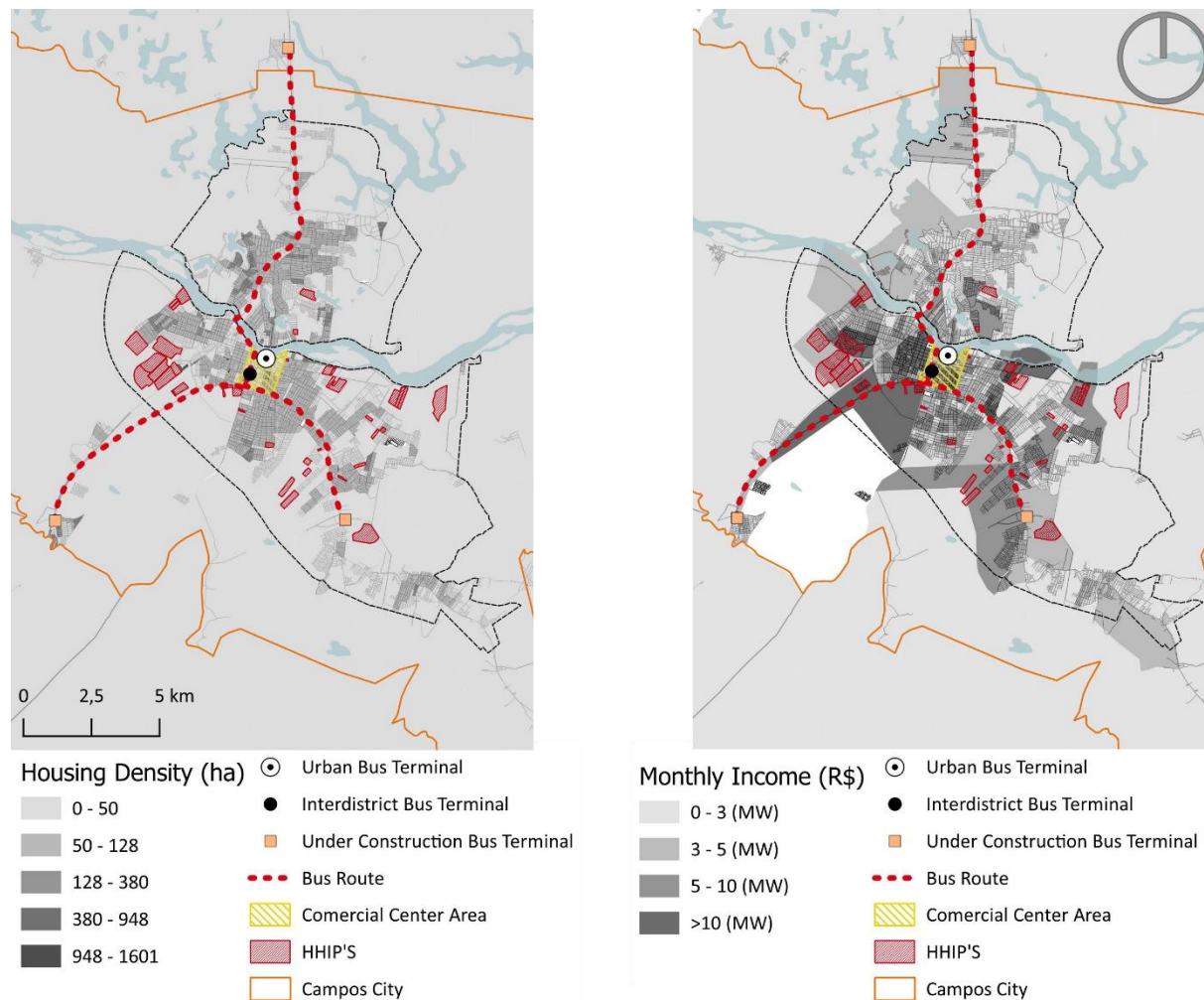


Figure 5 - Housing density and monthly income in the city of Campos dos Goytacazes.

Source: Author, 2024.

Thus, the research highlighted three important urban growth trends driven by the close connection between the proliferation of Hhip's on the edges of urbanization and the reinforcement of urban mobility based on the private road matrix.

Hhip's encourage a fragmented urban growth that reinforces the emergence of peripheral areas of concentrated poor population and the emergence of areas contiguous to the traditional center of the city concentrated by higher incomes.

Roads are considered the main element of urbanization, defining a hierarchy between the three fundamental elements of the urban shaping process: streets, urban blocks and buildings.

Upper classes auto-segregation in Hhip's goes hand-by-hand with the urban and mobility planning models, privileging the richest and relegating to the poorest the outlying areas where the transport service is inefficient.

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