

Rapid Urban Expansion and Governance Fragmentation in Metropolitan Peripheries: A Territorial Assessment of La Puntilla, Samborondón

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Abstract— This study presents a territorial diagnosis of La Puntilla sector, located in Samborondón canton, aiming to understand the current territorial conditions under accelerated urban growth. The diagnosis is conducted due to increasing pressure from residential expansion, real estate investment, and limited institutional coordination, which have generated territorial conflicts, environmental risks, and service imbalances. The main objective is to characterize the current territorial model through the analysis of five subsystems: biophysical, sociocultural, economic, human settlements, and political-institutional. A mixed methodological approach was applied, combining qualitative analysis based on territorial observation and cartographic interpretation, with quantitative analysis using official statistical data and current planning regulations. The results reveal an unsatisfactory territorial system marked by disordered land occupation, environmental pressure on sensitive areas, conflicts between private and public interests, weak citizen participation, and institutional coordination challenges. However, significant potentialities were identified, including local government regulatory capacity, citizen interest, and the strategic metropolitan location of the area. This territorial diagnosis provides a technical foundation for territorial planning processes, supporting the formulation of the PDOT Partial Plan and promoting a more organized, sustainable, and equitable urban development model.

Keywords: Territorial planning, Territorial diagnosis, Urban planning, Territorial management, Territorial sustainability

INTRODUCTION

Land use planning has become crucial in guiding the growth of rapidly changing cities and parishes. In places like La Puntilla, which belongs to the Samborondón canton, we see that the population does not stop growing, cities are expanding and resources and services are under a lot of pressure. The study area covers an approximate area of 61.6 hectares, characterized by a predominantly residential urban growth and a high territorial dynamic. Samborondón, within the province, maintains a close metropolitan relationship with Guayaquil and Durán, which makes it even more important and forces us to look closely at its current situation. Doing an analysis before acting is key to seeing problems coming, putting order in how the soil is used and

ensuring that everything grows in a balanced way, considering the physical, social and urban characteristics of the environment.

Carrying out a diagnosis of the territory is like analyzing and interpreting how the territorial system is, to see what problems there are, what risks we run and what good things we can take advantage of, according to Gomez Orea (2007). This type of diagnosis is essential for sustainable urban planning. With this, we understand how natural, social, economic and urban elements are connected, and how they influence the management of the territory. In Ecuador, all this is based on laws such as the COOTAD, the Constitution, the Organic Law of Territorial Planning, Land Use and Management (LOOTUGS) and the Development and Territorial Planning Plans (PDOT) in force. All of them emphasize that we must plan thinking about the future and seeking the well-being of all. This is where Good Living or Sumak kawsay comes into play, which is in the Constitution and tells us that we must seek equality in the territory, take care of the environment and ensure the rights of all. beyond a merely technical conception of development.

PDOTs are technical tools that mark the path to follow for local governments to organize their development in the medium and long term. It defines objectives, policies and rules to organize land use, avoid conflicts over territory and achieve growth that does not harm the planet. In addition, there is the Partial Plan, which serves to study in depth a specific area within the canton, detailing what that area is like and how the general PDOT guidelines should be applied.

In this context, La Puntilla represents a strategic sector of the Samborondón canton that is growing very fast and the consolidation of residential and commercial uses. The main objective of this work is to characterize the current state of the territory of La Puntilla, through the construction of the Current Territorial Model, analyzing how five key areas work: nature, society, economy, human settlements and politics. This way we will be able to see what the main problems and risks are, how things are evolving and what opportunities we have. This will give us a clear and well-founded vision of the territory. The diagnosis delimits exactly the area where we are going to act and organizes the necessary information for the next stages of planning, especially to create the Partial Plan of the PDOT of Samborondón and to design how we want the territory to be in the future, the Desired Territory Model. The analysis period corresponds to the year 2024, in accordance with the available information and the current PDOT of the Samborondón canton.

Table 1 General Characteristics of the Study Area in La Puntilla Parish, Samborondón Canton

Category	Description
Location	La Puntilla Parish, Samborondón Canton, Guayas Province
Approximate Length	≈ 61.6 ha (own measurement using Google earth)
Urban Characteristics	Expansion area with accelerated growth, predominantly residential
Metropolitan connection	Direct relationship with Guayaquil and Durán through main roads and bridges
Pressure on services	Increased demand for infrastructure, utilities and mobility
Strategic elements	High real estate value areas, new commercial and residential developments

MATERIALS AND METHODS

To carry out the territorial diagnosis of La Puntilla, a methodological approach was used that combines qualitative and quantitative tools, in accordance with the guidelines established by the National Planning Secretariat (SENPLADES) for the preparation of territorial diagnoses. Initially, the study area was defined using the administrative limits of the Development and Land Use Plan (PDOT) and the analysis of satellite images from Google Earth Pro, which made it possible to accurately determine the extent and limits for data collection.

A documentary review of secondary sources was carried out, which included statistics from the National Institute of Statistics and Census and INEC and the Municipal Cadastre. All this data was considered up-to-date and, therefore, provided detailed information on different demographic, economic, and social dimensions that are fundamental to understanding the dynamics of the territory. In addition, current regulations, such as the COOTAD and the PDOT of Samborondón, were reviewed to see how the diagnosis could be linked to various existing policies.

Direct observation and mapping with digital applications, such as Google Earth, made it possible to know the distribution of the land and occupation patterns. This instrument identified urbanized areas, expansion areas, and undeveloped sectors that could be important for future interventions.

In relation to the quantitative aspects, Excel spreadsheets were used to process the data, classifying them into different categories, and to perform basic calculations such as population density, land use and green areas. Trend diagrams were used to show growth trends and particular territorially rooted problems.

The analysis was broken down into five key subsystems: biophysical, sociocultural, economic, human settlements, and political-institutional. Each subsystem was analyzed individually, determining its main problems, risks and opportunities. This procedure ensured that a deep and orderly diagnosis was produced, which not only facilitates the current understanding of the territory but also supports the formulation of the Partial Plan of the PDOT, and in turn the planning of the desired territorial model.

Figure 1 shows the delimitation of the study area, We use Google Earth Pro to mark the area of La Puntilla with a polygon. Thus, we define the limits of the study and calculate its size so that the analysis of the space makes sense with the diagnosis of the territory.



Figure 1. Delimitation of the study area – La Puntilla, Samborondón
(source: own elaboration based on Google Earth)

Subsystems Analyzed

In what follows, the five subsystems that are taken into account for the territorial analysis of the La Puntilla sector, located in the town of Samborondón, are presented in a concise manner:

1. Biophysical subsystem.- Analyzes the natural conditions of the territory, considering variables such as climate, relief, hydrography, soil type, vegetation cover and natural risks. This subsystem makes it possible to detect the environmental capacities and constraints that affect the urban and productive growth of the sector.

2. Sociocultural subarea.- Analyzes the demographic structure of the population, its conditions of security and social cohesion, cultural dynamics and educational levels. The analysis it carries out allows us to understand the needs of society, territorial disparities and existing human capital.

3. Subsystem of the economy.- Analyzes the most important economic activities, the structure of production, income and employment levels, as well as the relationship between formal and informal employment. This subsystem allows detecting the economic feasibility and ability of the region to create employment opportunities.

4. Human settlements subsystem.- It examines the way in which the territory is occupied, the population density, the type and condition of housing, as well as the accessibility to essential facilities and services. The quality of the habitat and the living conditions of the people are evident in this subsystem.

5. Institutional-political subsystem.- It analyzes the existence and functioning of public institutions, current regulations, territorial planning mechanisms and the degrees of citizen participation. Its analysis makes it possible to evaluate governance and institutional competence to manage territorial development.

Information Collection

To carry out the territorial analysis, several sources of information were used, which were organized as follows:

Documentary references:

- Cantonal Territorial Development and Organization Plan (PDOT) in force (2020-2025).
- Population and housing census of the National Institute of Statistics and Census (2022).
- COOTAD (Organic Code of Territorial Organization, Decentralization and Autonomy).
- LOOTUGS (Organic Law on Territorial Planning, Land Use and Management).

Municipal ordinances of the canton of Samborondón.

- Fieldwork
- Reconnaissance visits to the study area.
- Direct observation of the current conditions of the territory.
- Photographic record of physical, social and urban elements.
- Informal interviews with local actors and residents of the sector.

Cartographic sources

- Google Earth Pro for polygon digitization and spatial analysis.
- Geoportal of the Military Geographic Institute (IGM).
- Geoportal of the Municipal Decentralized Autonomous Government of Samborondón.

Statistical sources

- Parish population projections.
- Municipal information on basic services.
- Statistical data contained in the cantonal PDOT.

Analysis Tools

The tools used for the processing and analysis of the information obtained are the following:

- Google Earth Pro: definition of the study space, digitization of territorial components and geospatial analysis.
- Microsoft Excel: organization, tabulation, and examination of statistical data.
- Documentary analysis: study and summary of legal, technical and regulatory information.
- Matriz de análisis territorial: determinación y conexión entre las causas, los efectos, los problemas y los subsistemas que se analizan.

RESULTS

Theoretical Adaptation Patterns by City

The analysis of Guayaquil reveals distinct applicability patterns for different theoretical frameworks. Lynch's perceptual elements show strong effectiveness in the formal city center, where landmarks like Malecón 2000 and Las Peñas neighborhood generate strong identity and orientation. However, his framework requires significant modification for peripheral informal areas where edges are fluid and multifunctional rather than clearly defined. Path legibility varies dramatically between planned commercial areas and organic residential neighborhoods, with poorly legible edges identified in informal settlements contrasting with central nodes that provide clear spatial reference points.

Jacobs' emphasis on use diversity and street life demonstrates high relevance for contexts with strong neighborhood fabric and informal commerce. In Guayaquil's popular neighborhoods, urban vitality emerges from natural mixed-use patterns that align with Jacobs' observations about community-generated diversity. However, these organic patterns face increasing threats from gentrification processes that could undermine the social fabric Jacobs identified as essential for neighborhood vitality.

Gehl's humanistic approach proves applicable in consolidated urban centers but shows limited relevance in degraded peripheries. In sectors like Guayaquil's historic center, analysis reveals lack of human-scale meeting spaces and insufficient attention to pedestrian comfort in tropical climate conditions. The peripheral areas require different approaches addressing basic infrastructure needs before implementing Gehl's public space quality considerations.

Bazant's structural approach provides the most comprehensive framework for understanding the city's complex morphological evolution. His methodology enables understanding of disordered peripheral growth and its socio-spatial implications, proving highly contextualized and useful for integral analysis of Latin American urban dynamics. This approach successfully addresses the informal settlement patterns and peripheral development challenges that other theories struggle to accommodate.

Biophysical Subsystem

La Puntilla, which is located in the canton of Samborondón, is located around the geographical coordinates 79.8635° W and 2.1410° S and has an average height of 4 m a.s.l. The study sector comprises approximately 3.11 km² (311 hectares), which includes peri-urban and urban areas in permanent territorial change.

Most of the sector is flat, a situation that has favoured the development of infrastructures and the city. The climate is dry-semi-arid tropical megathermal, with two clearly marked seasons: rainy and dry. In the dry season, average temperatures fluctuate between 22 °C and 25 °C, while in the rainy season they fluctuate between 30 °C and 32 °C; Annual rainfall ranges from 500 to 1,000 mm.

The territory is affected by artificial bodies of water located within private urbanizations, in addition to significant rivers such as the Babahoyo and the Daule. Most of the land is alluvial and colluvial, with a high

capacity for agriculture; however, today a large part of them are urbanized. The vegetation cover is a tropical dry forest ecosystem, which includes green areas in the city, grasslands and native plants such as guasmo, carob, mate and leucaena.

Identified Problems

The problems that have been identified show a strong pressure on the physical environment, which comes from urban growth that has not been planned and concentrated in a single main road axis.

Table 2. Main Territorial Problems, Causes, and Associated Impacts in the Study Area

Problem	Main Cause	Impact territorial
Reduction of green areas	Accelerated urban expansion	Loss of vegetation cover
Traffic congestion	Insufficient road infrastructure	Pollution and noise

Potentialities

The potentialities of the biophysical subsystem constitute a strategic foundation for sustainable territorial planning in the sector.

Table 3. Biophysical Potentialities and Associated Development Opportunities in the Study Area

Potentiality	Development Opportunity
Remaining green areas	Creation of ecological parks
High solar radiation	Photovoltaic energy implementation
Alluvial soils	Agroecological projects
Proximity to rivers	Tourism and environmental recreation

Sociocultural Subsystem

The population of the Samborondón canton, which is mostly young, is in continuous expansion. According to INEC estimates (2020), the population of the canton is about 110,000 inhabitants, of which 32.19% live in rural areas and 67.81% in urban areas. The majority age group is between 5 and 39 years old, which shows that there is a working-age population.

In the education sector, Samborondón has extensive coverage, particularly in the urban area. There, 1,160 teachers are in charge of 15,121 students distributed among 59 educational establishments. In rural areas, 370 teachers teach 7,612 students in 34 educational institutions. Despite this, illiteracy levels continue, with 1,708 individuals registered; This highlights the social gaps between the urban and rural sectors.

Table 4. Main Sociocultural Problems and Their Associated Social Impacts in the Study Area.

Problem	Description	Social impact
Urban-rural inequality	Unequal access to services	Social exclusion
Labor informality	27,417 unaffiliated persons	Economic instability
Teen pregnancy	76 cases recorded	Social risk
Domestic violence	50 cases reported	Deterioration of the social fabric

Identified Problems

These identified social problems demonstrate the urgency of strengthening public policies that seek to protect and include socially.

Potentialities. They strengthen the human base of the canton and contribute to sustainable development.

Table 5. Main Sociocultural Problems and Their Associated Social Impacts in the Study Area

Potentiality	Territorial benefit
Young population	Economic dynamization
Urban growth	Investment attraction
Social projects	Social inclusion
Utilities	Improved quality of life

Economic Subsystem

The economy of La Puntilla, located in the Samborondón canton, is active and varied, especially highlighting the services and commerce sectors. The presence of emblematic shopping centers such as Riocentro Entre Ríos, restaurants, private financial, educational and health services constitutes the main economic engine of the urban area. According to territorial information, 74.1% of the more than 102,000 residents counted in 2020 were people of working age.

Due to the rapid urbanization process, agricultural activities have experienced a significant reduction and are now only carried out in peripheral areas and in a limited way. In urban areas, household income is at the upper-middle level, particularly in gated communities. Regarding the labor structure, there is a mixture of formal and informal work. Even though there is a part of the population with formal jobs linked to private companies and services, informal work is a considerable percentage, especially independent activities, entrepreneurship and retail trade, limiting access to social security and job stability.

Table 6. Employment Distribution by Economic Sector in the Study Area

Economic sector	Employment Percentage
Service sector	53,44 %
Primary sector	23,35 %
Secondary sector	12,18 %
Trade	17,82 %
Main agricultural activity	Rice cultivation

Identified Problems

These circumstances create a vulnerable economic situation and restrict job stability and equitable development of the territory.

Table 7. Main socioeconomic challenges: problem identification, description, and structural impact.

Problem	Description	Impact
Economic dependence	Urban trade and rice monoculture	Vulnerability to crises
Informal employment	Lack of social security and stability	Job insecurity
Territorial inequality	Fewer opportunities in rural areas	Socioeconomic gap

Potentialities

These circumstances make it possible to project an economic model that is more inclusive, sustainable and diverse.

Table 8. Regional potentialities and strategic opportunities for economic growth

Potentiality	Opportunity
Strategic location	Formalization of commercial activities
Proximity to Guayaquil	Attracting private investment
Urban development	Generation of formal employment
Road infrastructure	Boosting trade and services

Human Settlements Subsystem

The subsystem of human settlements in the La Puntilla sector is mainly composed of a consolidated urban area that contains areas in the process of expansion. There are many residential developments that have been planned, as well as peri-urban areas that have a lower degree of consolidation.

The general condition of the houses is mostly good, especially in closed residential areas, where reinforced concrete buildings predominate. In the outlying areas, there are houses in regular condition that are built with mixed materials. The net density of dwellings is medium, in line with the prevailing horizontal urbanization model.

Regarding facilities, the sector has private educational institutions, recreational areas, shopping centers, private health services and administrative facilities; however, they are not evenly distributed throughout the region.

Table 9. Deficits in basic services and urban infrastructure: environmental and social impacts.

Problem	Description	Impact
Deficit of basic services	Irregularity in drinking water and sewerage in peripheral sectors	Effect on quality of life
Homes in risk areas	Presence of homes near flood zones	Physical risk
Deficit of public spaces	Shortage of parks and green areas	Recreational limitation
Incomplete garbage collection	Irregular coverage in remote sectors	Pollution

Identified Problems

Demonstrate the need to strengthen urban planning and provide fundamental services in an equitable manner.

Potentialities

They make it possible to guide urban development towards a more sustainable and organized model.

Table 10. Urban potentialities and associated benefits for planned land use and mobility.

Potentiality	Benefit
Vacant Land Available	Planned Densification
Road connectivity	Efficient access to Guayaquil
Public transport	Urban mobility
Consolidated urbanizations	Improvement of services and equipment

Political-Institutional Subsystem

The socio-political-institutional system of La Puntilla is mainly supported by the administration of the Decentralized Autonomous Government (GAD) of Samborondón, which acts as an authority in matters of territorial planning, land management and its use, urban control, provision of basic services and environmental management.

Given the rapid urban, economic and demographic expansion of La Puntilla, institutional action is configured as a fundamental factor to conquer order and regulations in terms of integrated development. The Municipal GAD may use the following instruments: The Territorial Development and Planning Plan (PDOT) and the Land Use and Management Plan (PUGS) that will determine guidelines for urban growth, densification, mobility and environmental protection.

In the area there are relevant public institutions such as the Community Police Units (UPC), fire departments, educational and health centers, which play a fundamental role in terms of security, social care and services. "However, to the extent that the strong prevalence of gated communities generates its own internal dynamics that have an impact on the relationship between citizens and local government.

Table 11. Synthesis of urban governance: comparative analysis of structural problems and institutional strengths.

PROBLEMS	STRENGTHS
1.-Little articulation between the Local Government and the private sector due to the predominance of closed complexes that manage their own services.	1.-High internal organization in the residential complexes, which facilitates collaborative processes and joint work with the GAD.
2.-Accelerated urban growth that exceeds the regulatory update, affecting mobility, housing density and protection of river banks.	2.-Capacity of the Local Government to update and generate new ordinances that respond to the growth of the territory.
3.-Limited and disjointed citizen participation; There is little communication between gated communities and the municipality.	3.-Citizens with a strong interest in security, environment and planning issues, which favors community initiatives.
4.-Territorial conflicts with Guayaquil, especially in the area of the Samborondón bridge.	4.-There is a strategic vision for the territory that facilitates metropolitan coordination with other cities.
5.-Intense real estate pressure that makes it difficult to balance urban development, environmental sustainability and mobility.	5.-The area is highly attractive for private investment, allowing financing infrastructure and new equipment.
6.-Lack of integrated metropolitan mechanisms to manage mobility between La Puntilla and Guayaquil.	6.-Availability of technical instruments (plans, studies, diagnoses)

DISCUSSION

Integrated matrix of problems

The combined analysis of the subsystems made it possible to identify structural difficulties that do not work on their own, but are connected to each other and produce cumulative territorial consequences. The matrix below summarizes the most important problems of the territory, their root causes, the resulting territorial impacts and the subsystems that are involved.

Table 12. Synthesis of urban governance: comparative analysis of structural problems and institutional strengths.

Matrix problems– causes–effects Problem	Root cause	Territorial effect	Subsystem(s) involved
Limited GAD-private sector articulation	Internal management models in gated communities; Absence of dialogue tables	Duplication of procedures; low coordination in security, mobility and services	Political-institutional + Human settlements
Congested mobility	Accelerated urban growth; dependence on the Samborondón bridge; Lack of alternative routes	Daily congestion; waste of time; Increased pollution	Human Settlements + Economic
Outdated ordinances	Accelerated dynamics of the real estate market; Densification pressure	Accelerated dynamics of the real estate market; Densification pressure	Political-institutional + Biophysicist
Fragmented citizen participation	Predominance of gated communities; absence of common spaces	Low representativeness; Difficulty in territorial consensus	Sociocultural + Political-institutional
Territorial conflicts with Guayaquil	Historical ambiguity of boundaries; Metropolitan expansion	Political tensions; delays in public investment	Political-institutional
Real estate pressure on riverbanks	High demand for premium residential projects; insufficient regulation	Environmental risks; loss of green areas and riparian ecosystems	Biophysical + Human Settlements

Description of the matrix

The matrix shows that the territorial problems of the La Puntilla area are systemic because they come from structural reasons related to planning, institutional administration and rapid urban growth, which causes effects at the same time in several subsystems.

Territorial conflicts

The integrated research shows that, according to the approach of Gómez Orea (2007), the territory of La Puntilla has features of an Unsatisfactory Territorial System; This is due to the simultaneous presence of numerous conflicts that have not been dealt with in a coordinated or comprehensive manner. The following territorial disputes are considered critical:

Protection of the environment against disorderly occupation.

The fragility of the environment in risk areas and near bodies of water constantly clashes with rapid urban expansion. Real estate pressure and spontaneous construction have exceeded the carrying capacity of the territory, which has had a negative impact on the remaining ecosystems and has increased environmental susceptibility.

Public interest versus private interest.

The preponderance of gated communities with internal management has benefited individual decisions being made without considering the effects on the community. This manifests itself in the scarcity of public areas, problems with the coordinated provision of services and the fragmentation of the urban fabric.

In the short term compared to the long term.

The responses of the institutions have been fundamentally reactive, focused on solving immediate problems such as transport or essential services, without a holistic perspective of territorial, social and environmental sustainability in the future.

Conflicts between jurisdictions.

The fact that Guayaquil does not have clear territorial boundaries has created tensions at the political and administrative levels, which hinders joint metropolitan planning and delays strategic investments.

Synthesis of Potentialities

La Puntilla has an environment conducive to its political-administrative and regulatory activity. The powerful private investment that contrasts with the enormous capacity of the Local Government to rush to elaborate or modify ordinances depending on the growth of the territory, which in this case is manifested in the gradual urbanization of the park. In addition, there is a community of people interested and organized about safety, the environment and quality of life, which encourages citizens to get involved. Its strategic location, as it has a direct connection with Guayaquil, enhances its metropolitan character and allows inter-institutional coordination. In summary, these capacities allow us to estimate a positive scenario to move towards a more integrated, participatory and sustainable management of the territory.

Implications for Territorial Planning

The current state of the territory of La Puntilla is due to partly contradictory decisions and the establishment of limited institutional coordination and weak articulation of citizen participation in planning processes. The lack of comprehensive territorial planning has allowed short-term private interests to prevail over the general interest, harming the equitable provision of services, the quality of collective spaces and the environmental sustainability of the area.

These processes led to social conflict, deterioration in infrastructure and population sensitivity to the environment, mainly in areas of high urban pressure. However, a precise definition of the problems, as well as the institutional-normative potentialities that it has today, makes it possible to intervene in the territory in a planned manner and coherent with the regulations that are in force. In this sense, territorial diagnosis is the essential technical support to guide planning decisions aimed at repairing imbalances, strengthening public management and orienting towards greater order and sustainability in territorial development.

CONCLUSIONS

The territorial diagnosis of the La Puntilla sector carried out an in-depth analysis that allowed it to address the interrelations of the dynamics that make up its current situation, managing to evidence the pressure generated by excessive urban growth, market speculation, institutional management and environmental limitations. The most important contribution of this study is that it allows for a clear visualization of the main problems, risks and potentialities of the territory, providing a technical reading that transcends a merely normative vision and that allows for an interpretation within the functional matrix of the territorial system.

It is admitted that a limitation of the study is the reliance on secondary sources and digital tools, which prevents the analysis of certain qualitative aspects linked to direct citizen perception and the internal social dynamics of gated communities. Similarly, given that the territory is constantly changing, the need to update the information for future planning processes arises.

The general objective of the study was achieved with the analysis of five territorial sub-systems, allowing them to verify the Current Territorial Model, specify the area of intervention, and order the information required for the planning process.

The results achieved constitute a sui generis technical basis to advance towards higher territorial planning in the degree of planning, institutional coordination, regulatory implementation and citizen participation.

Finally, this diagnosis allows the formulation of the Partial Plan of the PDOT to be projected and opens the space for future research related to metropolitan management, mobility, territorial governance and environmental protection, contributing to the consolidation of a more orderly and sustainable urban development

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