



**Habitar  
la *vivienda*.  
El caso de Santa Catarina**

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“L’essenza del costruire è il « far abitare». Il tratto essenziale del costruire è l’edificare luoghi mediante il disporre i loro spazi.  
*Solo se abbiamo la capacità di abitare, possiamo costruire. [...]*”

## Abstract

This thesis focuses on an in-depth study of the Mexican vivienda, analysing its multiple aspects, with particular emphasis on the serious social inequalities that permeate society and their reflection in the housing context. In the Mexican landscape, the vivienda has long been considered as a mere housing structure, however, the need to emphasise its fundamental role in influencing the lives and sociality of its occupants is highlighted.

Monterrey's accelerated demographic growth, closely associated with the industrialisation of the cities, has resulted in a constant and growing need for new livelihoods, especially for the lower and middle socioeconomic strata. However, the lack of adequate urban planning has given rise to disorganised settlements, often close to urban centres, creating metropolises of impressive size, but characterised by infrastructural deficiencies and a fragmented urban layout.

The problem inherent to the vivienda emerges when these dwellings are constructed as mere containers, unable to fully meet human needs. A large percentage of these viviendas are abandoned, as individuals prefer to seek informal housing solutions, albeit deficient, but better able to adapt to their specific needs.

The main aim of this research is therefore to devise suitable design methods to guarantee a quality of living, responding concretely to the needs and aspirations of the inhabitants. In order to achieve this objective, it is imperative to understand in depth the context in which the vivienda operates, carrying out a transcale analysis of the city in order to intervene effectively. From this perspective, it is evident how the vivienda, in its role as a fundamental urban element, plays a decisive role in the configuration and development of the city itself.

The design approach adopted privileges the individual, promoting flexible, adaptable, sustainable and compositionally innovative solutions. The project is characterised by its modularity, based on modular panels, which allow for a greater degree of customisation, and departs from conventional models, which have often alienated inhabitants within such living quarters.

After formulating the initial model based on the previously outlined characteristics, the next step is to make it concrete, giving it a physical location in the area of interest. Therefore, following an extensive analysis of the surrounding urban context, an intervention strategy based on the urban acupuncture approach was elaborated. This strategy was designed with the objective of effectively intervening in abandoned or disused areas, using the aforementioned model as a guiding tool. As a result, new perspectives and opportunities for the municipality of Santa Catarina are envisaged.

In summary, the ultimate purpose of this study is to provide contributions and suggestions for future in-depth studies on the topic of vivienda, placing the individual at the centre of housing choices and proposing innovative solutions to address the problems of uninhabited dwellings and the constant demand for new residences in the complex and distinctive Mexican context.

This thesis is the result of research conducted between November 2022 and September 2023. The work makes use of research, interviews and analysis in the field, through the collaboration between the Politécnico di Torino and UDEM - Univesidad de Monterrey.

## Resume

Esta tesis se centra en un exhaustivo estudio de la vivienda mexicana, analizando sus múltiples aspectos, con especial énfasis sobre las graves desigualdades sociales que permean la sociedad y su reflejo en el contexto habitacional. En el panorama mexicano, la vivienda ha sido considerada durante mucho tiempo como una mera estructura habitacional, sin embargo, se destaca la necesidad de enfatizar su papel fundamental al influir en la vida y la sociabilidad de sus ocupantes. El acelerado crecimiento demográfico de Monterrey, fuertemente asociado a la industrialización de las ciudades, ha dado como resultado una constante y creciente necesidad de nuevas viviendas, especialmente para los sectores socioeconómicos bajos y medios. Sin embargo, la falta de una planificación urbana adecuada ha dado lugar a asentamientos desorganizados, a menudo en las proximidades de los centros urbanos, creando metrópolis de tamaño impresionante, pero caracterizadas por deficiencias de infraestructura y un trazado urbano fragmentado. El problema inherente a la vivienda surge cuando estas viviendas se construyen como meros contenedores, incapaces de satisfacer plenamente las necesidades humanas. Un gran porcentaje de estas viviendas son abandonadas, ya que los particulares prefieren buscar soluciones habitacionales informales, aunque carentes, pero más capaces de adaptarse a sus necesidades específicas.

El objetivo principal de esta investigación es, por tanto, idear métodos de diseño adecuados para garantizar una calidad de vida que responda concretamente a las necesidades y aspiraciones de los habitantes. Para alcanzar este objetivo, es imprescindible comprender en profundidad el contexto en el que opera la vivienda, realizando un análisis "transcalare" de la ciudad con el fin de intervenir de forma efectiva. En esta perspectiva, es evidente cómo la vivienda, en su papel de elemento urbano fundamental, desempeña un papel decisivo en la configuración y el desarrollo de la propia ciudad. El enfoque de diseño adoptado privilegia al individuo, promoviendo soluciones flexibles, adaptables, sostenibles e innovadoras desde el punto de vista compositivo. El proyecto se caracteriza por su modularidad, basada en paneles modulares, que permiten un mayor grado de personalización, y se aleja de los modelos convencionales, que a menudo han alienado a los habitantes en este tipo de viviendas.

Una vez formulado el modelo inicial a partir de las características anteriormente expuestas, el siguiente paso es concretarlo, dándole una ubicación física en la zona de interés. Así, tras un extenso análisis del contexto urbano circundante, se elaboró una estrategia de intervención basada en el enfoque de la acupuntura urbana. Esta estrategia se diseñó con el objetivo de intervenir eficazmente en zonas abandonadas o en desuso, utilizando el modelo mencionado como herramienta guía. Como resultado, se prevén nuevas perspectivas y oportunidades para el municipio de Santa Catarina.

En resumen, el propósito último de este estudio es aportar contribuciones y sugerencias para futuras investigaciones sobre el tema de la vivienda, colocando al individuo en el centro de las opciones habitacionales y proponiendo soluciones innovadoras para atender los problemas de viviendas desocupadas y la constante demanda de nuevas residencias en el complejo y distintivo contexto mexicano.

La tesis es el resultado de una investigación realizada entre noviembre de 2022 y septiembre de 2023. El trabajo hace uso de investigaciones, entrevistas y análisis en campo, a través de la colaboración entre el Politécnico de Turín y la UDEM - Universidad de Monterrey.

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## Abstract

La tesi si concentra sullo studio approfondito della vivienda messicana, analizzandone gli aspetti multipli, con particolare enfasi sulle gravi disuguaglianze sociali che permeano la società e la loro riflessione nel contesto abitativo. Nel panorama messicano, la vivienda è stata a lungo considerata come una mera struttura alloggiativa, tuttavia, si evidenzia la necessità di sottolineare il suo ruolo fondamentale nell'influencare la vita e la socialità dei suoi occupanti.

L'accelerata crescita demografica di Monterrey, strettamente associata all'industrializzazione delle città, ha comportato un costante e crescente bisogno di nuove vivienda, soprattutto per le fasce socioeconomiche medio-basse. Tuttavia, la mancanza di una pianificazione urbanistica adeguata ha dato origine a insediamenti disorganizzati, spesso in prossimità dei centri urbani, creando metropoli di dimensioni imponenti, ma caratterizzate da carenze infrastrutturali e una frammentata conformazione urbana. Il problema intrinseco alla vivienda emerge quando queste abitazioni vengono realizzate come semplici contenitori, incapaci di soddisfare appieno le necessità umane. Un'ampia percentuale di queste vivienda viene abbandonata, poiché gli individui preferiscono cercare soluzioni abitative informali, seppur carenti, ma in grado di adattarsi maggiormente alle loro specifiche esigenze.

La principale finalità di questa ricerca è pertanto quella di concepire modalità progettuali idonee a garantire una qualità abitativa, rispondendo concretamente alle necessità e alle aspirazioni degli abitanti. Al fine di raggiungere tale obiettivo, è imperativo comprendere approfonditamente il contesto in cui opera la vivienda, effettuando un'analisi trasversale della città per intervenire con efficacia. In quest'ottica, risulta evidente come la vivienda, nel suo ruolo di fondamentale elemento urbano, giochi un ruolo determinante nella configurazione e nello sviluppo della città stessa. L'approccio progettuale adottato privilegia l'individuo, promuovendo soluzioni flessibili, adattabili, sostenibili e innovative dal punto di vista compositivo. Il progetto si caratterizza per la sua modularità, basato su pannelli componibili, che consentono un grado maggiore di personalizzazione, e si discosta dai modelli convenzionali, i quali hanno spesso alienato gli abitanti all'interno di tali vivienda.

Dopo aver formulato il modello iniziale basandosi sulle caratteristiche precedentemente delineate, la fase consecutiva consiste nell'operare la sua concretizzazione, conferendogli una collocazione fisica nel territorio d'interesse. Pertanto, a seguito di un'analisi estensiva del contesto urbano circostante, è stata elaborata una strategia di intervento fondata sull'approccio di agopuntura urbana. Tale strategia è stata progettata con l'obiettivo di intervenire efficacemente nelle aree abbandonate o dismesse, sfruttando il suddetto modello quale strumento guida. Di conseguenza, si prospettano nuove prospettive e opportunità per il comune di Santa Catarina.

In sintesi, il proposito ultimo di questo studio è di fornire contributi e suggerimenti per futuri approfondimenti riguardanti il tema della vivienda, posizionando l'individuo al centro delle scelte abitative e proponendo soluzioni innovative per affrontare le problematiche delle abitazioni disabitate e la costante domanda di nuove residenze nell'ambito complesso e distintivo del contesto messicano.

La tesi è il risultato di una ricerca condotta tra il novembre 2022 e il settembre 2023. Il lavoro si avvale di ricerche, interviste e analisi in campo, per mezzo della collaborazione tra il Politecnico di Torino e la UDEM - Universidad de Monterrey.

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## Introduction

“L’abitare è prassi umana costante e fondativa dello statuto della specie, ma si presenta con molteplici e contraddittori volti: è comportamento istintuale e progetto, idealità e pragmatismo, sentimento e oggettualità, sogno e concretezza. Mette in gioco la pura fisicità del corpo, ma la organizza secondo modelli culturali. Appartiene alla natura, ma si realizza nell’artificio: per circoscrivere la coscienza di sé, farne un modello di pensiero, deve incarnarla in strutture, edificazioni, oggetti, masse di materia.”<sup>[1]</sup>

In accordance with Maurizio Vitta’s analysis in his book “dell’Abitare”, we can state that the act of living is an intrinsic attribute of our human condition, closely connected to the very essence of nature.

This view underlines that from the moment we enter the world, we undertake a process of cohabitation with our surroundings. Indeed, the act of being born metaphorically corresponds to the act of inhabiting. This concept goes back to the very origins of humanity, in that even deities, from a mythological point of view, were assigned to dwell in specific places that ultimately contributed to the creation of our known universe. Consequently, it is in this world that human beings found their origin, destined to become the primordial and indispensable context for the settlement and residence of humanity itself. <sup>[2]</sup>

It is inherently complex to unambiguously delineate the concept of living, i.e. to formulate a precise definition or adequately circumscribe the boundaries of the term.

It is preferable to consider it as an intrinsic manifestation of human experience, permeated by a series of practices and customs that characterise it. This phenomenon is tangibly manifested in concrete reality, finding expression in the representations and symbols that accompany it, as well as substantially shaping human life.

At the center of the concept of ‘dwelling’ is the individual themselves, represented as an ‘I’. This ego constructs its identity through the way it locates itself within the space that belongs to it. When we inhabit a place, both our mind (consciousness) and our body (physical structure) become part of this experience. The connection between our consciousness and our body creates a dynamic in which the interiority of what we think merges with the exteriority of the world around us. In other words, the essence of who we are intertwines with the environment in which we live. This interaction creates a flow of energy that binds together form (our identity) and life (the experience of existing in a place). Ultimately, it is this deep interaction that gives meaning to the concept of ‘dwelling’.

This concept of living is closely linked, therefore, to the well-being of the individual within these spaces, *but what does it mean to live well?* What meaning do we give to comfort, to the domestic dimension, to the concept of home?

“L’essere umano non è l’unico animale che costruisce case, ripari, rifugi: molte altre specie esibiscono raffinate e persino sorprendenti capacità architettoniche” <sup>[3]</sup>

This is how Francesco Remotti, in the section *Abitare, sostare, andare: ricerche e fughe dell’intimità* del libro *Le Case dell’uomo, abitare il mondo*, approaches the concept of home and tries to give it an initial definition.

In agreement with the author, we define the home as a series of purpose-built spaces, born out of human commitment and creativity, supported by financial investment and often guided by aesthetics. These places require constant maintenance, care and dedication and exert an inevitable attraction towards individuals, who live their existence within these spaces.

Equally, they possess an inalienable aspect, so much so that we might even ask ourselves whether a human society without dwellings is ever really conceivable. The author lists numerous answers to this question, starting with the most banal and the most practical: shelter and protection. This is because regardless of the construction method, a dwelling constantly delineates a clear boundary between inside and outside: it establishes a separation between the indoor and the outdoor.

This indoor defends us from the elements, providing shelter, while at the same time protecting us from predatory animals or potential adversaries in the vicinity. The house also acts as a screen and barrier against unwanted intruders. <sup>[4]</sup>

But houses are not just boxes where people take refuge <sup>[5]</sup>, they are spaces where relationships, connections and emotions exist.

Within such environments, “*il corpo agisce come un “canale di transito “ tra lo spazio e il progetto”*”<sup>[6]</sup>.

The body represents a tangible element, capable of taking action and developing relationships with other bodies. In order to fully understand the essence of the concept of ‘living well’, it is essential to take a step back and turn towards those who create living environments. In this perspective, one can draw on the theory of Richard Neutra and the ‘architectural therapist’ approach, which employs elements such as emotions as a starting point for new designs. It is essential to respond to the psychological needs of the individual and to conceive an architecture in which the physical structure can elicit direct emotional reactions.<sup>[7]</sup>

**“L’architettura è essa stessa corpo, non è più un sistema di proporzioni, né una macchina per abitare, ma un flusso di energie potenti trasformate in spazio”** <sup>[8]</sup>

If we take this as the starting point for answering the first question that was raised, namely the meaning of living well, we can say that a definitive answer is out of reach. However, based on the considerations outlined so far, the fundamental question guiding our research is: how can we ensure that people lead a discrete and dignified life within their homes which should be one of the certainties of life, but which, as we all know, represents a huge problem for a large part of the world’s population?

This question has prompted us to cross oceanic borders to understand the customs and peculiarities of Mexican

culture. In attempting to formulate coherent answers to the question, we realise these answers cannot be definitive, but rather open the way for further investigation. This leaves an open ending which will form the basis for future research with the aim of ensuring that the entire population, whether Mexican or global, has the opportunity to live fully within their homes, in conditions of well-being.

<sup>[1]</sup> (Vitta 2008, 7)

<sup>[2]</sup> (Vitta 2008)

<sup>[3]</sup> (Augè, et al. 2016, 68)

<sup>[4]</sup> (Augè, et al. 2016)

<sup>[5]</sup> (Pinguini Tattici Nucleari 2019)

<sup>[6]</sup> (Bianchetti 2020, 13)

<sup>[7]</sup> (Bianchetti 2020)

<sup>[8]</sup> (Bianchetti 2020, 26)

<sup>[9]</sup> (Oxford Languages, s.v. “Vivienda”)

<sup>[10]</sup> (Pérez Porto 2021)

<sup>[11]</sup> (Oxford Languages, s.v. “Casa”)

<sup>[12]</sup> (Oxford Languages, s.v. “Habitar”)

<sup>[13]</sup> (Canales, Shared Structure Private Space Housing in Mexico 2020)

## Notes to the reader:

On the following pages, there will be a word that has voluntarily not been translated into English, it is the word **vivienda**. According to the definition:

**vivienda** /vi-vien-da/

*feminine noun*

1. La vivienda es el lugar cerrado y cubierto que se construye para que sea habitado por personas. Este tipo de edificación ofrece refugio a los seres humanos y les protege de las condiciones climáticas adversas, además de proporcionarles intimidad y espacio para guardar sus pertenencias y desarrollar sus actividades cotidianas.

2. Lugar protegido o construcción acondicionada para que vivan personas.<sup>[9]</sup>

This terminology was chosen because it is unique to Mexican culture. In fact, its etymological origin goes back to the popular Latin ‘**vivenda**’, meaning ‘*things by which or in which one must live*’, originates in turn from the Latin ‘*vivendus*’, which translates as ‘*that one must live*’ and is the gerund of ‘*vivere*’, a term denoting the action of living.<sup>[10]</sup>

The term captures the concept more accurately than a translation in other languages.

In fact, its essence cannot be fully encapsulated in a definition, as it represents a place of living, unlike the word ‘house’ which is defined as a ‘cubic construction intended to be inhabited.’<sup>[11]</sup>

Another term, which in this case is present in the title, is the verb **Habitar**. The definition according to the Oxford Dictionary reads as follows :

**habitar**

*verbo intransitivo*

1. Vivir habitualmente [una persona o un animal] en una zona o lugar determinados.

2.

*verbo transitivo*

Ocupar [una persona] una casa u otro lugar y vivir en él.<sup>[12]</sup>

But unlike the verb *vivir*, we can say - as Fernanda Canales states in her text *Shared Structure, Private space. Housing in Mexico* - this term implies something more than having a roof over a certain number of square meters: it means having one’s own little world that, at the same time, is connected to the world of others. The disparity that exists between the house we desire and the one we can afford explains the separation between the house, those who inhabit it, and ‘their’ city.<sup>[13]</sup>

# *01. La vivienda que se cuenta*

*All side of vivienda*

*02.1*

*Vivienda*

*Housing policies in Mexico*

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## Vivienda

The world's urban population has been steadily increasing in recent decades. More than 56% of the world's population lives in urban environments, and estimates suggest that by 2050 this proportion could rise to 68% <sup>[1]</sup>.

The effects of capitalism and neoliberal urban policies, which concentrate economic and political power in the hands of the few, channel resources to the only ever-growing centres, producing inequalities <sup>[2]</sup>.

In this context, phenomenon such as exploitation, displacement, exclusion, and discrimination affect the lives of most of the population. This situation has a global effect by sentencing more than a third of the world's population to live in poverty, generating major inequalities in different countries, especially in developing ones. Over the years, various debates on social justice issues have emerged, inspiring social and urban movements that represent a fight for the vindication of their rights. This demand for rights represents an opening towards new urban policies.

The main objective of these social and urban movements is "a dignified and supportive living environment", and their demands arise mainly from inequalities in the satisfaction of the basic needs of urban life, such as housing and services. The housing movements fight against a system that considers viviendas as a product and profits from its production, responding to the economic capacities of the population, but not to the specific houses needs.

The urban struggles for viviendas are

most persistent in developing countries, where inhabitants are unable to satisfy their housing needs due to their low incomes which do not allow them to access the real estate market.

Latin America is one of the most urbanised continents in the world, where high levels of social inequality are caused by rapid urban growth, which has had a strong effect on the living conditions of its settlements.

The public policies implemented have not been able to satisfy the demands, especially of the popular sectors, so that a large part of the population finds itself in a situation of poverty with a lack of access to vivienda or urban services of the same quality.

According to the Report on Economic, Social and Environmental Rights, a family must earn at least 5 minimum monthly salaries to have access to a full house through a financing system that not everyone has the economic capacity to afford, excluding them from the real estate market.

The high value of land and property, as well as the lack of public policies on *vivienda social*, have fuelled the need to resort to other alternatives to meet the population's housing needs. Self-production is a modality that has provided a solution to a high percentage of viviendas in Mexican cities, with minimal or no financing at all. This mainstream mode of vivienda production can be characterised as informal and irregular, of low quality, producing urban chaos and vulnerable neighbourhoods.

However, when this mode is carried out in a collective and organised way, it can have great potential, not only as a form of access to vivienda, but also as a means to advance in the construction of the right to the city, as is the case of the social production of habitat.

The social production of habitat is a model promoted by organised groups in contexts where the role of the State in dealing with the housing problems of the popular sectors is practically inexistent, encouraging the participation of the inhabitants themselves. Social groups demand transformations and satisfy their housing needs while at the same time fighting against marginalisation and urban and social segregation. Social Production of Habitat (SPH) is a concept developed in Latin America in the 1970s to define the process of production and/or improvement of habitat that arises as an initiative of the inhabitants to satisfy their own needs, ranging from the production of housing, neighbourhoods, and even large parts of the city. SPH is not a concept that emerged from academic reflection, but from the interaction of non-governmental organisations, social movements, social organisations, activists, and academic groups in Latin America that have come together to discuss issues of vivienda social and the defence of the right to la vivienda.

Moreover, a SHP process can be spontaneous and individual, but also collective and highly organised, and involves several factors: self-construction, planning, participation, mutual aid, democratic decision-

making, negotiation, management and political action <sup>[3]</sup>.

In the process of housing production in popular sectors, it is common to encounter the concepts of self-construction and self-production, just as it is very common to confuse these terms with that of social production of habitat. The difference is that the concept of self-construction only refers to the construction aspect of the housing production process. Self-building without technical advice produce poor quality housing. Self-production refers to the whole process that the users themselves set in motion to meet their housing needs and may or may not implement self-construction. Finally, social production of habitat is a process that may be carried out through self-production or may be implemented by third parties and may or may not implement self-construction.

Even though social housing production is an alternative for a large number of the country's inhabitants and, if carried out in a collective and organised manner, has great potential for development, there is confusion about what it represents and a negative conception of it as informal, irregular and even illegal. This erroneous conception is based on the idea that any housing that is not produced by private manufacturers or developers is considered informal.

<sup>[1]</sup> (UN 2022)

<sup>[2]</sup> (Harvey 2012)

<sup>[3]</sup> (Social Production of Habitat n.d.)



## Housing policies in Mexico

México experienced an accelerated process of urbanisation due to industrialisation, which led to the country's economic development. In 1940, most of the population lived in rural areas, but by 1970, the urban population had quadrupled, generating a high demand for housing and services. This led to problems of overcrowding and land encroachment in the cities.

*La vecindad*, in this period, became the main typology providing housing for the emerging working class, mostly located in or around urban centres.

Over time, this solution multiplied as response to the housing deficit, but they came to be seen as sites that did not respect basic hygienic and sanitary conditions.

The 1917 Constitution established that the supply of adequate housing was a fundamental right.

In 1925 the first state-financed mortgages were granted to private individuals, who had to find a way to acquire land they could afford, and with the help of professional labour for the construction. However, resources were lacking, and the process was complicated and inaccessible to most of the population.

Finally, as part of the post-revolutionary state's decision, the government began to be more involved in the whole process, acquiring vast portions of land so that it could build houses, leaving the population only to decide which house they wanted to live in.

In this first stage of the effort to provide housing for disadvantaged people, several factors combined to create

a unified narrative that guided the production of domestic space. During the 1940s-50s, the state was mainly involved in the production of *viviendas*. From this time Mexico became a laboratory for ideas of the modern movement, imported from Europe, partly to satisfy the need for housing, partly to offer a progressive vision to the economically expanding nation, a formulation of an optimistic path towards an utopian future <sup>[4]</sup>.

In parallel, a fragmented process of construction developed in the peripheries. The lack of an initial shared vision on *vivienda colectiva* allowed the government to carry out low-cost *viviendas* construction without the intervention of architects or engineers, a process that was subsequently formalised primarily through political decisions, giving rise to a post-transactional colonisation of urban space.

The following years witnessed significant changes. In 1971 a committee of workers, businessmen and government representatives was set up to analyse and find solutions to the main problems that Mexico was experiencing, one of which was affordable *vivienda*. This resulted in an agreement that allowed companies to take responsibility for ensuring a living for their workers jointly and not independently, extending the obligation to all employers.

Thus, in 1972, the constitution was modified to increase the financing of *viviendas* for workers, which consisted of asking them to deposit the equivalent of 5% of their salary in an individual

account.

This created the *Fondo nacional de la vivienda para los trabajadores* – INFONAVIT (National Workers' Housing Fund) and *El Fondo de la Vivienda del Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado* – FOVISSSTE (Housing Fund of the Institute of Security and Social Services for State Workers).

The Institute's objectives are: *to manage the resources of the National Housing Fund; to establish and administer a financing system that enables workers to obtain cheap and sufficient credit for the purchase of property and the construction, renovation, improvement or expansion of their housing* <sup>[5]</sup>.

Faced with a lack of *viviendas* to be mortgaged, the new institution decided to finance the construction of new real estate projects, quickly becoming the largest *vivienda* developer in the country. In its initial phase, Infonavit acquired an important number of plots of land and guaranteed the viability of projects built in phases over a number of years, producing a large number of *viviendas* for the future.

Things began to change in the 1980s, when several factors converted the *vivienda social* into what we know today. Firstly, in 1985 there was a major earthquake, and many of the buildings built up to that time collapsed, causing people to leave the city to avoid the conditions. <sup>[6]</sup>

In the 1990s, the government, faced with an even greater need for *vivienda* in addition to the previous demand, created a new system.

At that time the president, Carlos Salinas de Gortari, made two main adjustments that brought significant changes to the *vivienda* situation in Mexico.

The first was a legislative change that allowed municipal agricultural land to be put up for sale for urban development purposes. The second significant change was at the structural level in Infonavit, which withdrew all direct financing for housing.

This change emphasised Infonavit's role as a mortgage lender, strengthening its financial function. As a result, the Mexican state assumed the role of "facilitator and coordinator of *vivienda* solutions", whereas private developers assumed responsibility for land acquisition, planning, architectural and urban design, as well as the promotion and sale of the *vivienda*. A decade later, at the beginning of the 21st century, a national *vivienda* programme was established with the aim of providing a *vivienda* for every citizen.

According to Tatiana Bilbao, this was the moment when things turned seriously bad. Three million mortgage loans were granted in six years, resulting in large developments on the edge of cities. These projects consisted mainly of repetitive single-family *viviendas* on low-cost agricultural land. Identical, basic model single-family *viviendas* began to sprout up all over the suburban areas of the country. Some of the larger projects were carried out industrially, using reusable metal structures and sometimes managing to complete a structure a day.

Minimum vivienda dimensions, set by federal institutions, varied over time, but tended to be between 30 and 50 square metres. In fact, although the lack of viviendas improved in terms of quantity, the quality of life was affected by distance and lack of access to services and resources. The absence of coordination between federal and local governments made it impossible to fully address the challenges of creating sustainable communities in these settlements.

*“¿Quién no quiere una casa con tejado a dos aguas, una plaza de aparcamiento delante y un pequeño jardín y patio para crear la pequeña familia perfecta?”*

Developers in Mexico justified these projects by saying, “Who doesn’t want a vivienda with a gable roof, a parking space in front, a small garden and patio to create the perfect little family?”<sup>[7]</sup>.

In the past, urban planning at the municipal level in Mexico was limited and even today many municipalities do not have urban development plans. This has led to a significant increase in urban population without corresponding infrastructure.

This was the result of importing the “Levittown model”, which introduced a new middle-class model. The problem emerged when they tried to apply this car-based model to a low-income demographic that lacks accessibility to opportunities for socio-economic advancement.

The possibility for this to be realised is based on the availability of solid infrastructure, efficient roads and

comprehensive education systems. Unfortunately, in the absence of these elements, environments similar to those observed in Ixtapaluca are generated: uniform housing located in peripheral areas lacking urban development, devoid of infrastructure, transport, education, health care and employment opportunities. The experience of living in these areas becomes a nightmare. Even if the appearance is embellished with bright and flashy colours, the underlying reality remains just as grim and unfavourable.

The developers can hardly pass up the opportunity to acquire land at low cost, regardless of its location or distance from the established city. Sometimes the city grows enough to absorb and merge these new developments organically. However, when this does not happen, a real challenge arises in terms of urban planning. As a result, infrastructure eventually arrives in these areas, but its implementation is often chaotic and lacks proper planning. The city, which originally did not intend to maintain these areas, is now forced to deal with the associated burden and responsibilities.

*“No podemos olvidar que la vivienda es un derecho humano. Las casas no son sólo para vender. Las casas son para las personas, y tenemos que pensar primero en ellas”.*

*“We can’t forget that housing is a human right. Houses are not just for sale. Houses are for people, and we have to think of them first.”*<sup>[7]</sup>.

Mariana Sánchez Vieyra, technical secretary of Projects of the University Programme for City Studies (PUEC) of the National Autonomous University of Mexico (UNAM), pointed out that 19% of available viviendas in the country is unoccupied, which translates into more than eight million 669 thousand empty viviendas, according to the 2020 Census, causing problems of security and degradation<sup>[8]</sup>.

The private construction model generated a high amount of viviendas abandonadas, resulting in depreciation of surrounding properties and reputational challenges for the builders. The process involved private developers in the planning, approval and construction of viviendas, with local administrations taking control afterwards. Infonavit verified the compliance and provided subsidies for affordability. In 2013, a vivienda policy for urban densification was introduced and Infonavit promoted urban requalification through collaborations with architects and academic institutions, focusing on participatory processes and careful design.

On the other hand, in Mexico, what is commonly understood as vivienda social is actually directed towards individuals with formal jobs, which is far from covering the totality of people in an extremely precarious situation in terms of housing throughout the country. In the Mexican context, there is a specific government programme that certifies a type of affordable vivienda for those in extreme poverty in rural areas. This

programme targets people who lack formal income, have no access to credit and are unable to afford vivienda within the previously mentioned massive vivienda social projects.

It is essential to mention that these programmes are not part of the *Instituto del Fondo Nacional de la Vivienda para los Trabajadores* (Infonavit). Instead, they are administered by other government entities such as the *Comisión Nacional de Vivienda*- CONAVI (National Housing Commission) and the *Fondo Nacional de Habitaciones Populares* - FONHAPO (National Fund for Popular Housing), as well as by some private sector financial actors committed to social responsibility and the promotion of public welfare, even at the expense of minimising their own profits.

Today, in order to try to improve the vivienda situation, programmes have been set up at the national level that function as technical guides. These programmes provide assistance and allow for the direct and formal participation of citizens in every stage of decisions related to their future vivienda. However, there is a risk of repeating past mistakes if we overlook issues of collective, urban and environmental impact that have a major impact.

Despite efforts, the continuous increase in density over time suggests that these neighbourhoods will grow and evolve in the coming decades without any control.

<sup>[5]</sup> (INFONAVIT n.d.)

<sup>[6]</sup> (Bilbao, et al. 2018)

<sup>[7]</sup> (Bilbao, architectmagazine 2018)

<sup>[8]</sup> (PAÍS 2022)



*“Hablar sobre la vivienda implica hablar de como los deseos de modernización del país se han traducido en miles de metros cuadrados de casa mediocres, pero revisitar obras que han planteado cambios relevantes no solo significa cuestionar donde aquel progreso imaginado, sino también hacer que las lecciones del pasado se transformen en mejores formas de vida en el futuro”*

*Fernanda Canales*

<sup>(9)</sup> (Photo by Taboada Jorge, Alta Densidad, 2012)

<sup>[10]</sup> (Canales, Fernanda. 2017. Vivienda colectiva en México. El derecho a la arquitectura. Editorial Gustavo Gili, pag.9)

## La vivienda mexicana over time

Up to this point, all the research carried out has laid the basis for a comprehensive understanding of the vivienda's phenomenon in some of its aspects. Exploring, understanding and analysing various cases of vivienda in the Mexican territory contributes to obtain an increasingly comprehensive vision of the urban reality in Mexico, providing the necessary tools to its understanding.

The question posed by Fernanda Caneles: "What are the elements that make a house more habitable?", serves as the basis for her book "Vivienda colectiva en México. El derecho a la arquitectura"<sup>[11]</sup>. However, since ancient times, architecture has questioned this same question, raising concerns not only among architects, but also among the inhabitants themselves.

Over the years, the authorities have commissioned construction companies, architects and other professionals to build vivienda complejas. This begs the question, what factors influence the optimal functioning of a vivienda?

In Mexico, the variety of viviendas reflects the variability of the families that occupy them. Las viviendas has adapted to different situations over the years, from the size of the family to the incorporation of work or education spaces in the same place. In 2018, Mexican architect Tatiana Bilbao expressed the importance of designing with people's needs in mind in terms of real life, beyond simple elements such as bedrooms or kitchens. According to the 4th article of

the Political Constitution of the United Mexican States, "Every family has the right to enjoy decent and dignified housing". But what exactly does decent and dignified vivienda imply? <sup>[12]</sup>

According to the UN in 2008, it is the right of all people, regardless of gender, age or status, to have a safe home and community in which they can live in peace and dignity. Furthermore, the Consejo Nacional de Evaluación de la Política de Desarrollo Social - CONEVAL (National Council for the Evaluation of Social Development Policy) establishes that the concept of decent housing means that citizens of diverse economic and socio-cultural profiles have the opportunity to have access to quality housing, well located, with basic services, security of tenure and that complies with ethical standards of quality as a settlement. Despite these ideals, housing affordability is a challenge in Mexico. Reports indicate that only one third of the mortgage market is affordable for the average income. Demand exceeds supply, resulting in a housing deficit of 45% in the country.

*"El derecho a la vivienda digna implica que los ciudadanos de todos los perfiles económicos y socioculturales tengan la posibilidad de acceder a una vivienda de calidad, bien ubicada, con servicios básicos, con seguridad en su tenencia y que como asentamiento, atienda estándares éticos de calidad. En México, hay un rezago habitacional del 45% y se identifican desigualdades claras en cuanto a la disponibilidad de equipamiento, infraestructura básica y acceso a servicios.." <sup>[13]</sup>.*

Over time, the overuse of the term "vivienda digna" has led to a loss of its genuine meaning. In this sense, it is relevant to consider what a family looks for his vivienda: comfort. Is it then valid to speak of "vivienda cómoda"? However, does this imply a loss of the concept of dignity? Is it therefore appropriate to speak of "vivienda útil"? The usefulness of a vivienda is based on its ability to adapt, to be efficient and to be connected to the urban environment. This concept is intrinsically linked to urban density, in other words, how many people can live in a determined surface area or how habitable a space is. This is established by the relationship between la vivienda and la ciudad.

In Mexico, the long-standing imbalance between high housing density and poor service provision is being sought to be overcome. However, it is estimated that more than 38% of the Mexican population does not live in adequate housing.

In Mexico, viviendas are classified into categories such as formal, institutional, informal, rural and rural indigenous. Each type has particularities, from viviendas built in urban areas with permits to rural viviendas with limited access to services.

Overall, the situation in Mexico poses significant challenges. Financial mechanisms to purchase housing are largely targeted at specific groups such as beneficiaries of INFONAVIT, FOVISSSTE, PEMEX or the Fondo Nacional de Habitaciones Populares. This excludes low-income people in the formal sector, informal workers and those who rent or build on their own land. Although subsidy programmes have improved affordability, they have not guaranteed the right to a casa adecuada, as they often require a mortgage loan, as in the case of INFONAVIT.

Moreover, most subsidy programmes have focused on boosting the construction of new viviendas, despite the fact that the greatest need lies in self-construction, extensions and renovations. In fact, to date, approximately 66% of the subsidies granted by CONAVI have been earmarked for the acquisition of new viviendas.

For this reason, architects like Tatiana Bilbao are transforming the vivienda situation in Mexico through projects that aim to humanise space and address people's real needs. Despite the global economic crisis triggered by the COVID-19 pandemic,

there has been a boom in the real estate market that has created a gap between families struggling to maintain their homes and those who, with savings or secure jobs, acquire property as an investment or home, reflecting inequalities. Bilbao suggests that the home must be transformed into a space that prioritises wellbeing, care and community, rather than just a function of shelter or work. The pandemic has demonstrated our ability to adapt to social and spatial changes, and has altered the design and construction of cities and housing. Adaptation will be essential for success in the post-COVID era, and cities and housing will be expected to respond more effectively to the real needs of society.

In this chapter, an analysis of various case studies in the field of vivienda will be carried out using an analytical approach, derived from a thorough understanding of the essential fundamentals underpinning the analysis itself.

Reviewing past projects allows for an examination of what has and has not been successful.

A central aspect of the case study research was the search for such cases. For years, authorities commissioned the building of viviendas complexes to construction companies, which often neglected the design, resulting in mostly uninhabitable complexes. Only in recent years, thanks to studies by various architects and the growth objective of different authorities, has

greater attention been paid to the users of these spaces, prioritising wellbeing, care and community, as Bilbao mentioned.

Therefore, we started by identifying a specific period of construction, with the aim of including more recent case studies that could be easily compared. In the time interval between 2000 and 2023, significant events have occurred that have brought about a change in the architectural landscape with respect to vivienda. The geographical boundaries of the research were then drawn. The analysis focuses on the Mexican territory, covering almost all states and very diverse contexts.

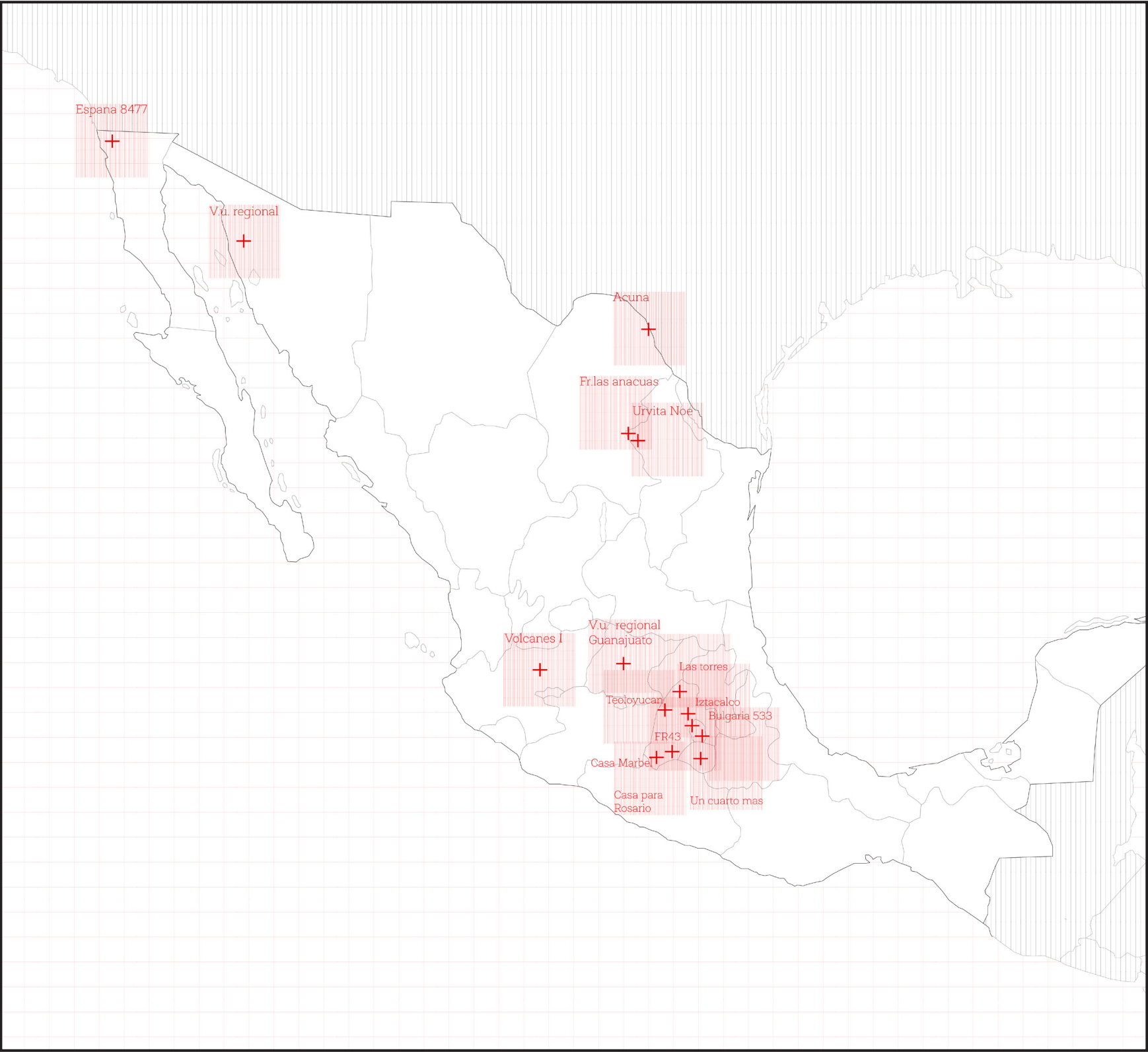
These two parameters guided the choice of fifteen case studies distributed throughout Mexico. Once both the geographical location and the time period were defined, the analysis proceeded with the analysis itself.

[11] (Canales 2017)

[12] (Ampudia 2020)

[13] (CONEVAL 2018)





## Definition of parameters

The research involved identifying key parameters to facilitate a comprehensive analysis and characterization of housing approaches.

### Spatial and temporal location:

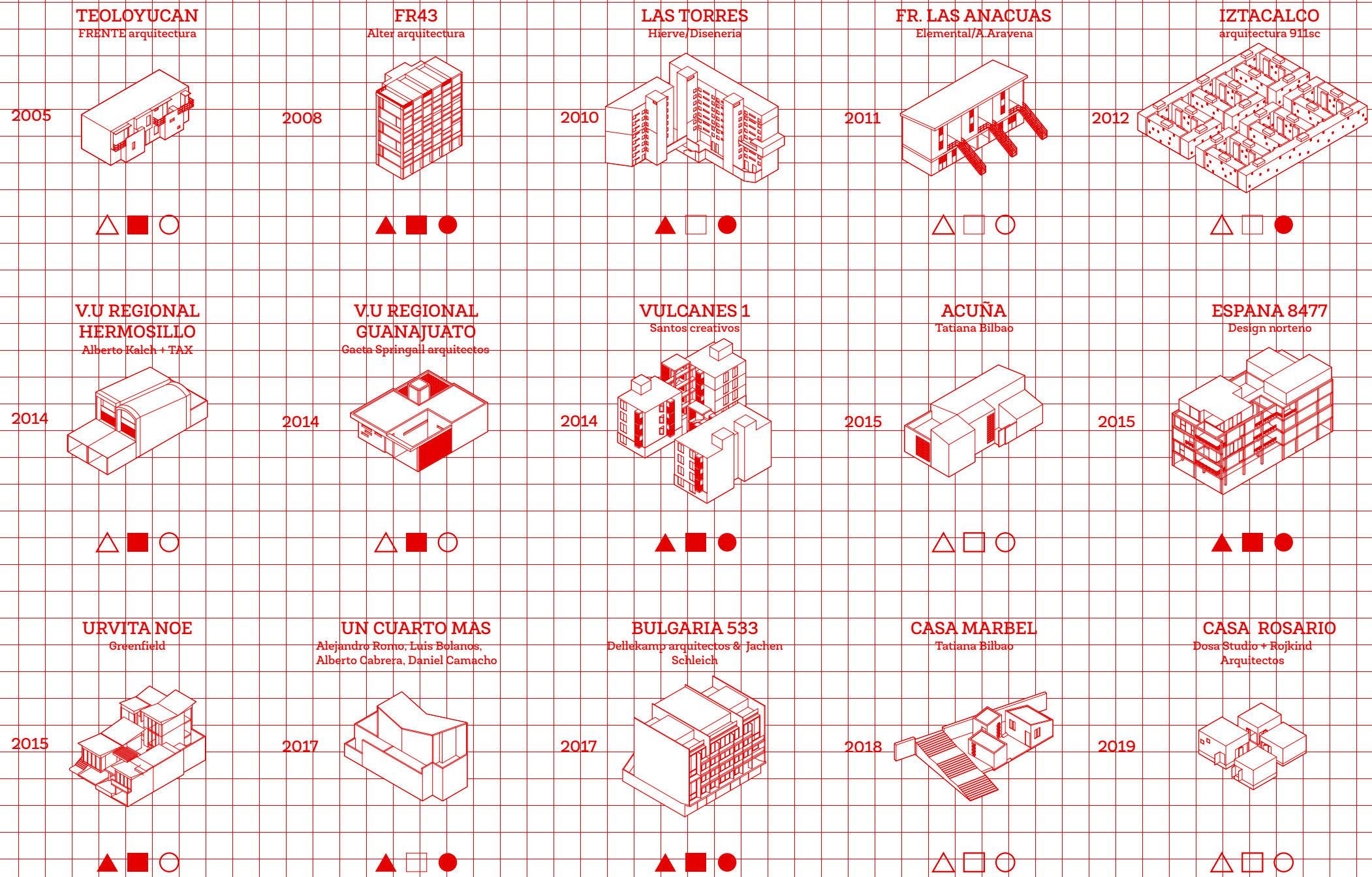
Housing cases within the Mexican territory, built and realised between 2000 and 2023, set the framework for the selection of fifteen case studies.

**Function:** The focus of the research is exclusively on the type of vivienda.

**Commission:** The type of commission for these viviendas is crucial for the analysis; a distinction is made between private and public commissions. This distinction reveals clearly different characteristics.

**Urban context:** This parameter, together with the more technical ones below, is essential to define all the characteristics. Case studies can be placed in three types of contexts: urban, rural and high-density. These characteristics are closely linked to the geographical location and the type of client.

**Architectural type:** The determination of this parameter is one of the most influential, as it tells the story of the housing and how the local population lives in it. Departamentos are found in vertical complexes, as well as viviendas unifamiliares in complexes. This parameter defines how this population has become accustomed to living and is closely linked to the available budget, the entity, the year of construction and, above all, the location.



# KEY

- COSTUMER**
  - private
  - public
- URBAN CONTEXT**
  - urban
  - rural
  - high density
- ARCHITECTURE TYPOLOGY**
  - vertical complexes
  - single-family house



In the previous pages, we explained how we selected significant projects in the history of housing. By presenting these projects in chronological order, we attempt to provide an initial insight into how, over the years, architects have addressed the challenging demand for housing through their ideas which, taken together, offer a valuable perspective for understanding the ways in which relationships between people and the environment have been established.

Over the years, all architects were motivated by the desire to create a sense of community. These proposals, built or unbuilt, represent examples of how to align the hopes and dreams of life with the actual conditions of the project.

Architecture is the stage on which we move, but it is also the space that defines how and what we want to be surrounded by.

Despite the differences in the commissions, it is clear that in recent decades there has been an attempt to move away from what the Modern Movement left as a notion of house.

*[14] “The house went from being the key element for exploring the possibilities of more equitable societies to become a global, repetitive, obsolete stereotype, increasingly out of touch with the needs of its occupants, and simply a money-making mechanism for a privileged few. This led to grater inequality and implied that architectural contributions have no impact on cities that we can no longer control.”*

Mexico served as a pioneering laboratory for evaluating the urban and social implications of the population explosion, pollution and traffic in the megalopolis of the 20th century. Here, unprecedented modern utopian projects, influenced by Europe and the United States, were carried out. In this context of rapid growth, limited budgets and a diversity of climates, densities and customs, designing housing projects became essential to define the cities of the future. This gave rise to a dramatic variety of housing programmes, including residential high-rises, neighbourhood buildings, communal buildings (vecindades), standardised housing complexes, small duplexes and minimal housing prototypes.

From the turn of the new century onwards, the consequences of these experiments led to new responses to the country's major problem,

the housing shortage. Not only the continuous increase in population, but also natural disasters were the causes of a new way of responding to the housing problem.

Our analysis focuses on projects implemented from 2005 onwards.

Over time, we observe how architectural solutions have changed in terms of ideology. In the initial cases, the design focused more on purely aesthetic responses. For example, in the Teoloyucan complex, it is designed with a play of volumes and colours obtaining a diversification of the facades, distancing itself from the repetitive Infonavit-type solutions.

Likewise, in vertical buildings such as the FR43 project, the interior heights of the rooms are played with to emphasise the separation between common and private areas in the flats. But as we can see, this is a first step, which in some way allows the project to be aesthetically solved.

Another prominent approach is to give importance to the place and context in which the projects are built, integrating the buildings in a natural way and respecting the land's slopes. In the Las Torres complex, local materials were used for the facades, focusing on cultural identity. This typology of thinking is not something new in Mexico, what is interesting is how these factors are taken into consideration in a vertical building.



From 2011, a new concept emerged in response to the lack of budget to build new housing.

Alejandro Aravena introduced the concept of 'progressive housing'. Faced with limited resources, instead of designing individual houses or small units, he proposed to build half a quality house for the same cost. *Elemental* created essential housing with sanitary facilities and two bedrooms in 40 m<sup>2</sup>. Under this approach, families were able to complete the construction at a later stage, taking advantage of Mexico's ability to self-construct to achieve a promising extension. This allowed for a gradual transformation from basic social housing to more desirable units. <sup>[15]</sup> However, this idea only worked theoretically; at least in the case of

Monterrey, the Las Anacuas complex faces difficulties due to its location far from the urban centre and services, including the lack of professional follow-up in the completion of the housing, which has contributed to precarious and insecure conditions in the community.

By constantly addressing the problem of accessibility to housing, especially social housing, this has become one of the most prominent issues in the history of residential architecture.

Tatiana Bilbao was another contributing architect. She developed a project with the aim of creating a *prototipo de vivienda* with affordable spatial qualities and materials. To achieve this, it was essential to understand the needs of the people who would inhabit the house in terms



of materials, form, function and appearance. Through interviews and on-site workshops, a project was arrived at that contrasts with what is common in the country. The result was an archetypal house with pitched roofs, adaptable to different geographical, social and cultural conditions. Using a rigid central core in the house, surrounding modules of lighter and more economical material, such as wooden pallets, were placed around the house,

allowing for future expansions while retaining the exterior appearance of a finished house.

These expansions are tailored to each family's budget, needs and desires, considering diverse urban and rural customs and traditions to ensure affordable and dignified solutions for each household. <sup>[16]</sup>

Moving forward in time, we observe how the *Un cuarto más* project, developed and coordinated by the INFONAVIT institution, marks a significant change in the way architects and the state have approached housing design and urban planning in recent decades in Mexico. This project aims to encourage the addition of rooms to existing dwellings in urban areas that are underutilised and deficient in adequate public services.

In contrast to the old practice of creating entirely new cities through planned housing projects and large communal areas, *Un cuarto más* focuses on smaller, more targeted interventions in already established settlements. <sup>[17]</sup>

This change in strategy reflects an evolution in the conception and execution of architectural and urban projects. In the past, it was common to start from scratch, using a "tabula rasa" approach to build entire cities. Today, however, architects, private investors and the state are adopting more modest and adaptable approaches that build on existing structures.

This is not only more efficient in terms of resources and costs, but also has a



positive impact on the quality of life of the people residing in these urban areas, by improving and optimising the space already available rather than demolishing and completely rebuilding.

In the end, *Un cuarto más*, as well as the Urvita project, which we will discuss in detail in the following pages, are outstanding examples of how architecture and urban planning have evolved to adapt to the changing needs of contemporary cities.

<sup>[14]</sup> (Canales, *Shared Structure Private Space Housing in Mexico 2020*, pag.18)

<sup>[15]</sup> (Tatiana Bilbao Estudio n.d.)

<sup>[16]</sup> (Ott n.d.)



## *How people live in the vivienda*

During this research process, an important factor emerged: the ability to get directly in touch with the thoughts, questions, and needs of the local population. This engagement involves both men and women, as well as professionals who have dedicated their time to exploring these issues over the years. This one-to-one approach with local people has resulted in an assortment of reflections and considerations. One particularly remarkable aspect has been the gradual recognition of a reality that is significantly distant from the European one, raising questions that, up to this point, had remained unexplored. The deep roots of cultures and traditions in a specific context exerted a distinctive mark on domestic life and the urban environment.

The next pages will present fragments of the stories of individuals such as Karina, Jose Federico, Cesar Raul, Jonathan Adrian, Eder, Sandi, Iliana, and Ruth. These figures were met through access to 'The Library of Reacción'. A variety of age groups and a diversity of social backgrounds characterize these individuals. Their family histories also varied and reflected a patchwork of unique experiences, each animated by distinctive personal dreams and ambitions.

A fundamental contribution in complementing and expanding this framework emerged through the active participation of several architectural firms from Mexico City and Monterrey. These realities have dedicated themselves to investigating

and addressing the challenges related to these issues over many years, sharing their experiences by providing robust guidance in this complex and articulated field.

It should be noted that in recent times, these topics have gained more and more resonance and dissemination in various contexts. In addition to architectural practices, voluntary associations and university programs are becoming increasingly immersed in these challenges. This phenomenon testifies to a growing appreciation of the importance of addressing such complicated and fundamental topics in different facets of society.

<sup>(17)</sup> Photo taken from Roma. Diretto da Alfonso Cuarón. 2018



*“La casa tipo Infonavit comprende de dos recamaras, una cocina, posiblemente un salón y un baño, no tienes cochera”*

*"The Infonavit type house consists of two bedrooms, a kitchen, maybe a living room and a bathroom, you do not have a garage".*

*“Si, me gustaría tener más espacio”*

*“Yes, I would like to have more space”.*

*“Estamos batallando de agua, así que prefiero no tener jardín.”*

*"We're struggling with water, so I'd rather not have a garden."*

*“Yo vivía en una casa Infonavit, pero era muy pequeña para mí y mi familia, por eso la cambie, incluso me mude de municipio.”*

*"I used to live in an Infonavit house, but it was too small for me and my family, so I changed it, I even moved to another municipality”*

*“Aumentaría la dimensión del salón”*

*"I would increase the size of the living room".*

*“Las casas de Infonavit están llenas de goteras”*

*“Infonavit houses are full of leaks”*

*“Un cuarto para ser grande debería tener espacio para una cama de tipo King, con su peinador y mínimo un armario”*

*“A large room should have sufficient space for a king-size bed, a hairdresser and at least one wardrobe”.*

*“Cabe solo la cama y un mini closet. No entren dos camas”*

*"Fits only the bed and a mini wardrobe. Do not fit two beds".*

*“Yo vivo con mis papas, y vivo en una casa tipo Infonavit. Antes vivíamos en 5 en la casa, era muy chiquita. No sé cómo vivíamos los 5 ahí adentro. Ahora ya no, quedamos en 3, mis hermanos se fueron.”*

*"I live with my parents, and I live in an Infonavit type house. We used to live in a house with 5 people, it was very small. I don't know how the five of us lived in there. Now we're not anymore, we're down to 3, my brothers left."*

*“Cambie mi casa, porque donde estaba era muy chiquito.”*

*"I changed my house because it was too small.”*

*“El material que utilizan para las casas Infonavit son muy baratos e incluso las pagas caras.”*

*“The materials that they use for Infonavit houses are very cheap and you even pay for them expensively.”*

*“No vivo cerca del trabajo. Vengo siempre en camión y me demoro casi 1 hora y media para llegar”*

*"I don't live close to work. I always come by truck and it takes me almost an hour and a half to get there".*

*“Yo vivo e la casa de la familia de mi pareja, somos muchos en la casa. Es de un solo piso. Esta dañada. Lo primero que haría sería aumentar un segundo piso.”*

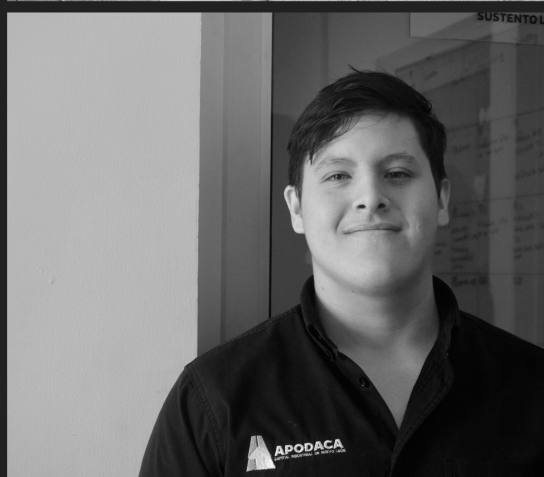
*"I live in my partner's family's house, we are many in the house. It is a one-storey house. It is damaged. The first thing I would do would be to add a first floor".*

*“Los materiales son básicos, cuando hace calor hace mucho calor, cuando hace frío hace mucho frío”*

*"The materials are basic, when it's hot it's very hot, when it's cold it's very cold".*

*“Me gustaría que tengan ventanales grandes, para que entre lo más posible de luz.”*

*"I would like them to have large windows, so that as much light as possible can enter.”*



## The different types of living: Apodaca and San Pedro

### introduction

Up to this point we have analysed how over time, the concepts of *casa*, *hogar*, and *vivienda* have acquired different meanings, especially when they align with the needs of different types of users.

During our stay in Monterrey, we have had the valuable opportunity to become acquainted with various realities present in the city. With the collaboration of several individuals, we have explored two *viviendas* cases that exhibit distinct differences, both in terms of location and housing typology.

Thanks to the Casa Nueva Esperanza Community Centre, a part of the 'Reacciona Project' <sup>[18]</sup>, we have had the privilege of interacting with the community of Apodaca. Through these interactions, we've been able to grasp the needs and deficiencies they face in their *viviendas*.

During our time there, we had the pleasure of meeting Karina García, the centre's secretary. With great kindness, she allowed us into her *vivienda*, offering us a real point of view into the challenges present in a *Vivienda Infonavit*. It is located in the extensive private colony of Santa Rosa, one of the largest in Apodaca.

Thanks to Karina's collaboration, we also managed to get to know a nearby neighbourhood called "Barrio La Gloria", previously known as "el Infiernito". This neighbourhood emerged informally and through self-construction years ago in response to the influx of immigrants in the area who, due to limited economic resources, were unable to access regularized land for rent or purchase.

This is how this irregular settlement was born, which has now been formalized by the Government.

Apodaca, at present, is a municipality in the state of Nuevo León, adjacent to the metropolitan city of Monterrey. This urban enclave is recognized as the most influential nucleus in the northern part of the country, owing to its privileged location, robust industrial infrastructure, and strategic communication routes. It is part of the northern industrial corridor and is close to the United States. However, in recent years, the municipality has faced environmental challenges due to rapid urbanization and growth without adequate planning. This growth has consumed vast stretches of land, transforming agricultural zones into industrial areas, which has brought about challenges in terms of adaptation, water management, and solid waste handling <sup>[19]</sup>.

On the other hand, we have had the pleasure of interviewing and getting to know Kenji López, a passionate engineer on a quest for solutions to create and enjoy better cities. Kenji leads innovative projects like *Greenfield* and *Urvita*, two initiatives recognized for their disruptive approach to architecture and housing. We find ourselves immersed in one of his notable projects, *Urvita Victoria*, located in the Tampiquito neighbourhood, in San Pedro Garza García <sup>[20]</sup>.

*Urvita* is a housing concept that, based on a contemporary rental model, allows people to live in specific neighbourhoods, like this one in San

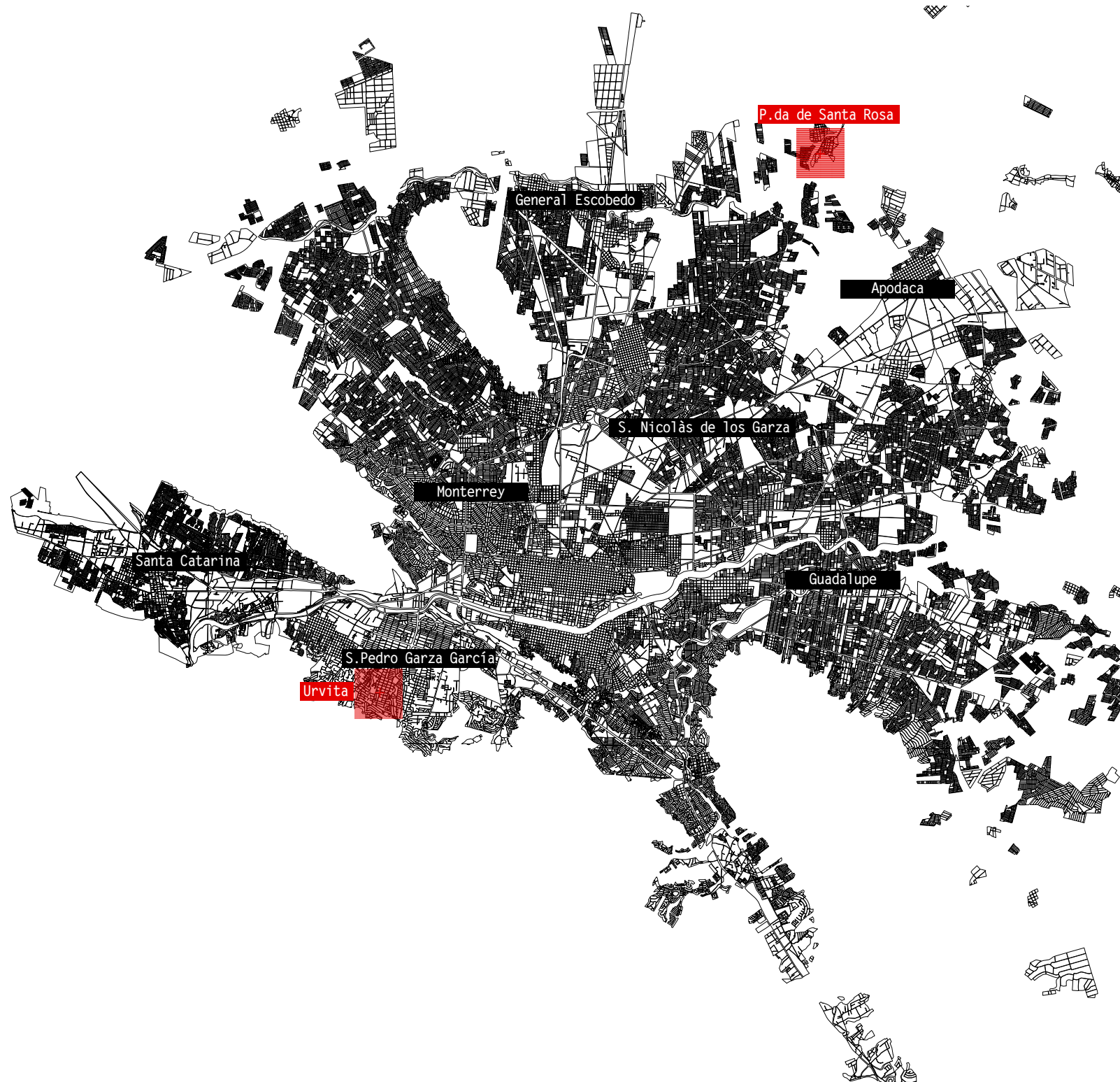
Pedro, for stays ranging from a day to a year, to the entire life. These loft-type spaces offer contemporary solutions for urban living, blending diverse social classes and age groups in their environment.

San Pedro Garza García has the highest average per capita income in the country. This translates to high-quality public, urban, commercial, health, education, and recreational services. According to the 2019 Municipal Competitiveness Index of the State of Nuevo León, San Pedro Garza García holds the top position and excels in essential services, human capital, security, and administrative performance. This makes it an attractive hub for its resident population and other parts of the metropolis, as well as other states. Its attraction potential continues to grow due to its internal economic dynamics and its role in the Monterrey metropolitan area.

<sup>[18]</sup> (Archdaily 2022)

<sup>[19]</sup> (MUNicipium n.d.)

<sup>[20]</sup> (Lopez n.d.)



This map represents the entire Monterrey metropolitan city, highlighting the two sections of the city where we were able to directly visit the *viviendas*.

Map of the Monterrey metropolitan area (MTY), including all its municipalities.



## Apodaca: Infonavit and informal viviendas



Karina has lived in the private colonia of Santa Rosa in Apodaca for the past 16 years. She lives there with her children and husband in an Infonavit type house.

As previously mentioned, in order to acquire an *Vivienda Infonavit*, it is necessary to satisfy certain requirements that, unfortunately, were not fulfilled in this case. For this reason, with the assistance of a *Confinavit*, through the collaboration of a patronage that covers a portion of the total cost, they were able to acquire the land within the neighborhood, and later, with the help of a construction company, they built their vivienda. Construction companies are mostly predefined, so you should trust the one selected by the government. However, this often leads to mistrust, as these companies focus only on profit, resulting in viviendas built with

low quality materials. This is precisely what happened with Karina's vivienda, built with cement blocks, a material known for its durability, but not for its thermal comfort. However, in this case, the blocks are also made of low-quality material, which explains the cracks and water leaks throughout the house.

Originally, the house consisted of a kitchen and a living room on the ground floor, with access to the backyard. On the first floor, there is small rooms and a bathroom.

For this reason, the family decided to expand the house, a choice that every owner in the neighbourhood makes individually.

Some expanded at the back, some at the front and some at the top.

Karina chose to extend her garage in the front and create an additional room above. This decision was aimed at increasing the available space and accommodating an extra room that can be used by her and her husband, leaving a room for each of her children.

This work was carried out by Karina's contracting of a building company. However, they were financed from her own resources due to her mistrust of the building company that previously built her vivienda.

These projects were started a few years ago, but to the present day, only the garage extension has been completed. Currently, the work is on standby because of the increase in the price of materials. In fact, after the COVID-19 pandemic, the prices of materials increased by 40-50% compared to previous years.

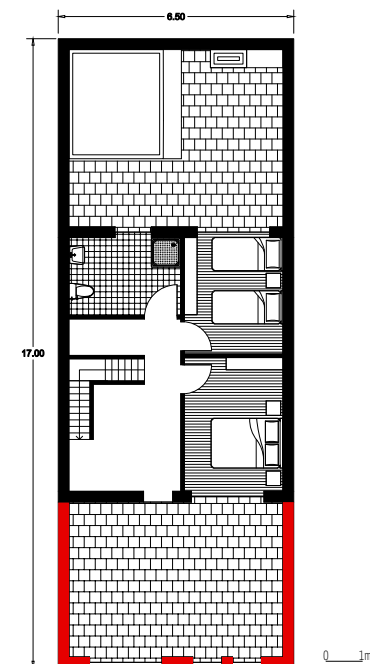
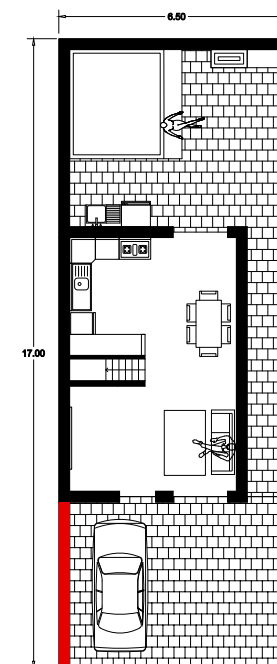
This is the reality in the Infonavit neighbourhoods.

Frequently, or even in most cases, these "cajas" turn out to be uninhabitable throughout time. They fail to adapt to the natural changes of life and sometimes deteriorate within a few years of their construction.

As previously mentioned, the municipality of Apodaca has suffered environmental challenges due to rapid urbanisation and growth without adequate planning. This is what has led to the multiplication of cases such as the Santa Rosa colony over time. Therefore, we have observed how residents of the same colonia have come together to secure certain services that they cannot easily find in their immediate surroundings.

That is why we had the opportunity to meet a family who, like others, decided to allocate part of their plot of land for a business. This was not an isolated case. In fact, it is something that most colonias do.

Through a board of directors, they try to ensure some minimum services. In the case of this specific colonia, they have also considered increasing the green areas. In fact, we have observed how the residents, with their own resources, have planted trees and put up playground equipment for children. In summary, this colonia is characterised by its regular urban planning, with lots almost uniform in size. However, it is the variability in the modifications that are made to these lots that creates the diversity among the houses, even allowing the joining of two adjacent lots for those who have that option.





*“[...] in Mexico, when people build their own houses, they traditionally build them with flat roofs and leave the steel bars sticking out of the top. The landscape of the whole country is covered with construction like this. In the past, the steel bars have really been a symbol of hope—a way of saying, ‘I’m going to do the second floor when I have more money.’ It was a statement and promise of future growth.*

*However, when the second floor wasn’t built, and usually it wasn’t, the steel bars became a representation of failure—the failure to grow. So nowadays, nobody wants a house that does not have the appearance of being finished. So, yes, while all of the models for low-income housing are this archetypal house, the reason was much less about an ideal than it was related to the fact that it represented a finished product [...]”*

*Tatiana Bilbao*

[21] (Bilbao, Tatiana, Gabriela Etchegaray, Hilary Sample, e Ivonne Santoyo-Orozco, 2018. A House is not Just a House. Columbia Univ Graduate School.

Unlike the last mentioned colony, which is private and was built under the supervision of the government and Infonavit, we had the opportunity to explore “Barrio La Gloria”, previously known as “Barrio El Infiernito”.

The industrialisation led to a rapid increase in the urban population. This growth exceeded in a few years the state’s capacity to provide housing for the new immigrants, resulting in the emergence of numerous informal settlements. As we know, decades ago entire neighbourhoods were established on the edges of the city and in new municipalities, self-building on hillsides and undeveloped land.

Through the self-construction approach, each individual family is in charge of building their own vivienda, which evolves over time based on the household’s economic resources and their particular needs. The configuration of the buildings arises from a gradual process, where viviendas are built progressively from rectangular units, using available materials, generally reinforced concrete masonry, cement blocks and recycled materials. With increasing density, the inhabitants of these viviendas build upwards and sideways to expand their living space. The structure of the informal city grows naturally and increases over time; the result is a multi-focal pattern, defined by infinite subsets of individual groups of buildings, rather than by the logic of a dominant urban plan<sup>[22]</sup>.

Over time, these settlements became integrated into the urban sprawl, forming

marginalised and impoverished areas. Overcoming these precarious conditions and integrating these settlements into the formal city is one of the main challenges in developing countries. Most of the people who came to the Monterrey Metropolitan Area (AMM) had limited economic resources. Because of the economic inability to rent or buy legalised land, the emergence and expansion of irregular settlements continued. In fact, Monterrey stood out with the largest number of informal settlements.

In many of the informal settlements, as in the case of ‘El Infiernito’, streets were unpaved and transport, health and security services were scarce, in contrast to conventional neighbourhoods. Nevertheless, they were largely provided with drainage and street lighting. Residents lacked motorised transport, forcing them to travel 2-3 hours by bus to reach urban centres. The lack of security was also a persistent problem in these places, and indeed, it is these types of settlements that experience various security crises.

This explains why we were not able to take photos or conduct face-to-face interviews with the locals, but through recollections and narratives of those who know the neighbourhood.

The viviendas, on a reduced scale, adapt to the surrounding topography, creating an organic tissue that adjusts to the land. A flexible urban pattern developed, where the viviendas are in constant transformation according to the needs of the residents, densifying on their plots

of land. Viviendas tend to change from *viviendas unifamiliares* to *viviendas colectivas* through self-build, both in terms of form and character.

Over the decades, they have evolved from an initially rural character with precarious techniques and materials to an urban character with durable materials and basic services, although still self-built.

The viviendas are units that have accumulated to form a neighbourhood with its own dynamics. They are usually low-rise, mainly ground and first floor. Occasionally, three-level vivienda can be found. In this tissue, viviendas are occasionally built with wood and adobe, but mainly with concrete blocks, tin roofs and concrete.

Over time, this settlement has undergone a steady process of consolidation, despite being located in a highly complex socio-economic and urban environmental setting. In view of this situation, the main objective of the policies implemented was to regularize the settlement. This approach responds to the considerable magnitude of the social welfare effects arising from informality, as well as to the progressive creation of land rights over time. From a policy perspective, it is imperative to regularise informal settlements, as failure to do so would be unsustainable

. These policies covered various legal aspects related to property ownership and its registration, as well as financial, urban and environmental aspects. Their fundamental purpose was to ensure that consolidated neighbourhood residents are not subject to eviction

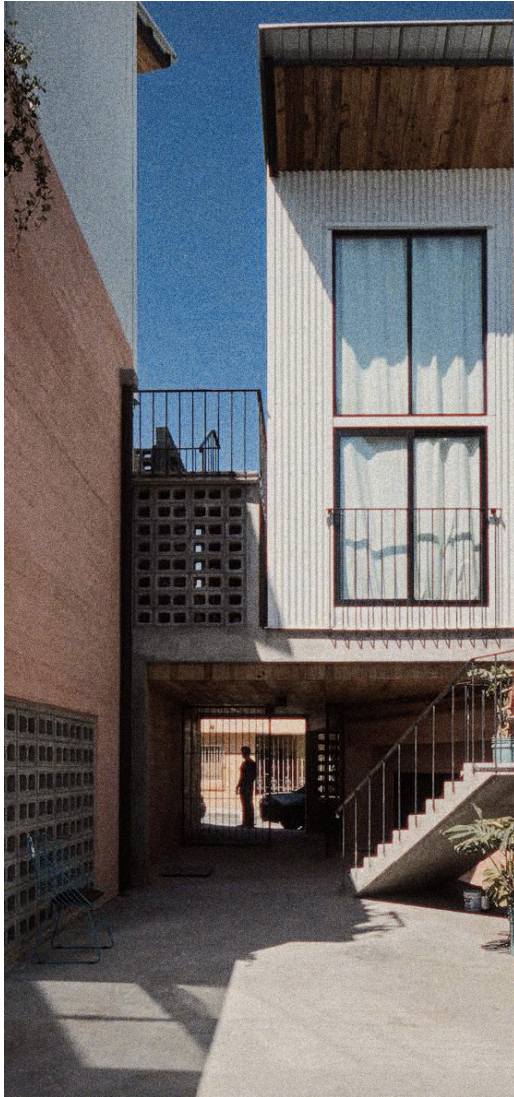
and displacement, but can continue to live on the land they have occupied, improving their living conditions. This involves guaranteeing security of tenure, the legal rights of owners and the provision of urban infrastructure and services<sup>[23]</sup>.

<sup>[22]</sup> (International Lotus 2019)

<sup>[23]</sup> (Programa para Regularizar Asentamientos Humanos 2022)



## Urvita, a new way of living



Kenji Lopez, one of the co-founders of the Urvita Project, explains that its main objective is to provide future generations with exceptional spaces to live, work and enjoy. In fact, the basis of this project is not limited to the concept of housing, neither is it limited to replacing housing units or buildings. Instead, it is about building a city in a completely new way. Therefore, this project focuses on creating a better and more liveable city.

Kenji introduces us to a reality that is evident in Mexican cities like Monterrey and others similar cities: people need and deserve decent housing. The government offers the possibility and support to acquire land with a vivienda Infonavit. However, these viviendas are identical replicas of millions of other houses around them, uninhabitable and located on the outskirts of the city, lacking infrastructure and services.

This approach has resulted in 73% of people spending 20% of their income and approximately 2 hours per day on transport. In addition, many people have no qualms about abandoning their vivienda Infonavit, highlighting a serious lack of respect for property and a preference not to live in them. This has contributed to the current reality of cities with a high percentage of abandoned houses and informal constructions, social insecurity and others<sup>[24]</sup>.

Therefore, after his work experience in construction companies whose projects focused on these “viviendas cajas” located on large expanses on the outskirts of the city, without considering the implications of such a large settlement, the engineer came to the conclusion that this approach was not the right one. He came to understand that the root of the problem lay in the design and use of the city as a whole, coupled with the poor organisation of the housing industry.

The current challenge is an urban crisis, and the sad reality is that neither the Mexican government nor most real estate developers are focused on creating better cities. Urban sprawl continues unchecked, the city centre is abandoned and architectural inefficiency is observed. This decreases quality of life, increases travel times and environmental pollution.

Kenji argues that proper land use planning is the key. This implies a diversity of uses that promotes social variability, which is crucial for a well-functioning community and city. Each

neighbourhood in the city should have different functions to create a network of opportunities that foster proper functioning in social, economic, cultural and other aspects.

Thus the Urvita Project was born, with the idea of creating affordable housing for various economic classes and ages. The project is based on a flexible rental housing and real estate investment service that provides financial freedom in an affordable way. It allows people to live in neighbourhoods such as San Pedro Garza Garcia for short or long periods of time, with the possibility of changing to a larger or smaller home, based on the person's needs at the time.

Urvita envisions inclusive and vibrant spaces, where different social classes and age groups can coexist<sup>[25]</sup>. The project aims to be the first step towards a new society, promoting a more pedestrian-friendly, dense, heterogeneous and sustainable city through a network of strategically located multi-family buildings. Urvita projects are true living spaces, with high architectural quality and loft-style housing units, which are located in areas where there is not much land, but where there are many services and where you can live a life similar to that of a neighbourhood. These were designed in a compact and efficient manner, with each room having better spatial qualities than the average offering, including high ceilings, landscaped terraces, natural air and light that allow for superior climatic comfort, as well as taking advantage of the natural views of the area.



Each Urvita project offers private, semi-private and public spaces, and features multiple bedrooms, private and shared bathrooms, kitchen, living room, dining room, laundry, patios and service areas<sup>[26]</sup>.

So far, five projects have been realised, and Urvita's network continues to develop. They are confident that these projects will bring about change and help improve development in Monterrey, increasing the quality of life of citizens and providing social benefits at various levels.

We had the opportunity to visit Urvita Victoria, the project located in the Tampiquito neighbourhood in San Pedro Garza García.

During our visit, we were able to observe up close how the various residents interact with each other, how the community is organised and how the different vivienda options have been conceived and designed.

Kenji shares that at the beginning of the project, at the land acquisition stage, they sought to involve the former homeowners. The idea was that they would contribute their property, while Urvita would take care of the renovation. Once the work was completed, Urvita would manage the rental of the vivienda and take over the entire project, especially the maintenance, ensuring that the residents maintained the property. Although this was a win-win opportunity, unfortunately only a few accepted this investment.

Unlike other projects, Urvita Victoria retains part of the pre-existing structure before renovation. Although this is more costly, it preserves the authenticity of the site. Many of these plots contained viviendas built and extended over time, and Urvita felt it was crucial to maintain this language architectural integrity. The project offers a diverse range of viviendas options with variable rents, facilitating the inclusion of people from different economic backgrounds. Urvita's goal is to create affordable housing, so in Urvita Victoria there are rental options from 8000 MXN (around €400), and in future projects they will look to reduce the cost even further (around €250). This will allow low-income people to live close to their workplaces.

To address the diversity of users with different economic situations, the materials used in the project are selected without associations with specific economic classes. Unlike many developers focused solely on profit, Urvita considered the importance of thermal comfort within the viviendas. In addition, it made sure to provide common spaces where residents can interact, organise events and activities to encourage conviviality.

A distinctive feature of the project are the "nidos", lightweight aluminium structures placed above the viviendas. These are prototypes of double-height viviendas totalling 30 square meters, offering all the necessary living comforts. This demonstrates that it is possible to have a complete vivienda in the space of a car park, conveying a message about the

need to reconsider the space allocated for cars according to regulations, and even promote other transport typologies.

In terms of rentals, Urvita has an efficient pricing algorithm. By booking in advance, it is possible to access accommodation at a lower cost. This is feasible because, in the event that owners do not occupy their properties, Urvita takes care of renting them out, generating income in the process. By purchasing a property, such as a flat, you are making an investment that can pay off when you rent it out, meaning that the return never goes to zero.

For this reason, its strategy is based on the use of technological platforms to maintain the visibility of the site. In addition, these platforms allow them to establish human connections with people. In this way, they manage to provide a comprehensive and enriching approach for those who trust in their project.

<sup>[24]</sup> (Lopez, Kenji Lopez (Urvita): Cómo hacer ciudad 2020)

<sup>[25]</sup> (Greenfield s.d.)

<sup>[26]</sup> (Archdaily, Urvita Noe / Greenfield 2016)

# 02. *El fenómeno de Santa Catarina*

## 02.1 *Exploring Santa Catarina*

*Reading of the territory*

*Santa Catarina localitation*

*Urban tissue*

*Land-use*

*Mobility infrastructures*

*Topography and green areas*

## 02.2 *The phenomenon: the rise of industry*

*The industry's territory*

*Nearshoring: the coming of Tesla*

## 02.3 *Recent developments*

*The present situation*

*La vivenda in Santa Catarina*

*Santa Catarina's phenomenon*

## *Exploring Santa Catarina*

### introduction

The second part of this research will study the phenomenon of Santa Catarina, one of the largest municipalities in the Metropolitan City of Monterrey.

This term is used to explain an event that gives rise to problems; in this case, the phenomenon refers to the housing crisis in the municipality. To try to explain it, we have made readings of the city from different points of view, such as territorial and urban, which are fundamental to understanding how these problems arise both in the conformation of the city and in the use of space.

In a second moment, the actuality has become the second piece; it is necessary to understand what is happening now in Santa Catarina, which started as an industrial city but is experiencing strong growth due to continuous industrialization.

The phenomenon identified is a chain response because as the city is continually industrializing, it needs more and more housing.

Right now Santa Catarina has a housing deficit problem, caused by its topographical conformation, but also by continued growth. It is a very complex phenomenon because, despite the housing deficit, there is a high presence of uninhabited houses and informal settlements.



## *Reading of the territory*

The first part of this chapter sets out with a reconstruction and reading of the municipality of Santa Catarina, located to the west of the Monterrey Metropolitan Area and with an area of 915.8 km<sup>2</sup>. It is considered the *puerta de Nuevo León* <sup>[2]</sup> for its strategic location.

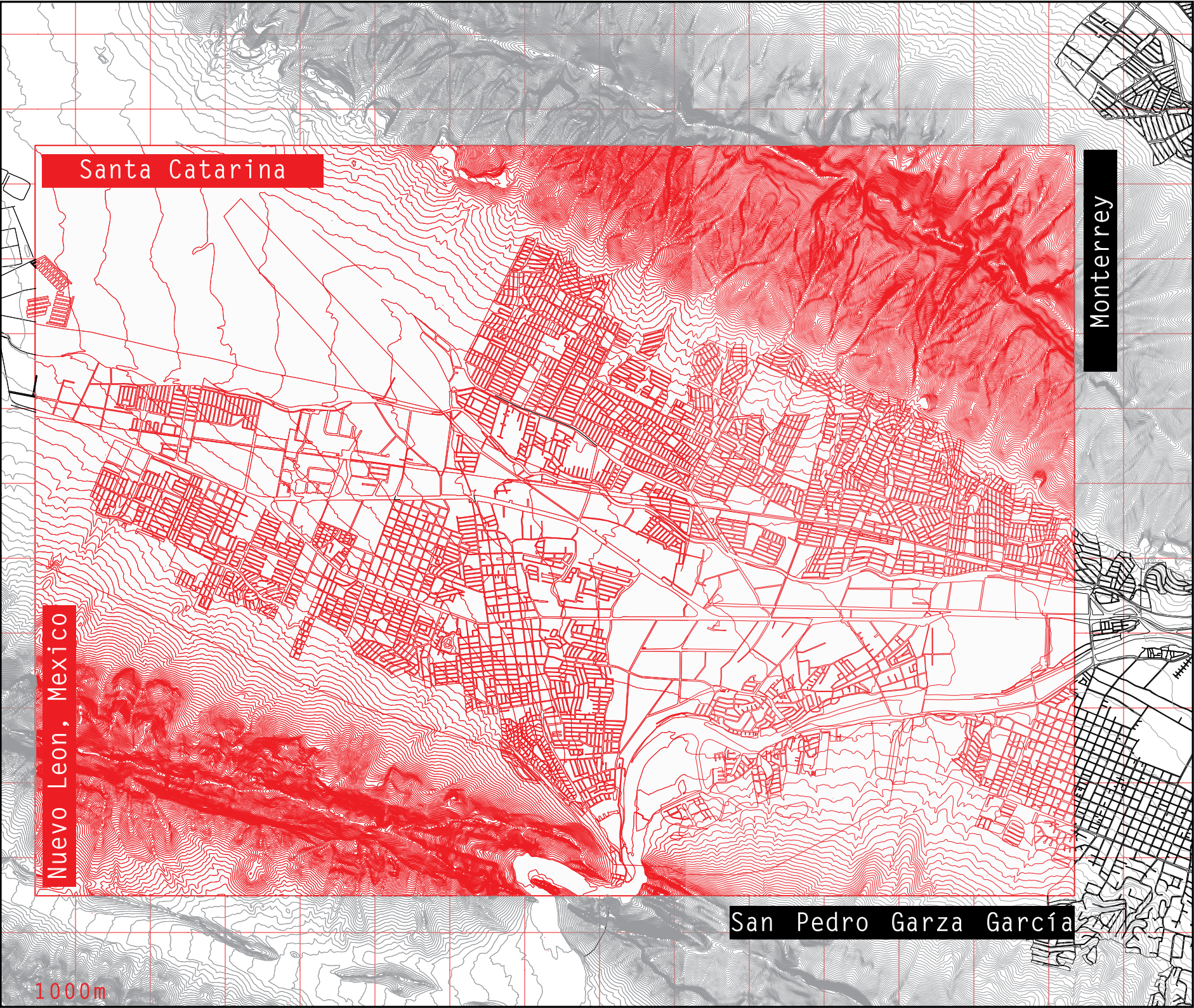
Although it is the fourth biggest municipality in terms of size, the urban area - located between the Sierra de las Mitras and south of the Sierra Madre Oriental - occupies 4.82 % of the total area, owing to the presence of the Cumbres de Monterrey National Park, which forms an important part of the Sierra Madre Oriental. <sup>[3]</sup>

Cartography shows its particular morphological conformation, full of mountains with altitudes ranging from 1,600 to 3,400 metres above sea level, which gives a particular altitude to the municipality, located at 690 s.l.m.

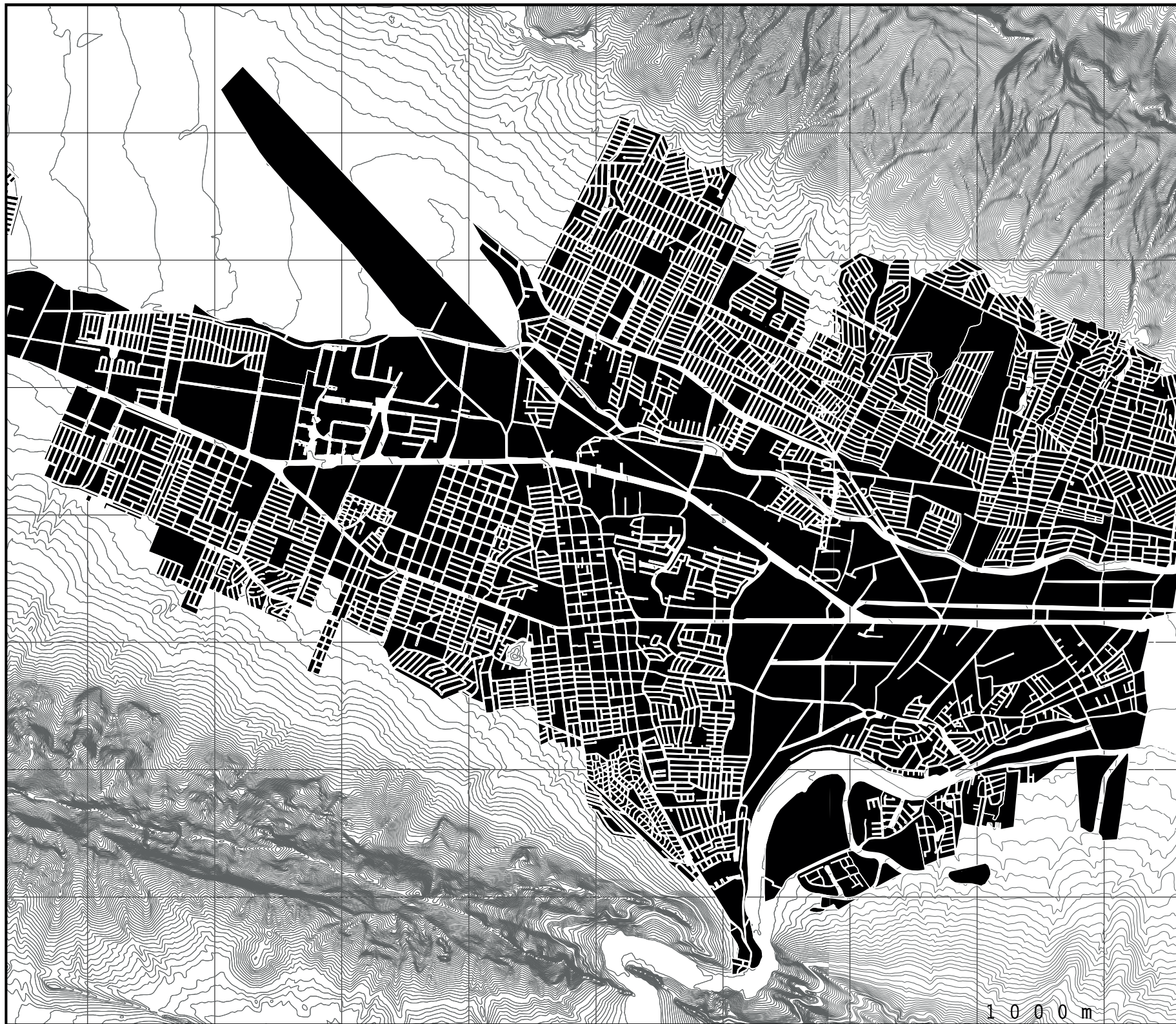
The orography of the city has been very important in history, because Santa Catarina was considered one of the most important mining areas in the country, as opposed to the agricultural sector, which is in severe decline as a result of constant drought and the morphology of the soil; but the main activity of the municipality is the processing industry. The urban centre was created by the construction of houses around the factory, used by technicians and workers. Over time, different textile factories were established, creating the industrial city that it is today.

<sup>[2]</sup> (Gobierno de Santa Catarina n.d.)

<sup>[3]</sup> (Administración 2021 - 2024 2021)



In the analyses reported, some of the characteristic features of the city of Santa Catarina will be analysed, with special attention paid to both the urban part and the morphology of the territory, these factors determining the conformation of the city.



## urban tissue

Analysis of this map shows how the city was generated in an uncontrolled way.

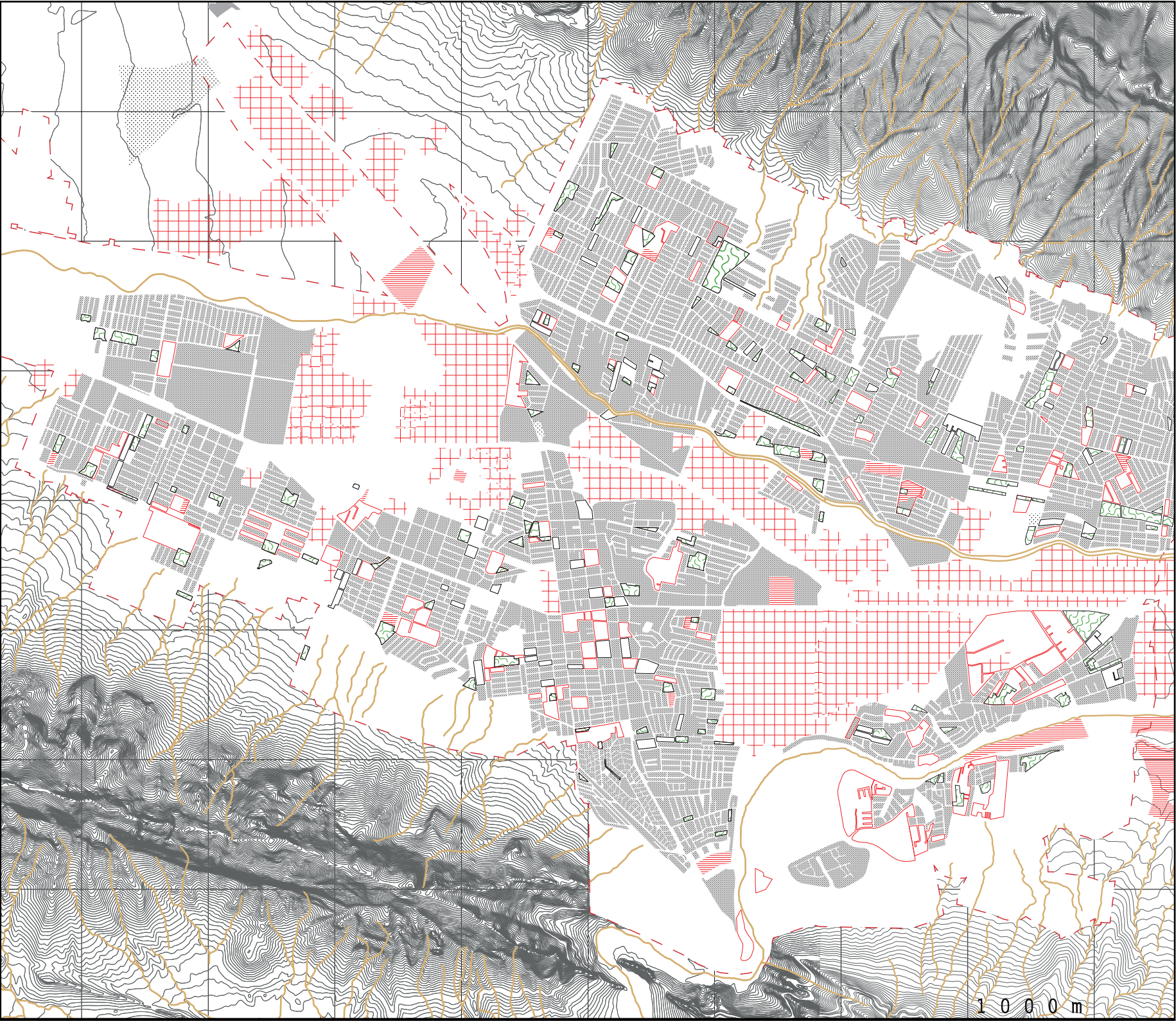
Over time, different plots have been juxtaposed without a defined plan, resulting in a high-density city.



The Photo shows Santa Catarina's Urban tissue.  
Credit by Adrián Machuca Parás

The Photo shows Santa Catarina's Urban tissue.  
Credit by Adrián Machuca Parás.





land use

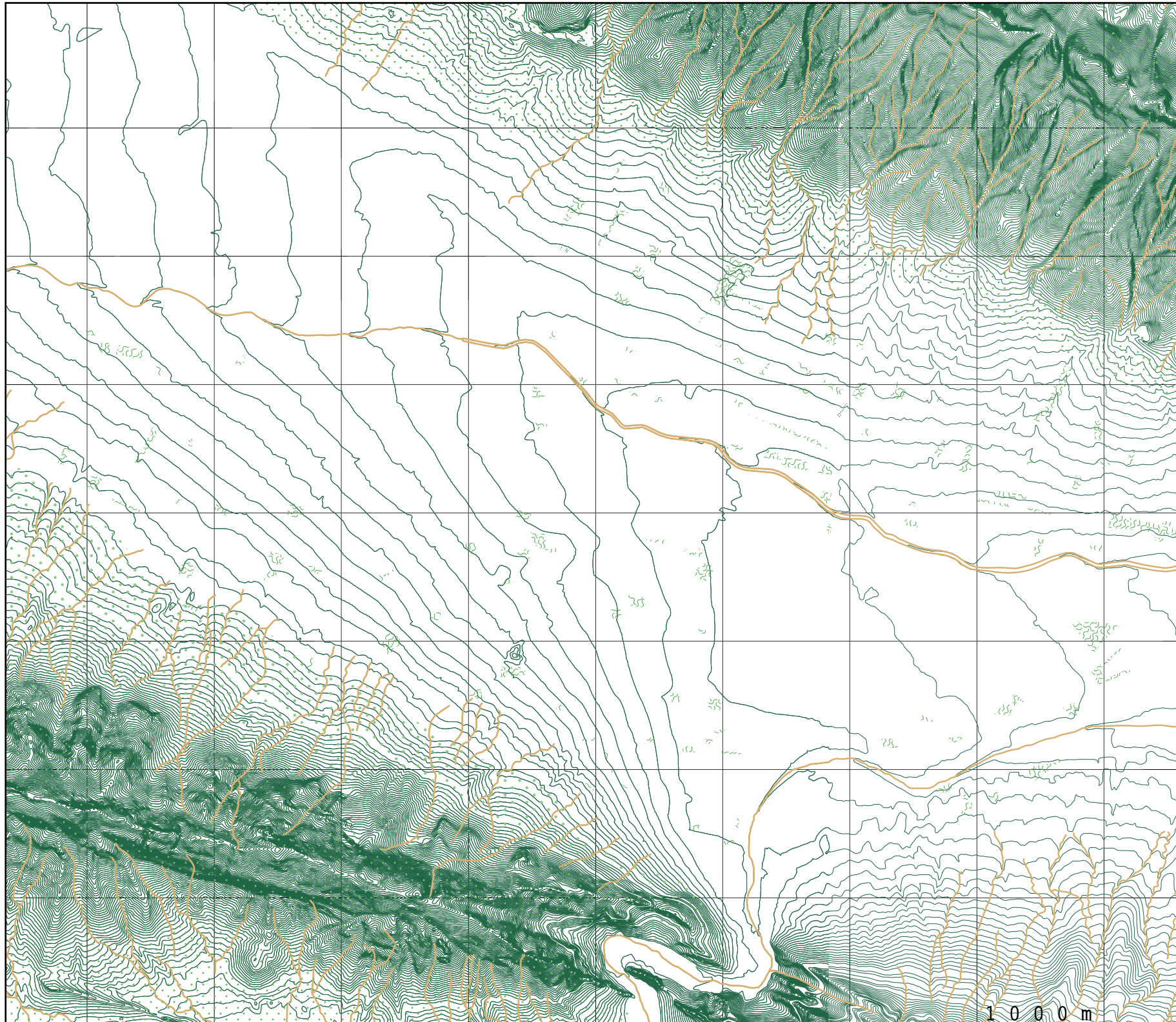
This Analysis examined land use; this map shows the human activities carried out within the municipality.

For the most part, the land is dedicated to residential use, corresponding to 25.66% of the city's surface area; with a slightly lower percentage -equivalent to 24.7%- we find industrial land use, confirming the nature of the city.

Inside the municipality there are various services, such as schools of all grades, places of cult and sports facilities, there are green areas, such as small private and public parks.

The growth and consolidation of the industrial sector, with an always more strengthened objective.

- industrial
- green area
- residential
- sport area
- school
- places of worship

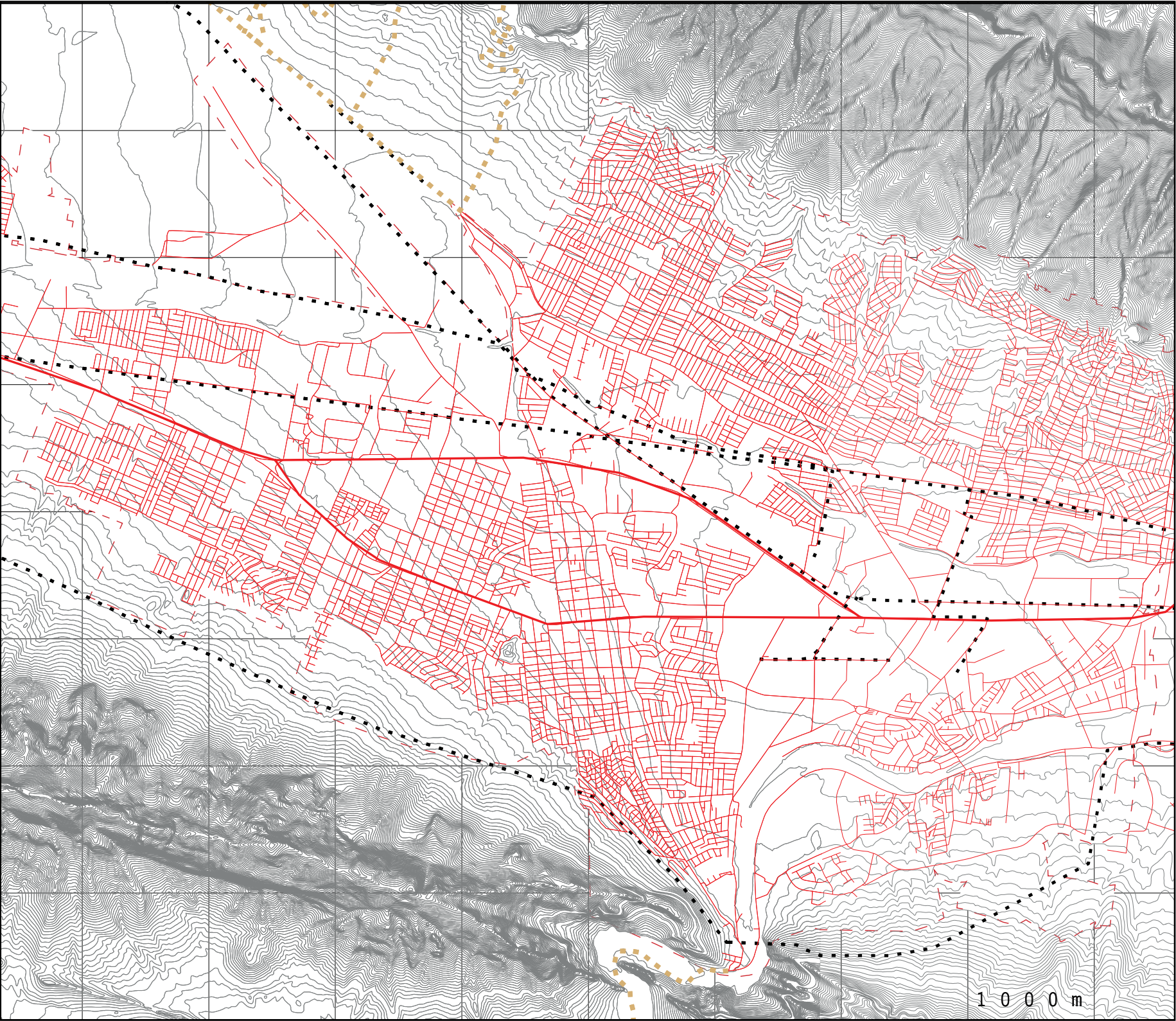


## topography

The city is very interesting from a morphological point of view, as can be seen from the map, mountains surround the city, with Cerro de las Mitras, Cerro del Agua del Toro, Sierra de San Urbano, and Cerro del Tariyal standing out among its main reliefs. Their altitudes range from 2,400 to 3,400 m above sea level.

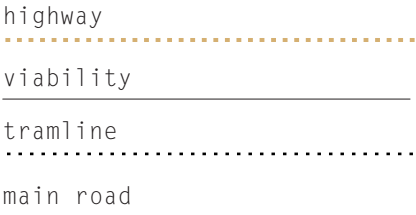
Inside the city, on the other hand, the Santa Catarina River, which originates in La Huasteca in the Sierra Madre Oriental crosses the city from west to east and provides 30% of the metropolitan area's water needs.

Other smaller but frequently flowing streams, such as Las Vegas and Las Ancuas, supplied the urban center until the 1940s.



**mobility**

The city from an infrastructural point of view is functioning, it is known as the city of vehicles. It is criss-crossed by two main roads, which allow connection with adjacent municipalities. On the other hand, the city has critical issues in terms of mobility and transport. For years there has been no investment to improve the outdated transport units and there are no plans for future development.





## *The phenomenon: increase in industry*

### introduction

In this chapter we will analyse the phenomenon of industrial growth in the state of Nuevo Leon, but especially in the metropolitan area of Monterrey. We will see that this is considered the industrial capital of Mexico and how the phenomenon of nearshoring is becoming more important after the global COVID-19 pandemic.

Today Nuevo Leon is considered the most important financial and industrial centre, as well as the gateway for trade and commerce between the Northeast Region of Mexico and the United States. The state has the ideal infrastructure for technological and commercial development, which makes it possible to recognise the city with optimal conditions for the growth and consolidation of the industrial sector, with an ever-strengthening objective.

There are several types of industry, and the strategic sectors range from aerospace, biotechnology, household appliances, specialised medical services, information technology, agri-food, nanotechnology, sustainable housing and interactive media. This is why in the State of Nuevo León, there are 94 industrial and technological parks, in more than 14 municipalities of the entire state.

In fact, Nuevo León contributed 8% of the national Gross Domestic Product (GDP) in 2022 <sup>[4]</sup>, making it the second state with the highest foreign investment attraction, and the forecast

The area of Santa Catarina is known as the third most industrialised municipality, only after Apodaca and Monterrey. In fact, 24.71% of the total surface of the urban area of the municipality is used for industrial use.

The history of the industry in Santa Catarina presents two moments of great development, due to the great abundance of water that allowed the operation of the old factory of Hilados y Tejidos de la Fama, which multiplied over time. Another important stage of industrial development was in the agricultural area. But Santa Catarina was an important mining enclave, probably the most important reason for the development of the old Santa Catarina, thanks to the mountains of the municipal territory. The economic activities that have been declining are agriculture and livestock, mostly because of the soil conditions and the constant droughts.

Today, Santa Catarina is dominated by retail trade (beauticians, groceries, among many others), followed by other services, manufacturing and accommodation services, and a boom in shopping centres.

The recent pandemic has taught companies the need to locate their production and distribution centres closer to the final consumer in order to optimize costs and better control risks.

**[5]“Nearshoring is the practice of transferring a business operation to a nearby country, especially in preference to a more distant one.”**

This comes in response to the ever-increasing logistical costs of moving products from distant countries. Since 2022 Santa Catarina has been in the public eye for being chosen as the perfect location to build and invest in Tesla's new Gigafactory.

Today, this opens an important new chapter for the industrial development of

the municipality, it is reported that the Mexican Association of Industrial Parks (AMPIP) has registered an inflow of 19 billion dollars in 2022 in direct investments, mainly in the automotive sector (78%) and in the electronics sector (13%) <sup>[6]</sup>.

This is only a small part of the potential of nearshoring.

<sup>[4]</sup> (GOBIERNO DE MEXICO 2021)

<sup>[5]</sup> (Hernández 2023)

<sup>[6]</sup> (Mexican Association of industrial Parks 2022)

<sup>[7]</sup> (MUNICIPIO DE SANTA CATARINA SECRETARÍA DE DESARROLLO URBANO Y ECOLOGÍA 2021)

# EL PAÍS

Además por el “efecto multiplicador” habrá una mayor demanda de

Según estimaciones de la Comisión Nacional de Vivienda, en Nuevo León existe un déficit habitacional de 106,989 **viviendas**, es decir, hogares que cuentan con materiales precarios en pisos, techos y muros, no cuentan con excusado aquellas cuyos residentes habitan en hacinamiento.

ECONOMÍA

## NEARSHORING

# Tesla muestra a México la “oportunidad histórica” que tiene con nearshoring

Gracias a la relocalización de empresas nearshoring, el país puede llegar a importar hasta 20% de los bienes que vende Estados Unidos, estima Santander.

De acuerdo con las proyecciones del Consejo Nacional de Población (Conapo), entre 2010 y 2015 creció la inmigración en Nuevo León, de 0.3% por 100 habitantes a 0.4% por 100 habitantes, y se estima que el crecimiento esté por debajo de 0.3% por 100 habitantes.

## La-Lista

Se requerirá vivienda, servicios -agua, luz, transporte, entre otros; así como educativos, mejor seguridad y condiciones que den certeza y certidumbre, vías de comunicación y servicios financieros.

Con unos cinco millones y medio de habitantes, se duplicará en unos diez años. Eso implicará más inmigración, más habitantes y se requerirá más de todo. Eso quiere decir que los que hacen casas van a vender más casas y así, el sector industrial va a responder, pero se necesitará más agua, más vialidades, más transporte, más seguridad”, refiere.

## Tesla en Nuevo León: ¿En cuánto tiempo abrirá la gigafactory de Elon Musk?

“Considero que hay excelentes oportunidades en Santa Catarina para este tipo de desarrollos. De hecho, en el municipio los desarrollos verticales van en aumento, al igual que en San Pedro Garza García. Planteó como una opción para la optimización de la vivienda en Santa Catarina el formato vertical. De los desarrollos verticales”, aseguró el titular del Instituto de Vivienda de Nuevo León.

La vecindad con Estados Unidos da una “oportunidad histórica” para México con la actual tendencia del **nearshoring**, y un ejemplo de ello es *la inversión que anunció Tesla para construir una planta en el estado de Nuevo León*.

Lo que que una opción para la optimización de la vivienda en Santa Catarina con la llegada de Tesla es el formato vertical, por lo cual se requerirá que las constructoras garanticen a los habitantes los servicios necesarios: infraestructura urbana, servicios de agua y saneamiento, vías de comunicación y servicios financieros.

## Obras

El Instituto de la Vivienda de Nuevo León señaló es muy probable que personas de otros estados cercanos al municipio busquen trabajar en la planta y adquirir una casa.

Tesla requerirá la construcción de 13,000 viviendas en Nuevo León

La llegada de la empresa de Elon Musk aumentará la demanda de viviendas para sus trabajadores.

## Tesla desatará construcción de viviendas en Santa Catarina

## TESLA

personas de otros estados cercanos al municipio lleguen a trabajar y, por ende, a adquirir vivienda

## “Para abastecer la demanda de vivienda adecuada, será fundamental

el papel de instancias públicas, como el Instituto de la Vivienda, Infonavit, la Secretaría de Movilidad y Planeación Urbana, así como Servicios de Agua y Energía Federal de Electricidad, pero también de los bancos y de la banca”, enfatizó el funcionario.

## Planteó como una opción para la optimización de la vivienda en Santa Catarina el formato vertical.

## VIVIENDA ADECUADA

En la entidad, existe un rezago habitacional de 106,989 viviendas.

Esto equivale a un 6.5% de su parque habitacional.

“El crecimiento vertical favorece que las distancias de viaje entre el hogar y los centros de trabajo sean cortas, reduciendo la carga de tráfico causada por los desplazamientos diarios”, señaló.

Dijo que sería favorable el crecimiento vertical en la zona cercana a la planta.

Por ello es necesario que las constructoras garanticen a los próximos habitantes los servicios necesarios: infraestructura urbana, servicios de agua y saneamiento, vías de comunicación y servicios financieros.

## MILENIO

“Para abastecer la demanda de vivienda adecuada, será fundamental el papel de instancias públicas, como el Instituto de la Vivienda, Infonavit, la Secretaría de Movilidad y Planeación Urbana, así como con Servicios de Agua y Drenaje de Monterrey y CFE, pero también de los desarrolladores inmobiliarios y de la banca”, dijo Montiel Amoroso.

Con la instalación de la “gigafactory” de Tesla en el municipio de Santa Catarina, es probable que personas de estados cercanos lleguen a trabajar y requieran un hogar, por lo que tan sólo para cubrir la expectativa habitacional se necesitará construir al menos 13,000 **viviendas**, declaró Eugenio Montiel Amoroso, director general del Instituto de Vivienda de Nuevo León.

## EL ECONOMISTA

## SANTA CATARINA

Se ubicará la Gigafactory de Tesla en Santa Catarina ya se están tramitando mientras que los trámites para los permisos a nivel federal y estatal están en proceso de autorización.

## Instalación de "gigafactory" de Tesla generará demanda de 13,000 viviendas en Nuevo León



Se requerirá la construcción de 13,000 viviendas más

personas de otros estados

cercanos al municipio lleguen a trabajar y, por ende, a adquirir vivienda

Se necesitarán 13 mil viviendas en Santa Catarina

## planta de Tesla: autoridades

Se estima que la planta generará entre 35 mil y 40 mil empleos directos e indirectos.

Para satisfacer la demanda, que se prevé sea de todos los municipios, la apuesta planteada será por la vivienda en formato vertical para optimizar el espacio.

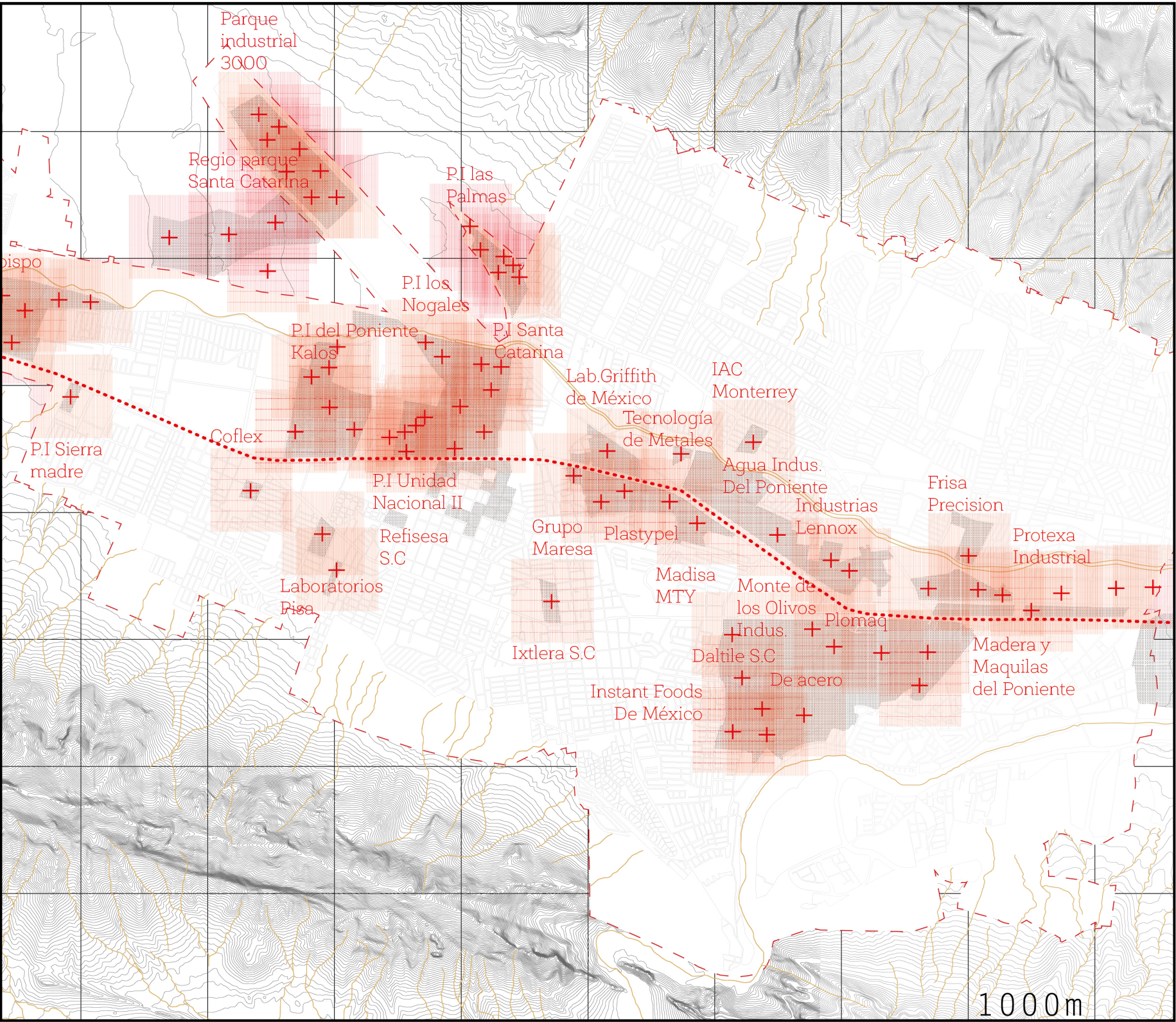


El paisaje irregular, salpicado de montículos de tierra, será transformado en las próximas semanas por el trabajo de maquinaria pesada que preparará el terreno para erigir un mole de concreto de tres pisos para alojar a los más de 40 mil trabajadores que fabricarán sus vehículos de última generación. El habitacional se requerirán por lo menos 13 mil viviendas.

El crecimiento de la población de 13.9 por ciento y casi la cuarta parte de ese crecimiento son personas jóvenes que demandarán vivienda para evitar traslados.

## VERTICAL

The industry's territory



The municipality stands out for its economy focused on the secondary sector. In the heart of the urban area, we find a concentration of medium and heavy industries that, as a result of the growth of housing development in their immediate surroundings, have been absorbed. This phenomenon has generated a series of conflicts that are reflected in various aspects, such as pollution and road congestion. Moreover, the consolidation of the industrial zone has led to the formation of industrial corridors, mainly along Avenida de Díaz Ordaz, which is part of the established zone. These corridors continue to expand along the Monterrey-Salttillo Highway. On the latter, residential subdivisions and industrial parks have been developed, while similar growth can also be observed in the western direction of the urban area. However, the saturation of space for this purpose has not yet been reached, which has led to the existence of a considerable amount of empty land. This has generated a discontinuity in the urban area and a dispersed pattern of occupation, with isolated and abandoned industrial buildings. This situation also translates into high public investment costs, mainly in terms of infrastructure and urban services. [7]

## *The coming of gigafactory Mexico Tesla*

The nearshoring phenomenon is coming to fruition, with Tesla's arrival in the Santa Catarina municipality. The news was released on 1 March 2023. Elon Musk has chosen to establish within this municipality the first Tesla gigafactory in the whole of Latin America, in which more than one million cars per year will be produced.

The discussion was very intense, as President López Obrador initially opposed its location, expressing his wish for it to be located in the center or south-east of the country. This resulted in a secret agreement. <sup>[8]</sup>

The rugged, mountainous landscape will be transformed in the coming weeks by heavy machinery, which will prepare the ground for the construction of a concrete three-storey building. This structure will be used to house more than 7,000 workers to produce the latest generation of vehicles.

The automotive boom generated by this plant is an opportunity to create an ecosystem of economic effusion that reaches out to small and medium-sized Mexican companies. <sup>[9]</sup>

According to Eugenio Montiel Amoroso, director general of the Nuevo León Housing Institute, with the installation of Tesla's 'gigafactory' in the municipality of Santa Catarina, it is likely that people from neighbouring states will move to work and will need housing. To meet this demand, at least 13,000 houses will have to be built. <sup>[10]</sup>

According to El Economista, it is known that Santa Catarina is one of the municipalities with the lowest percentage of housing. In light of the potential number of direct and indirect jobs that could be created (estimated at 35,000), it is likely

that all housing sectors, albeit to varying degrees, will experience a recovery in Santa Catarina and neighbouring cities. Collaboration with the construction industry will be essential for homogeneous growth to be possible. <sup>[11]</sup>

<sup>[8]</sup> (Moreno, 2023)

<sup>[9]</sup> (Suarez 2023)

<sup>[10]</sup> (Flores 2023)

<sup>[11]</sup> (Flores 2023)





## *The present situation*

The demographic situation in Santa Catarina, as reflected in the data, shows a steady increase in population. Exponential growth is expected, driven by increased job opportunities within the municipality.

According to the Annual Report on the State of Poverty and Social Gap 2023, it is interesting to note that the percentage of people over 65 is consistently low compared to young people. This demographic group represents only 6% of the total population. Although the increase is modest, it suggests a gradual aging of the population, even though this is the lowest percentage group in the municipality.

Moreover, it is important to note that the number of immigrants has been increasing over the years. This growth is expected to accelerate further due to the phenomenon of nearshoring. This trend shows an increase in the cultural and demographic diversity of the municipality, which in turn enriches its social and economic fabric.

The analysis of the social situation of the municipality shows a diverse distribution of the population in different socio-economic categories. The data reveal that 29.7% of the population is in a vulnerable situation due to social deficiencies. This indicates that a significant part of the population faces difficulties in accessing services and basic conditions for their well-being. On the other hand, 47.5% of the population is classified as "not poor and not vulnerable". These people are in a more stable situation in socio-economic

terms, which implies that they have access to resources and opportunities that allow them to satisfy their basic needs and have an adequate standard of living.

In terms of income vulnerability, 6.3% of the population is in this category. These people face economic difficulties and have limitations to cover their basic needs because of a lack of sufficient income.

Moderate poverty affects 15.6% of the population. These people are in a situation of poverty, but not at the most extreme level. Although they may have difficulties in meeting all their needs, they have some resources and opportunities that enable them to cope with their situation.

Finally, extreme poverty affects 0.8% of the population. These people are in a situation of extreme precariousness, facing extremely difficult living conditions and significant shortages in terms of food, housing, and access to basic services.

These data demonstrate the existence of a socio-economic gap in the municipality, where part of the population faces significant challenges to their well-being and development.<sup>[12]</sup>

<sup>[12]</sup> (DGPA , Secretaría de Bienestar 2023)

<sup>[13]</sup> Roma. Diretto da Alfonso Cuarón. 2018.

2023 <sup>[14]</sup>

Demographic indexes

328,847 total population

6% over 65 y.o

25% 18-35 y.o

2117 immigrants

16,5% poverty

61,6% economically active population

<sup>[14]</sup> (Gobierno de México 2023)  
<sup>[15]</sup>(SEDESOL - Secretaría de desarrollo social 2015)

2015 <sup>[15]</sup>

296,954

5%

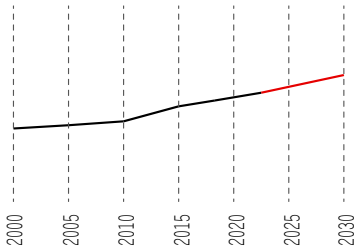
20%

~1500

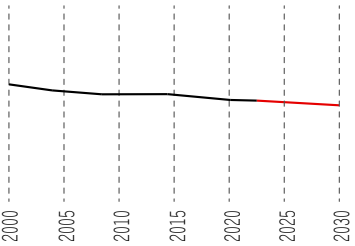
27,5%

~58%

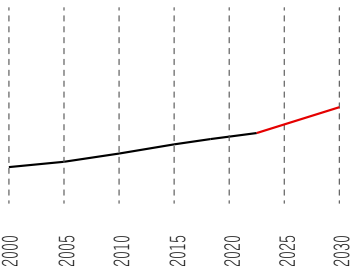
population trend



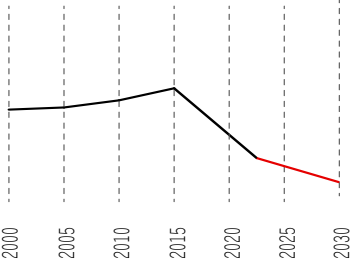
old-age index



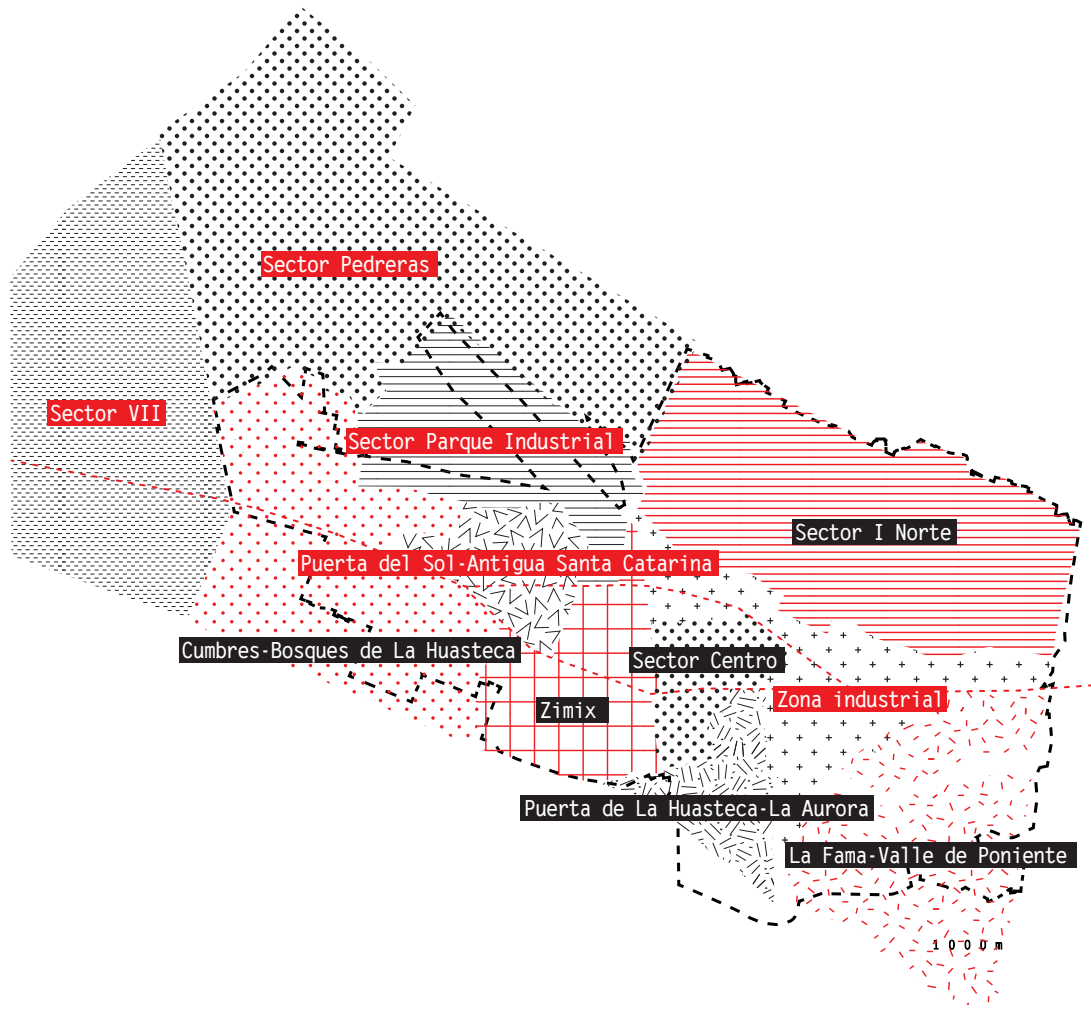
immigration trend



poverty trend







La vivienda en Santa Catarina

According to INEGI data, the viviendas situation in the municipality of Santa Catarina has shown steady growth over the years. In 2010, it was estimated that there were 78,293 viviendas in the municipality <sup>[16]</sup>, representing approximately 5.1% of the total number of viviendas in the state of Nuevo León. This significant increase has contributed to the reduction of the overcrowding index, from 4.93 inhabitants per vivienda to 4 inhabitants per vivienda. In 2020, it was estimated that there were 82,912 viviendas in the municipality <sup>[16]</sup>. This number shows a significant rise but does not reach the same level of growth observed during the decade 2000-2010. Overall, population growth in housing availability has shown different patterns. On the one hand, the increase in population has been more significant than the increase in housing production. While the population has experienced rapid growth, the housing growth rate in the municipality has shown a deceleration in its growth rate. Currently, this situation persists and is likely to intensify shortly. With the increase in employment and industry in the municipality, the demand for housing will increase dramatically, increasing the number of inhabitants in Santa Catarina.

The average number of occupants per viviendas in the municipality is 3.7 people, which indicates that most of the viviendas are inhabited by families composed of 4 people. In terms of services and equipment, 98% of the viviendas have basic services such as piped water, drainage, sanitation, and electricity. A fundamental aspect to consider in the analysis of vivienda is the type of

materials used in its construction since its durability and resistance to climatic conditions depend on these materials. Moreover, this is directly related to the quality of life of the population. In general, the state of housing in terms of quality is good. According to data from INEGI in 2010 <sup>[17]</sup>, 97.43% of the viviendas inhabited in the municipality have materials other than earth. Of these viviendas, 49.86% have solid or cement materials, while 74.57% have floor coverings, such as mosaic or wood. The latter have finishes ranging from modest to luxurious.

There are different types of viviendas in the municipality : Vivienda Unifamiliar Popular (36 %); Vivienda Unifamiliar Media (11 %), Vivienda Unifamiliar de Interés Social (24%), Vivienda Unifamiliar de Interés Medio (12 %); Vivienda en Conjunto Habitacional de interese social (3 %); Vivienda en Conjunto Habitacional de interese medio (5 %); Conjunto Habitacional medio (1 %); Conjunto Habitacional residencial (3%); Vivienda precaria (1%) <sup>[18]</sup>.

<sup>[16]</sup> (Cuarón 2018)  
<sup>[17]</sup>(Municipio de Santa Catarina secretaria de desarrollo urbano y ecologia 2021)  
<sup>[18]</sup> (Secretaria de Economia 2023 2020)



*La vivienda  
unifamiliar  
popular*

It represents approximately 36% of the area destined for housing use in the municipality. It is predominantly located in the northeastern part of the municipality, on the slopes of the Sierra de las Mitras, as well as in the southeastern area around La Fama and the central part of the municipality. These dwellings are the result of a process of self-construction.



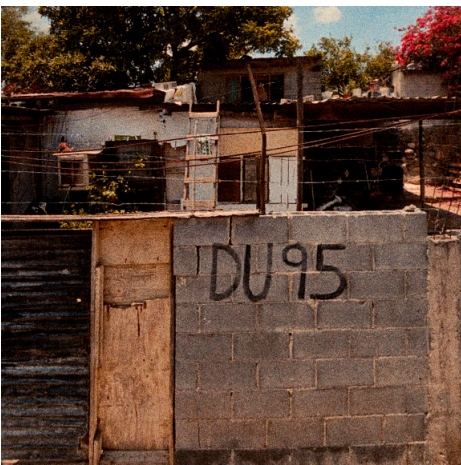
*La vivienda  
unifamiliar de  
interés social*

It is part of a group of viviendas that were originally prototypes of houses and that have been renovated over time, preserving some features of the original design. These viviendas represent approximately 24% of the surface area destined for housing use and are distributed mainly in the northeastern part of the municipality, as well as in the south-central part of the urban area and to a lesser extent in the west.



*La vivienda unifamiliar de interés medio*

La vivienda unifamiliar de interés medio comprises around 12% of the surface area destined for housing use. These viviendas are characterized by the fact that they are mass-produced prototypes, but with larger plot sizes compared to social housing. Over time, they have been modified in their original design and have good finishes. These viviendas are mainly located in the northwestern part of the municipality.



## *La vivienda precaria*

They are built with unsuitable materials, are part of a self-building process and have no water and sewage services. They have irregular access to electrical services and in most cases have irregular land occupation. These types of dwellings have a 1% occupation of the land used for housing, and are mainly located on the edges of the El Obispo and Santa Catarina rivers, and in the north-western part of the municipality on the slopes of the Sierra de Las Mitras.

2023 <sup>[19]</sup>

*Deficiencies in the vivienda*

10,401

Quality and space of *vivienda*

1,872

Overcrowded *vivienda*

725

*Vivienda* with dirt floors

703

Basic services in the *vivienda*

494

*Vivienda* with roof in weak material

439

*Vivienda* without access to water

901

*Vivienda* with walls in weak material

187

*Vivienda* without drainage

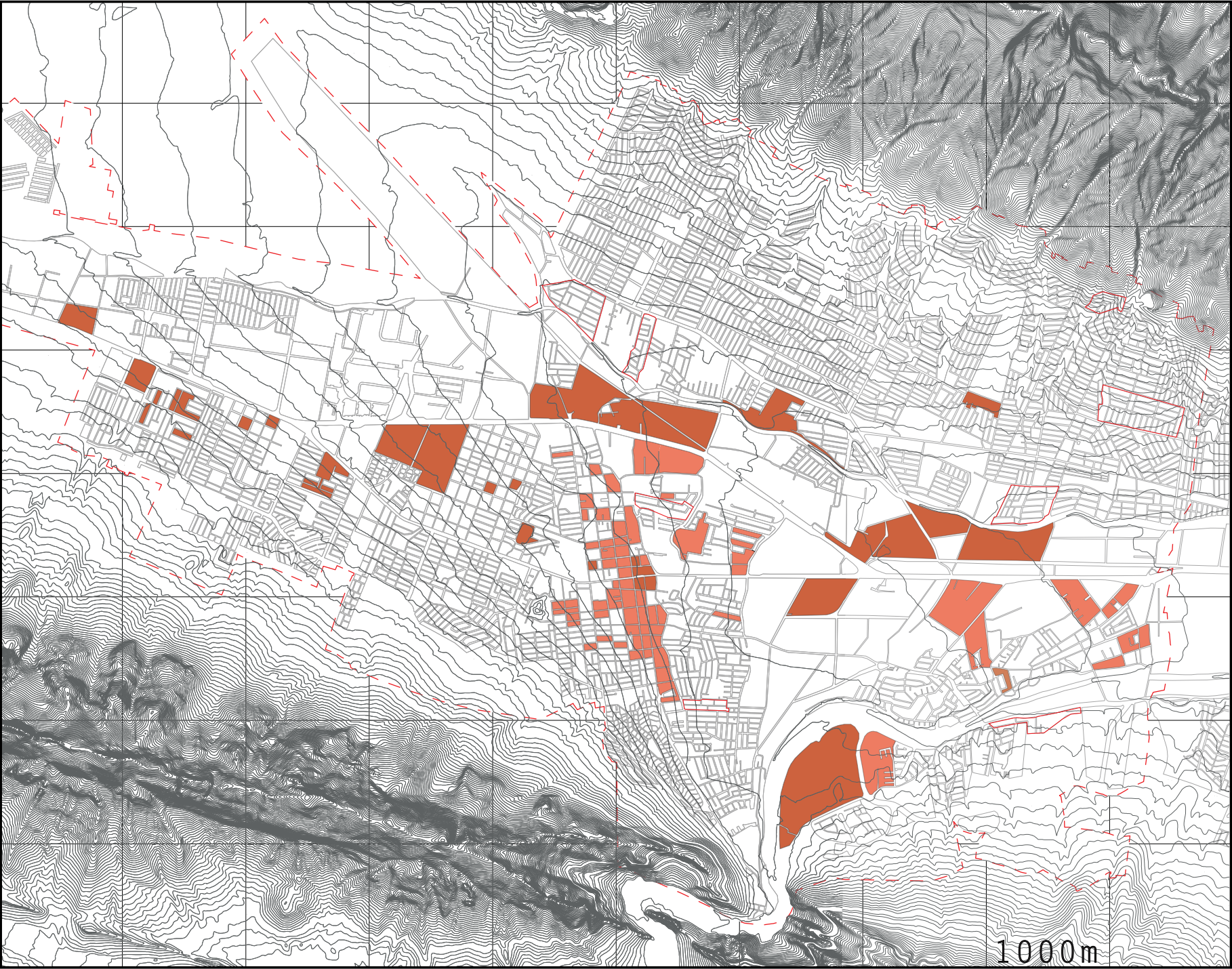
9,131

Overcrowded *vivienda*

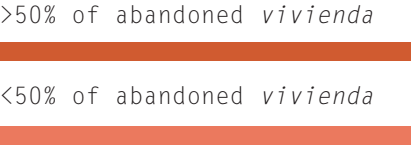
228

*Vivienda* without electricity

<sup>[19]</sup> (Fomerrey, Instituto de la vivienda 2023.)



Amount of abandoned vivienda





# 03. \*ViMo

03.1 *How \*ViMo is born*

03.2 *The elements abacus*

03.3 *Assembly process*

*\*Modularity*

03.4 *Housing and construction  
types*

*\*Flexibility*

*\*Variety of husing type*

*\*ViMo*

## How \*ViMo is born

<sup>[1]</sup> “Abitare è l’essenza stessa dell’esistenza, è il radicamento della vita nella realtà quotidiana”

“Dwelling is the very essence of existence, it is the rootedness of life in everyday reality” <sup>[1]</sup> This is how Marcello Vitti in his book ‘Dell’abitare’ provides a series of definitions of this fascinating and complex term. This practice not only involves the design of physical spaces, but also human experiences and interactions with the built environment. The research - carried out so far - shows how the focus is increasingly shifting towards the concept of ‘home’ as a place to live and share, rather than a mere real estate object.

The design of a house is based on the experiences and empathy of the user. The house must be set up as a space in which “to live in the best way possible until death” <sup>[2]</sup>; therefore all the designer can do is to provide multiple solutions to the users in order to satisfy the demands of the client. A device is provided in the form of a house, to which the inhabitant will give meaning through their own life experiences and choices. In so doing the inhabitant realises that it is architecture that influences and shapes their life experience and grafts and grafts what is referred to as lived space. The latter is inspired by the phenomenological analysis of philosophers such as Edmund Husserl and Maurice Merleau-Ponty, who affirmed that space can be intended not only in geometric terms, but as a situation involving the body and emotions of the inhabitants. In this way, the architectural work stands as a process of communication between designer and user, where the latter

contributes to making sense of the inhabited space. <sup>[3]</sup>

When the architect is tasked with designing a place, they combine different stimuli and ideas, taking into account constraints and opportunities, desires and challenges, to correctly understand the context and translate the idea of home into an architectural design. This approach aims to realise ‘Good Living’. It is essential to understand the techniques and responsibilities of the architect, who acts as a mediator in this process. <sup>[4]</sup>

This is the basis of the research that led to the conception of a new housing system: **\*ViMo**.

The name was born from the union of two fundamental words for the project: *vivienda modular*.

It is a revolutionary housing system that is completely based on prefabrication. This choice offers numerous advantages, including *remarkable modularity, lightness, flexibility and sustainability*. Thanks to these features, **\*ViMo** is able to adapt to a wide range of needs and guarantee high performance.

**\*ViMo**’s design approach is completely human-centred in that it considers carefully every aspect of its construction in relation to the context in which the inhabitants will live. Not only immediate needs are taken into account, but also potential and future needs, in order to provide a complete and lasting living solution.

Despite its simple aesthetics, **\*ViMo** offers endless possibilities for customised responses to specific occupant requirements. The system’s flexibility allows interior spaces to be configured in a versatile and creative

manner, adapting them to different usage requirements.

**\*ViMo** is much more than an ordinary prefabricated dwelling; it is a work that combines functionality, adaptability and sustainability.

The human centred approach and attention to detail in its construction bring this innovative housing solution to the forefront of the industry, opening up new perspectives for the future of living. This is not just a simple initiative confined to a specific space, but the very concept of something that aims to improve lifestyles. It is not a definitive solution, but rather the beginning of a journey to understand people’s needs and imagine, think and design spaces where they feel safe. These spaces act as inner refuges, places where quality of life is prioritised.

<sup>[1]</sup> (Vitta 2009, pag. 10)

<sup>[2]</sup> (Vitta 2009, pag. 10 - traduction)

<sup>[3]</sup> (Vitta 2009, pag. 98)

<sup>[4]</sup> (Vitta 2009, )

<sup>[5]</sup> (Heidegger 1976)

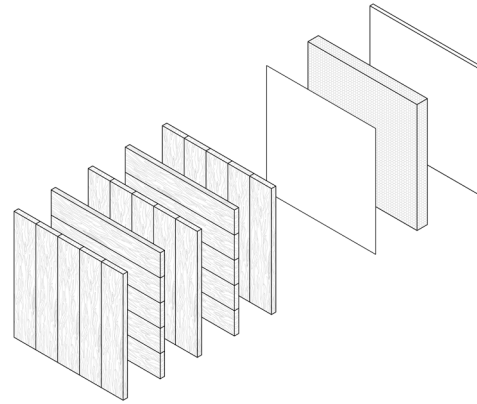
## The elements abacus

The structure of the panels that make up the housing model is CLT Cross Laminated Timber. The latter is an engineered wood material that is becoming increasingly popular in the construction industry due to many advantages, such as sustainability and ease of construction.<sup>[5]</sup>

It consists of cross-laminated timber layers arranged in a criss-cross pattern, usually in odd numbers, and joined together by glue and pressure to create a single wooden element with considerable load-bearing capacity in all directions. During the design and construction of CLT panels, it is essential to carefully consider two key factors: the number of layers and the geometry of the openings as both of them influence the compressive strength of the material.

<sup>[6]</sup> Cross Laminated Timber (CLT) is ideal for high-rise and multi-story timber buildings. This technology can be applied to create pre-insulated walls, roof sections, floors, cantilevered balconies, load-bearing lift shafts and staircases. The versatility of CLT allows it to be used in various types of buildings, such as residential towers, offices, schools and civil structures. It can be left exposed to enhance its aesthetic appearance or encapsulated as required.<sup>[7]</sup>

ViMo's starting point is a 2.00 m x 3.00 m high Cross Laminated Timber (CLT) panel. CLT, which is known for its environmental friendliness and structural strength, is used both as opaque exterior cladding and as an element with openings, allowing it to be adapted to specific design requirements, such as windows, French windows or doors.<sup>[7]</sup>



STRATIGRAPHY CLT (panel + vapor barrier + thermal insulation + wall finish)

In addition to being available in the standard sizes mentioned above, the dimensions of the closing panel can be adapted to the size of the ground to be occupied. This feature makes ViMo a flexible element that can be adapted to any situation.

As far as the horizontal division of the building is concerned, CLT panels with varying lengths are used, maintaining a constant width of two metres. This configuration provides greater flexibility in the design of interior spaces, allowing for the creation of customised and functional rooms.

The assembly of the CLT panels helps to form a solid and durable structure, providing excellent resistance to mechanical stress.

Thermal comfort within the building is ensured by a well-designed insulation system using a specially constructed panel package. This panel package consists of several components designed

to work synergistically and optimise the building's energy efficiency.

The load-bearing structure of the panel package is made of wood, a material known for its insulating properties; in addition to the load-bearing structure, a vapour barrier is integrated into the panel package. This barrier has the task of preventing the spread of moisture within the walls, preventing potential damage caused by condensation and preserving the long-term structural integrity of the building.

A layer of insulation is placed inside the panel package, between the supporting structure and the vapour barrier.

Finally, the panel package is completed with a skim coat and an internal finish. This internal coating serves both to protect the insulation and the other components of the panel package, and to provide an aesthetic and pleasing appearance to the interior of the building.

The panel package ensures high thermal comfort inside the building. The harmony between form and function is realised through the inclusion of strategic accessory elements. An example of this is the service block, which includes the plant room and the access staircase to the second floor. The implementation of the service block allows rational space management and easy access to essential services, guaranteeing a comfortable and functional environment for the building's occupants.

Another prominent design element is the porch, which adds a distinctive architectural touch to the building. In addition to providing shelter from the elements, the porch can be conceived

as a space for social interaction and outdoor activities, helping to enrich the experience of the building's inhabitants. In the third section of design elements, the focus is on optimising the interior environment. Here, objects of functional and aesthetic relevance rather than structural nature are included. These include different types of roofing, selected on the basis of solar orientation and local climatic requirements, which help to maximise the building's energy efficiency. Shades, for their part, allow for natural light control and optimal management of interior lighting. The coverings, on the other hand, allow the external appearance of the building to be customised, enabling perfect integration with the surrounding environment and meeting the aesthetic criteria required by the architectural context.

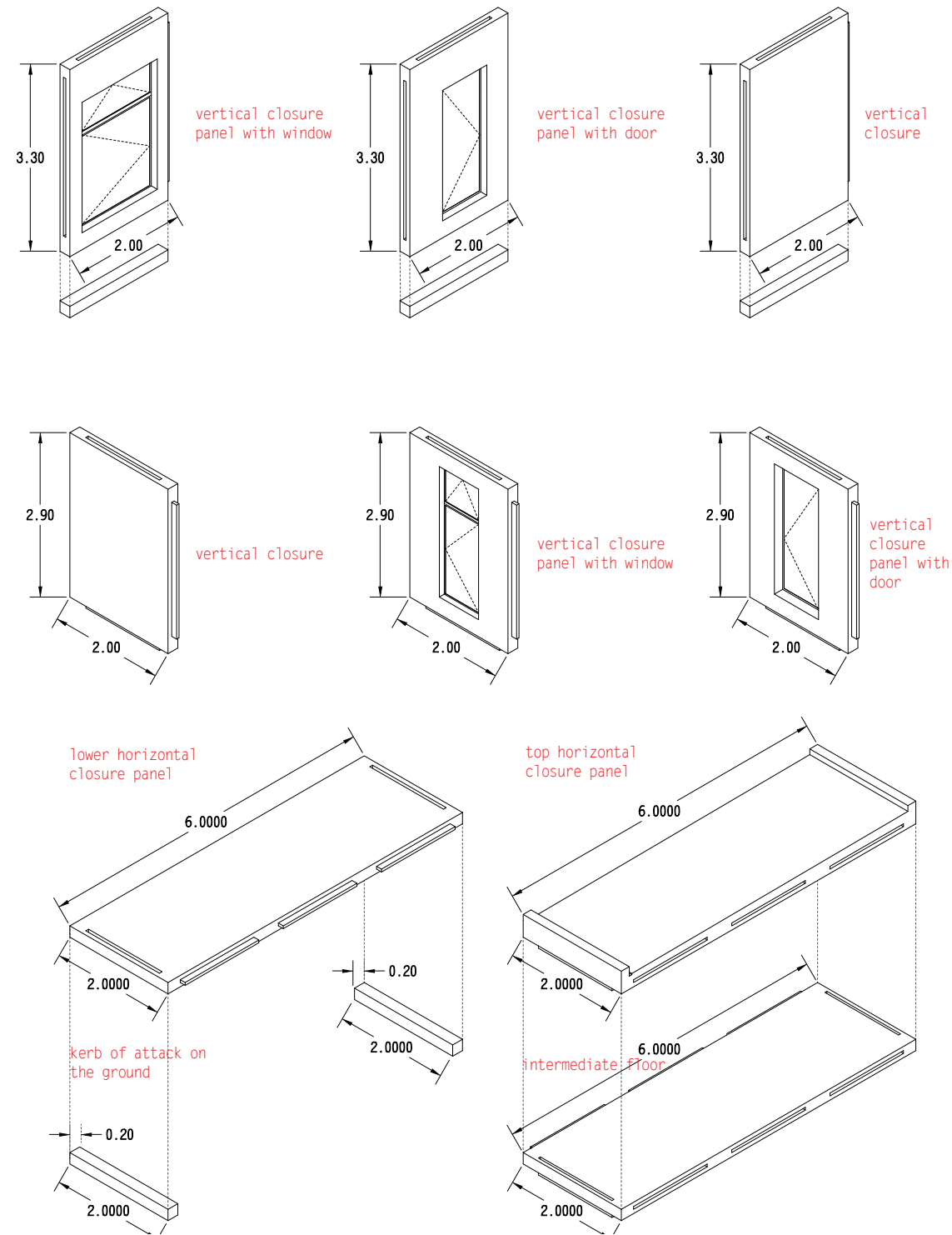
The different types of accessories are designed to cover all economic brackets so that one can design their home according to their budget. In summary, this design aims to exploit the full potential of the CLT to create a sustainable and functional building. The combination of structure, accessories and innovative design elements come together in an architectural harmony that meets the needs of the building's users, providing a comfortable, durable and pleasant space in which to live and work.

<sup>[5]</sup> (De Araujo 2023)

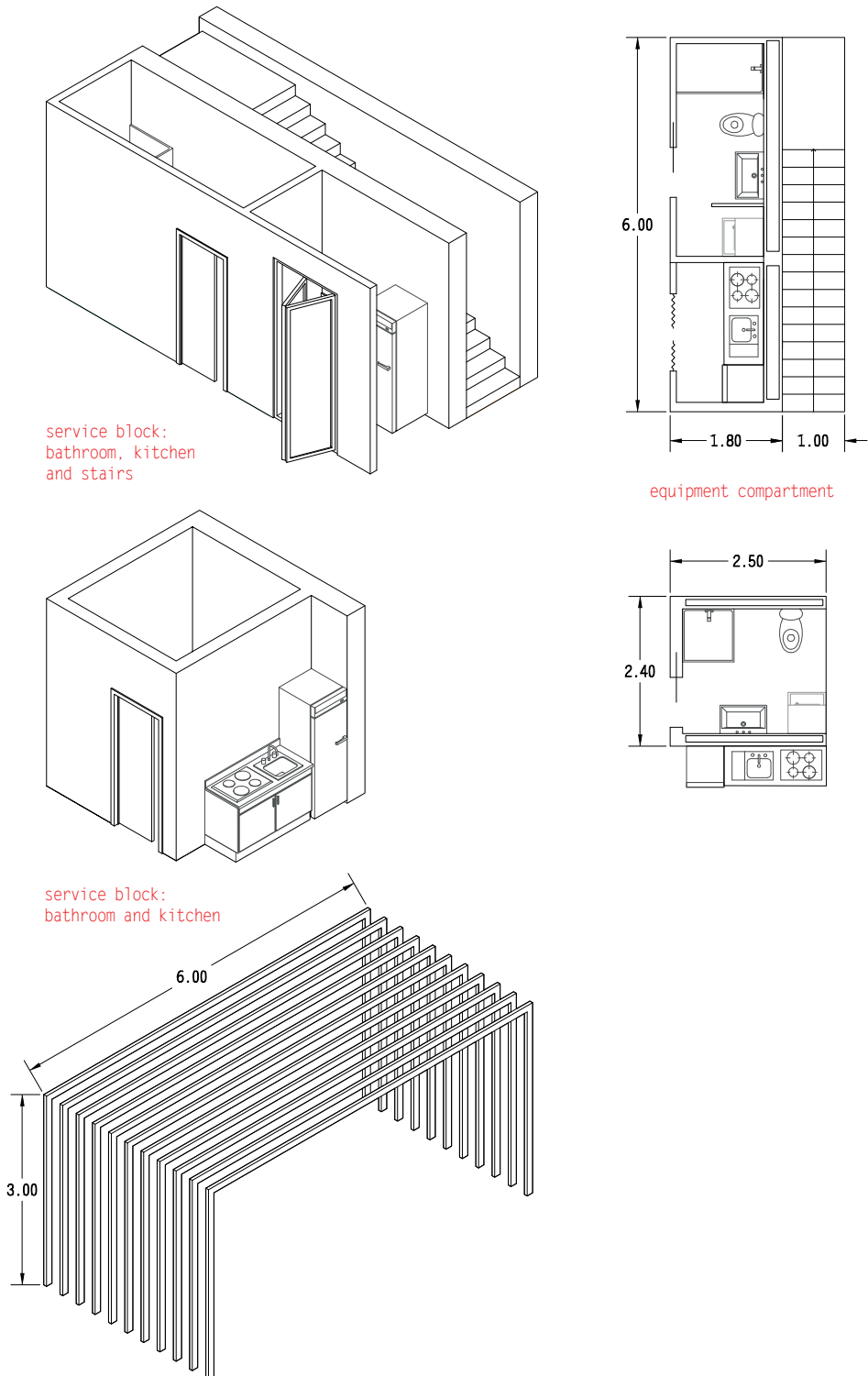
<sup>[6]</sup> (Wikipedia s.d.)

<sup>[7]</sup> (GARDENIA we build a green future s.d.)

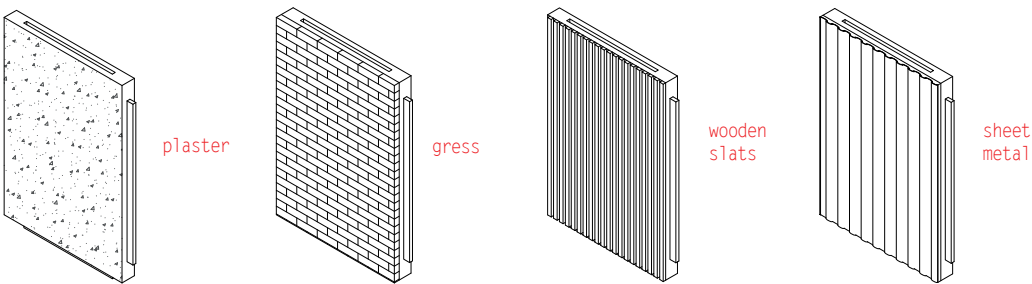
TYPES OF PANELS



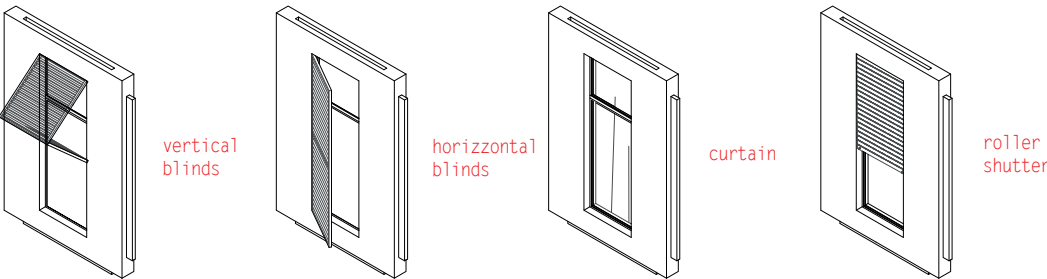
TYPES OF ACCESSORIES



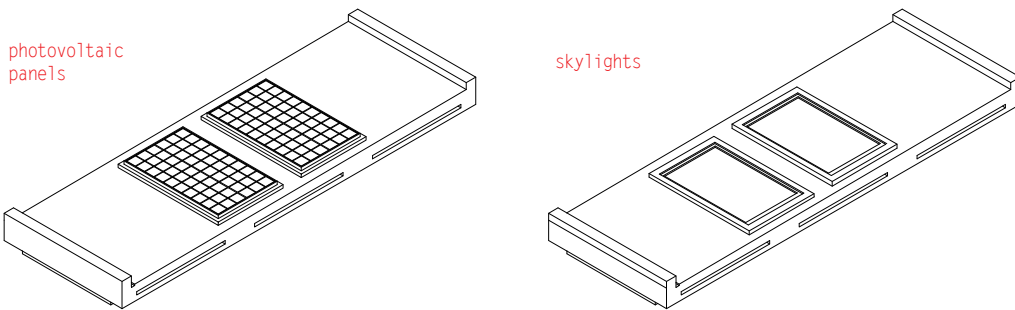
TYPES OF COVERING



TYPES OF SHIELEDING



TYPES OF ROOFING



Assembly process

The elements listed above constitute an on-site assembly procedure, characterised by a series of well-defined steps. The process begins with the casting of concrete along the entire plot, which is prepared considering the possibility of future extension. This operation is essential to ensure a solid and stable base on which to build the structure.

Next, the aluminium box elements are positioned. These elements play an essential role, as the ground connection is one of the critical areas requiring special attention. It is essential to avoid rising damp, which could compromise the stability and durability of the

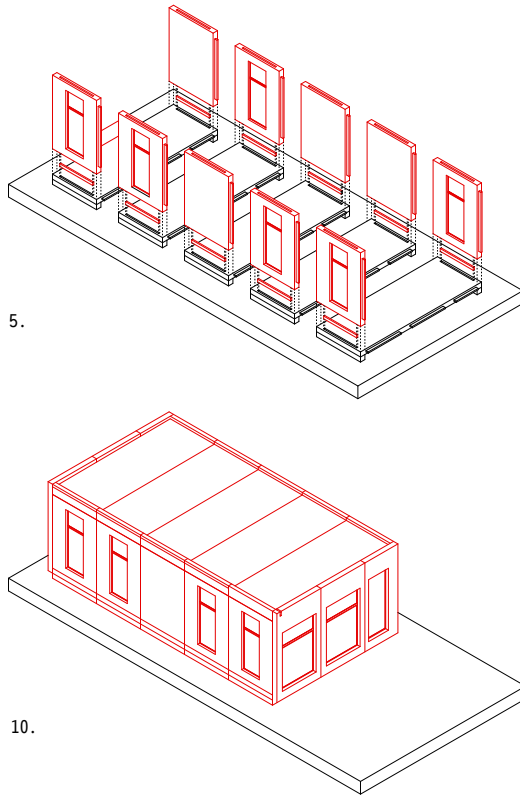
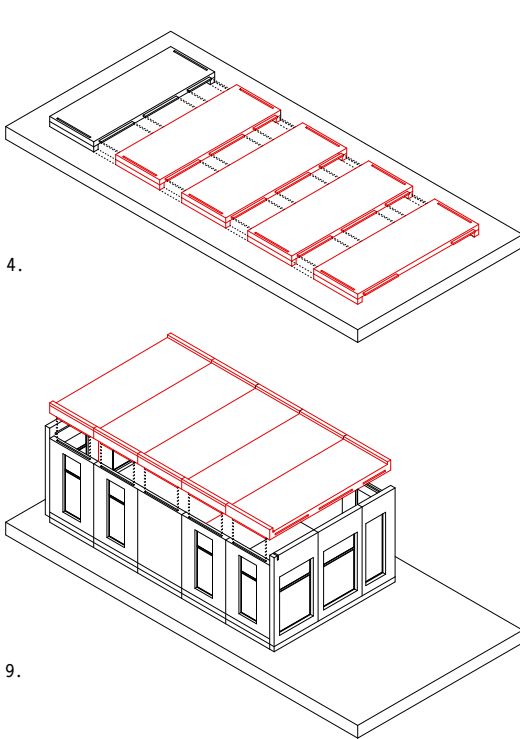
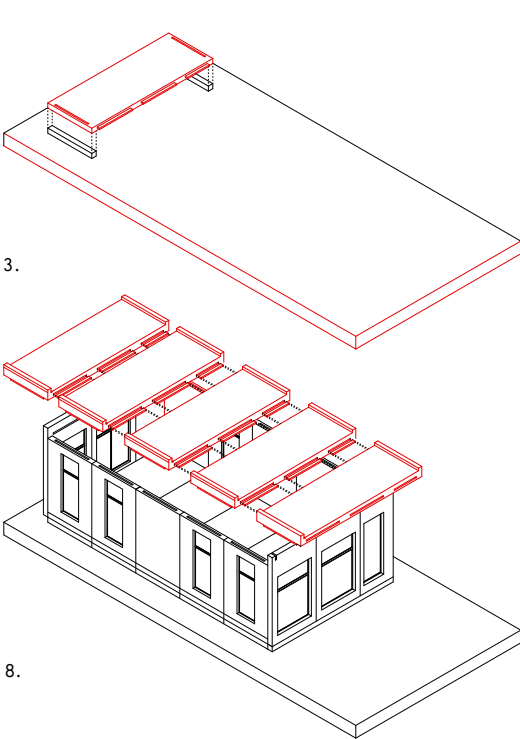
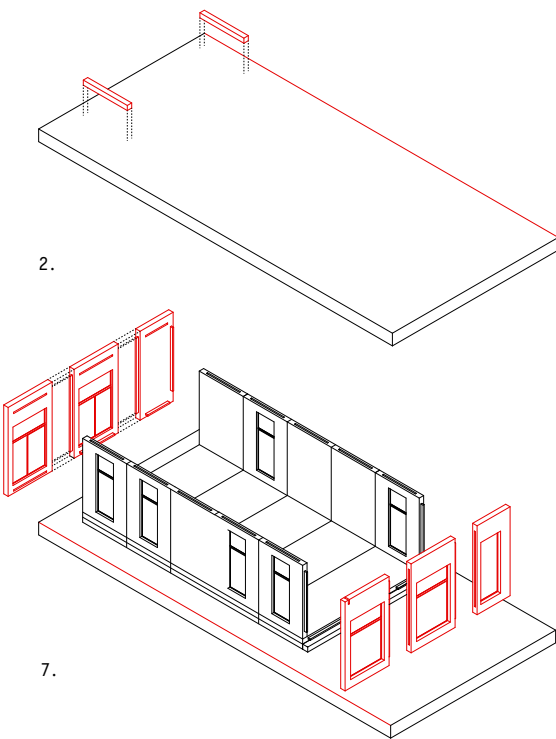
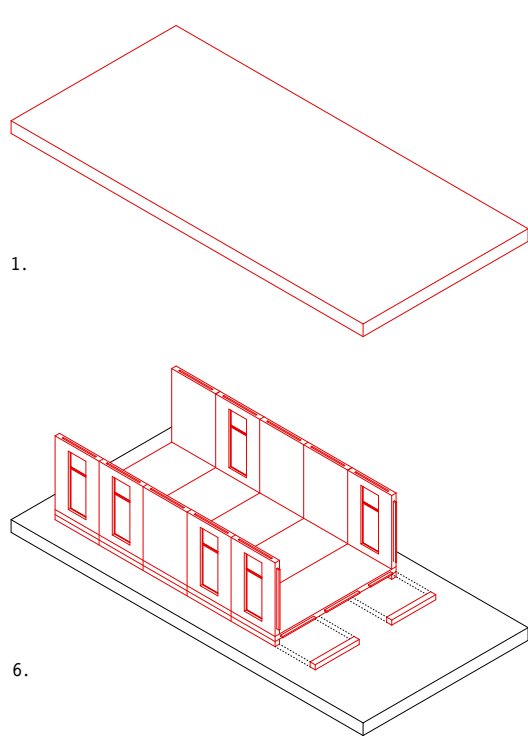
structure. The use of aluminium offers an effective solution to protect the structure from this type of problem. <sup>[8]</sup>

To achieve the desired degree of design flexibility, an ingenious and highly effective technological approach is adopted. All elements of the structure, including those that make up vertical, horizontal, inclined partitions or complete three-dimensional volumes, are equipped with a sophisticated interlocking system. This system features a rectangular section housing, which has the same thickness and depth dimensions for each element.

Within these accommodations, there are connector elements, which are made up of rectangular joist sections, and are fundamental as they allow any type of partition or closure to be joined with another element in an effective and robust manner. Further flexibility is provided by the pin-barrel locking system, which makes it possible to achieve flexibility in assembly and disassembly. Thanks to this system, which is accessible during construction, it becomes essential to allow the operators or users themselves to manage the composition of the housing module completely and independently.

The basic idea is simple, but thanks to this interlocking system and the connector elements locked by means of pins, the structure is at the same time extremely versatile and easily modifiable as required.

In summary, the assembly process involves a sequence of steps to ensure the solidity, efficiency and strength of the building. From the initial concrete casting to moisture protection with aluminium elements, to the use of tongue-and-groove joints for dry assembly of the horizontal panels, each step is carefully planned to achieve a high quality and safe end result.



<sup>[8]</sup> (SOLTECH s.r.l. s.d.)

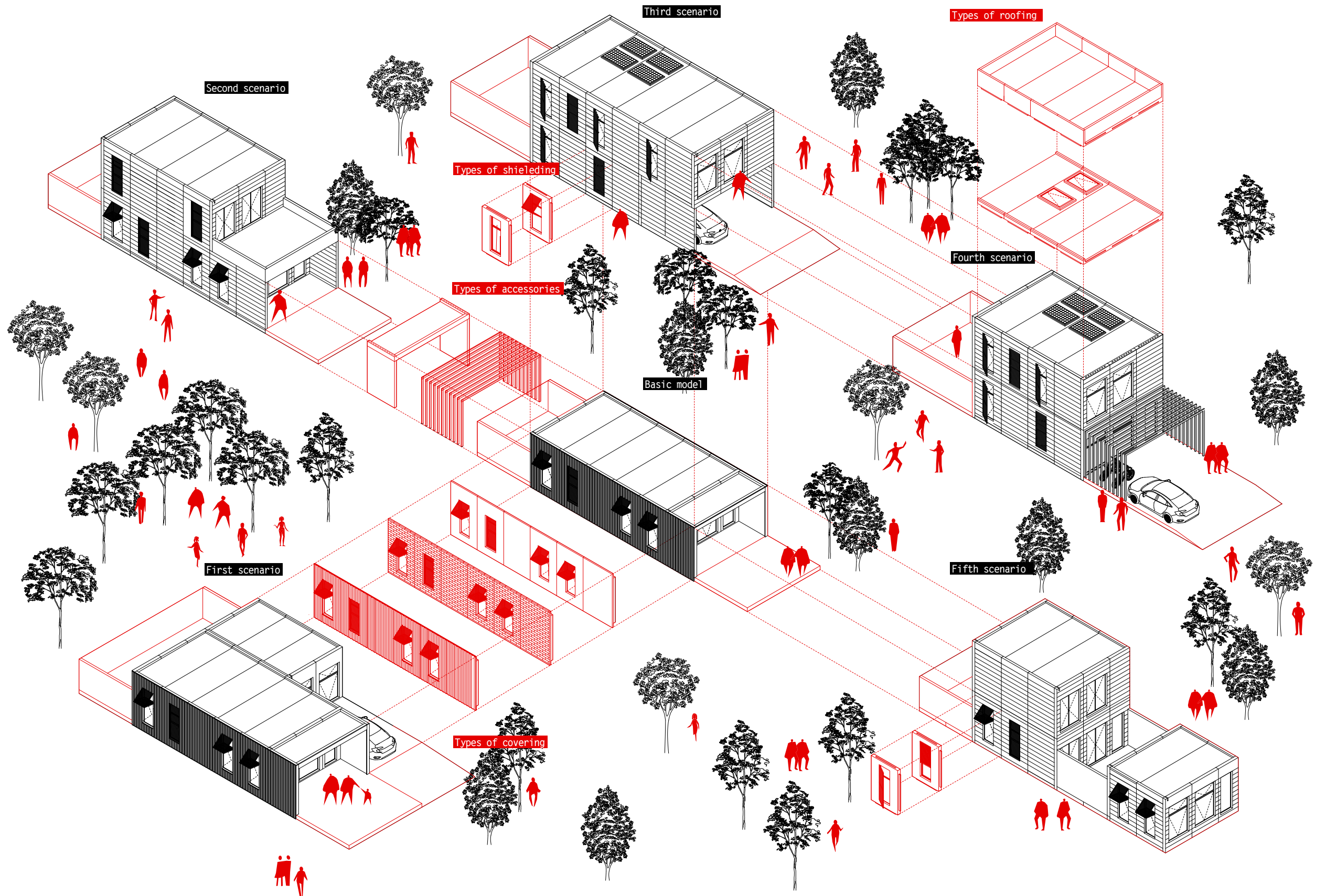
<sup>[9]</sup> (Wikipedia n.d.)

<sup>[10]</sup> (GARDENIA we build a green future n.d.)

\*Modularity

The proposal envisages the adoption of a modular system made of CLT (Cross Laminated Timber), which consists of solid wood panels made of planks arranged in crossed layers. This material offers maximum strength with reduced thickness and light weight. Thanks to this technology, it is possible to obtain different combinations through assemblies, allowing the dwelling to be transformed into different typological units and, at the same time, to adapt to future needs. <sup>[9]</sup> The modular approach allows the dwelling to evolve, growing or dividing spaces, moving easily from the idea of permanence to that of provisionality .This flexibility

makes it possible to respond to changes in occupants' needs over time, ensuring an adaptable and customisable dwelling. The versatility of the CLT system offers the possibility of reorganising interior spaces, allowing the creation of different architectural configurations without compromising the solidity and stability of the structure. By using solid wood and modular technology, a balance between strength and lightness is achieved, optimising structural efficiency and reducing environmental impact. Adopting a sustainable approach is key to promoting an eco-friendly built environment that respects natural resources. <sup>[10]</sup>



## Housing and construction types

The new housing model is characterised by its remarkable flexibility and adaptability, which has led to the creation of multiple housing types and, consequently, different building solutions.

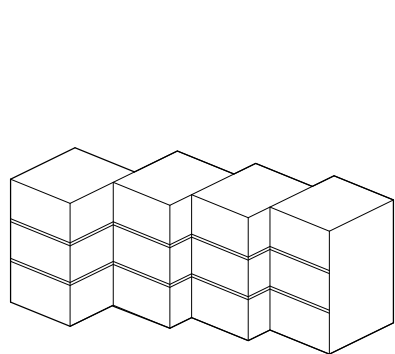
This flexibility offers the possibility of customising housing solutions according to various factors that characterise the user, such as the location of the dwelling and the user's economic possibilities.

Thanks to this versatility, it is possible to design and realise different living configurations, adapting them to the specific needs of those who will inhabit them. This allows a more precise and targeted response to the different demands and preferences of future residents, ensuring a more satisfying and comfortable living experience.

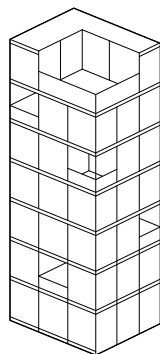
Each housing type can be designed and conceived to make the most of the characteristics of the location in which it is located, and the flexibility of the model

allows tailor-made housing solutions for different income brackets and space requirements, enabling a wide range of people to find the ideal home for their needs.

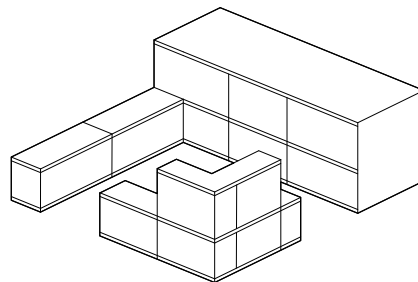
This highly adaptable approach to building design offers numerous advantages for both inhabitants and property developers. Inhabitants can enjoy greater customisation of the dwelling and an environment more suited to their lifestyle.



Terraced type



Tower type



Court type

## \*Flexibility

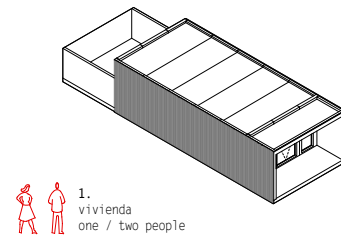
**“Flexible housing is housing that can adapt to changing needs and patterns, both social and technological” <sup>[11]</sup>**

The very broad definition provided by Tatjana Schneider and Jeremy Till in their book ‘Flexible Housing’ forms the basis for the elaboration of ViMo.

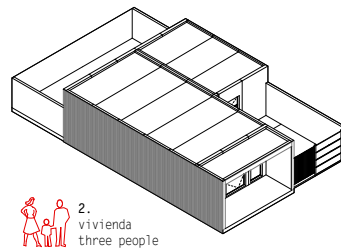
The concept of flexibility aims at providing solutions that can meet different needs, such as the expansion of a family, that can deal with practical situations such as ageing, the upgrading old services or economic issues, such as an increase in the rental market. Another aspect relates to the transformation of a simple dwelling into a workshop house or other types of uses, thus optimising available space.

Housing flexibility extends throughout the entire course of a residential project and offers advantages both before and after occupancy. Before occupancy, a flexible approach allows future residents the freedom to choose the internal layout of the dwelling. After occupancy, it allows people to use the home in different ways, without being bound to the predefined destination of the rooms, and offers the possibility of customised modifications. In the long run, the flexible approach allows housing providers to adapt housing units, change the interior layout and update properties economically. The notion of flexible building goes beyond simple definitions applied to dwellings that can be adapted to changing needs. In essence, it is a broader and more dynamic conception that allows the different needs of inhabitants to be met over time by offering evolutionary and customised solutions. <sup>[12]</sup>

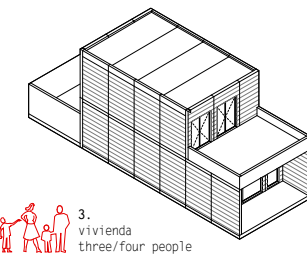
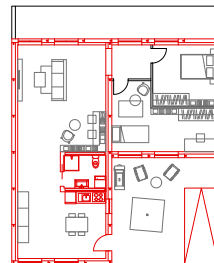
## \*Variety of housing type



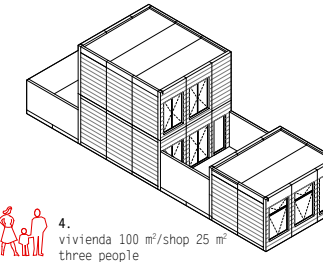
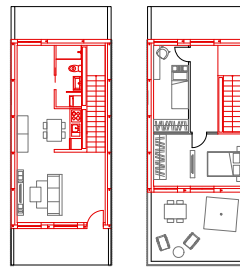
1. vivienda  
one / two people



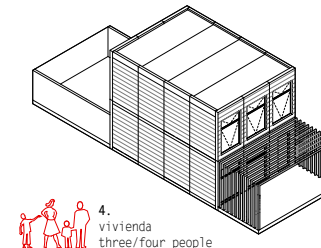
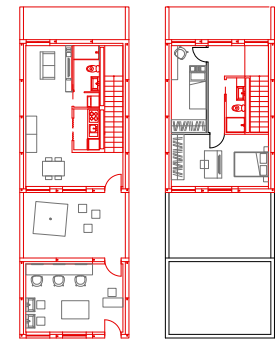
2. vivienda  
three people



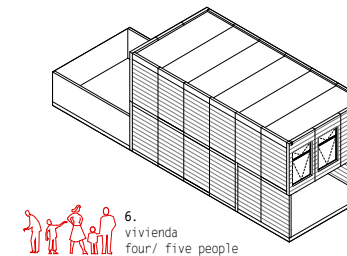
3. vivienda  
three/four people



4. vivienda 100 m²/shop 25 m²  
three people



4. vivienda  
three/four people



6. vivienda  
four/ five people



The diversity of existing family ties and the constituent dynamics of these processes have had a major impact on our society over time, leading it to evolve towards new housing models. This process has gradually dissolved dogmas and prejudices in the field of housing and the city, marking the end of the modern idea rigidly anchored to a single subject or a traditional conception of the family. Nowadays, the traditional construction industry and its craftsmanship processes often found it difficult to react adequately to the new forms of home living.

The growing need for customisation of the home living space has pushed society to seek new solutions and innovative approaches. Today, individuals have the opportunity to customise their homes and choose flexibly and interactively the arrangement of modules that best meet their needs and preferences. Thanks to an open and varied catalogue, they can select from a wide range of interior or exterior enclosures, fixed or movable, translucent or opaque, as well as different colour and finish options. This customisation process allows them to create

unique, adaptable and functional environments that fully reflect the personality and lifestyle of each individual or household. This shift towards more flexible and adaptable housing design and construction has been driven by the need to respond to the diverse and changing needs of modern families. The concept of 'home' is no longer static or limited to a fixed physical structure, but has evolved into a dynamic and customised vision that adapts to the needs and desires of its inhabitants. In conclusion, the evolution towards new housing models, driven by

the diversity of family ties and personal needs, has led to greater flexibility in home living. This trend has helped overcome old rigid paradigms, paving the way for a future in which home and city adapt to people and not vice versa. <sup>[13]</sup>

<sup>[11]</sup> (Till e Schneider 2007, pag 4)

<sup>[12]</sup> (Till e Schneider 2007, pag 4)

<sup>[13]</sup> (Arquitectos 2015)

## \*Authors' notes

The thesis does not include a detailed analysis of the material, neither the related thermal and economic feasibility assessments based on the specific climate of Santa Catarina.

The research focuses mainly on the problems encountered in Mexican cities, concentrating in particular on the issue of the high percentage of abandonment of *viviendas*. The current urban planning dynamics have favoured a continuous expansion of cities, generating further complications in the daily lives of residents.

In the next chapter, a detailed analysis of the current, concrete situation in Santa Catarina will be conducted, presenting a strategy that may open the way for different solutions, which could be the subject of further, more specific research.

# *04. Acupuntura*

*04.1 Acupuncture fragments*

*04.2 Scenarios*

*Acupuncture*

## Acupuncture

### introduction

The analyses conducted in the chapters above resulted in the search for possible scenarios to provide solutions to the housing crisis in the municipality of Santa Catarina. The action strategy includes the challenge of progressive urban regeneration. Usually, this involves different approaches, targeted at economic and social improvement, but in our case, particularly at improving building quality.

The goal is to bring about a transformation - using redevelopment and development - that focuses on the evolution of the city in a flexible way. The operation does not include the interest of large parts of the city, because it would imply long periods and significant investments. Instead, the challenge is to realize an urban acupuncture strategy to increase the housing supply in Santa Catarina. The analyses carried out so far, in particular the information that has emerged from the mapping of uninhabited neighbourhoods, the market analysis and the land use of the territory, have resulted in an abacus of eighty-six districts, which in turn have been classified into seven typologies, such as:

- urban voids;
- *full quarters arranged in complexes with an ordered pattern* ;
- *high-density districts arranged in complexes with an ordered pattern with voids inside*;
- *high-density districts with a pattern without an order*;
- *high-density districts with a pattern without an ordered plot with voids inside*;
- *low-density districts*;
- *square*;

From the illustration below, we can see that the prevailing typology, within the territory, corresponds to high-intensity districts with voids inside them with a plot that is complete without logic.

This is the source of our **acupuncture intervention**. The intent, as reported in the literature, is

**[1] "understood as a practice of traditional Chinese medicine - it is metaphorically applied to urban design".**

The 'needle pricks', as in medicine, have the power to cure disease, and to restore the diseased spot. With just the healing touch, not only is the affected spot revitalized but also the area around it. This technique could be applied to the city. Jamier Lerner, in his book **Urban Acupuncture**, states that because so much of the city is 'sick', medicine must be applied to the city itself. Just as in the real case, the interaction between doctor and patient becomes essential, in the same way, urban planning involves activating healthy responses within the city, exploring here and there to stimulate improvements and positive chain reactions. Intervention is about activation, an essential way for organisms to function and change . **[2] [3]**

**[4] "The planning process of a city takes time, involving a multitude of actors and issues, as well as long-term guidelines. However, sometimes a simple, focused intervention can create new energy, demonstrating the possibilities of a space in a way that motivates others to engage with their community. It**

**can also contribute to the planning process. This gets to the essence of true urban acupuncture: it has to be precise and fast, that is the secret."**

The action strategy, therefore, envisages an acupuncture intervention, going to intervene on targeted places, to improve the living conditions of the city and those who live there, laying the foundations for a progressive regeneration from the point of view of the vivienda for the entire city, because especially in the case of Mexican cities, it is the vivienda that tells the story of how a city is made.

The acupuncture intervention will concern - first of all - those that are abandoned and disused lots, going to replace, fill empty or uninhabited lots within the various neighbourhoods and in some cases the design of small complexes, this type of intervention, however, does not involve the design of large towers, a solution that could concretely solve the housing crisis, not taking into account that the planned solution would be too impactful within the municipality of Santa Catarina, a city that is mostly horizontal - especially in the city centre - and that places its cultural identity in the possession of the single-family house.

As has emerged from the previous chapters, not only a shortage of housing, but in some cases underlying problems in the Mexican *modus vivendi*, due to the lack of interest in the design of the vivienda itself and the shoddy material used, have led to this situation, where on the one hand we see built but mostly uninhabited plots, and on the other hand we see the poor construction and design quality of the vivienda.

<sup>[1]</sup> (Lerner 2014)

<sup>[2]</sup> (Lerner 2014)

<sup>[3]</sup> (NeedleAdmin 2018)

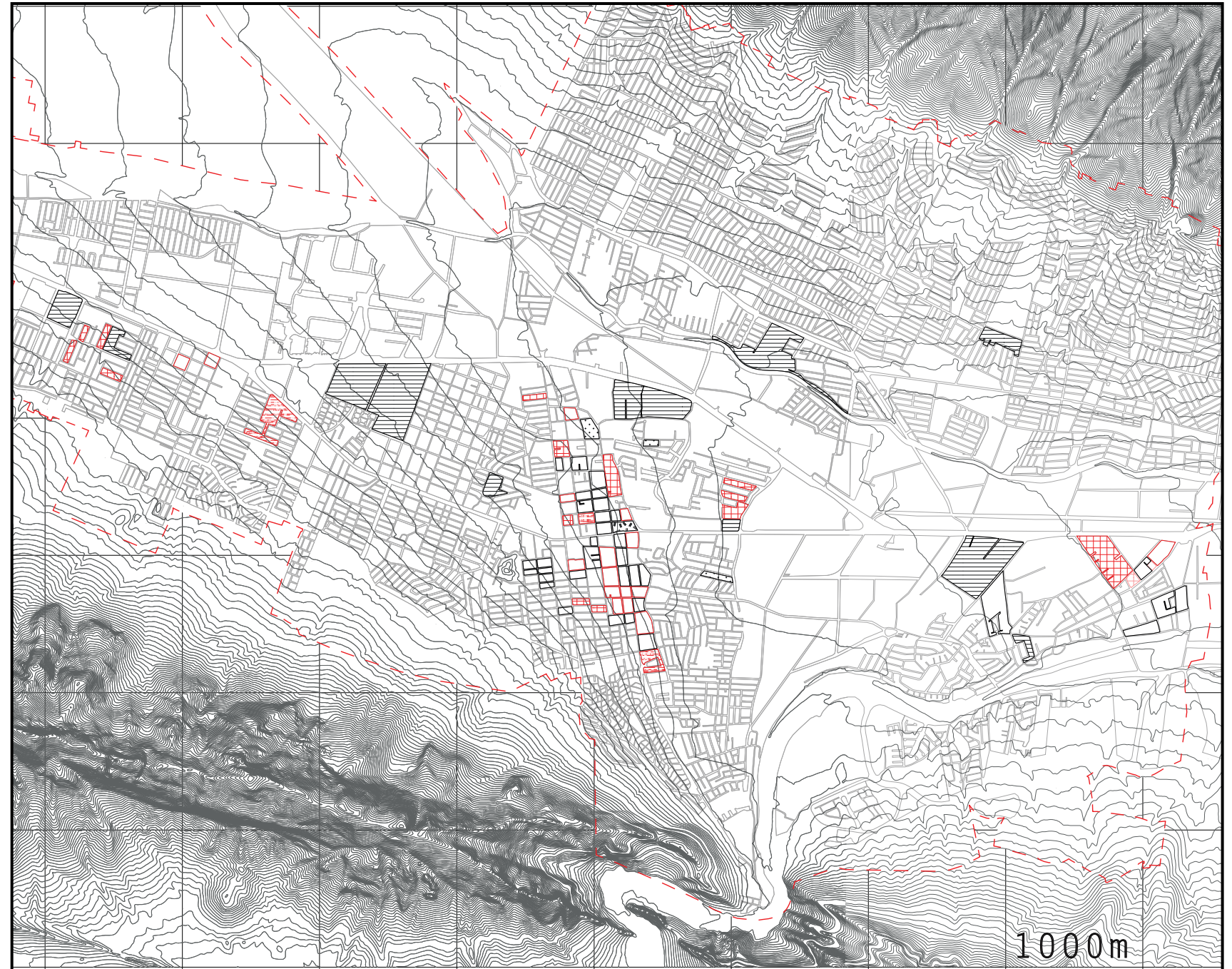
<sup>[4]</sup> (Lerner 2014)

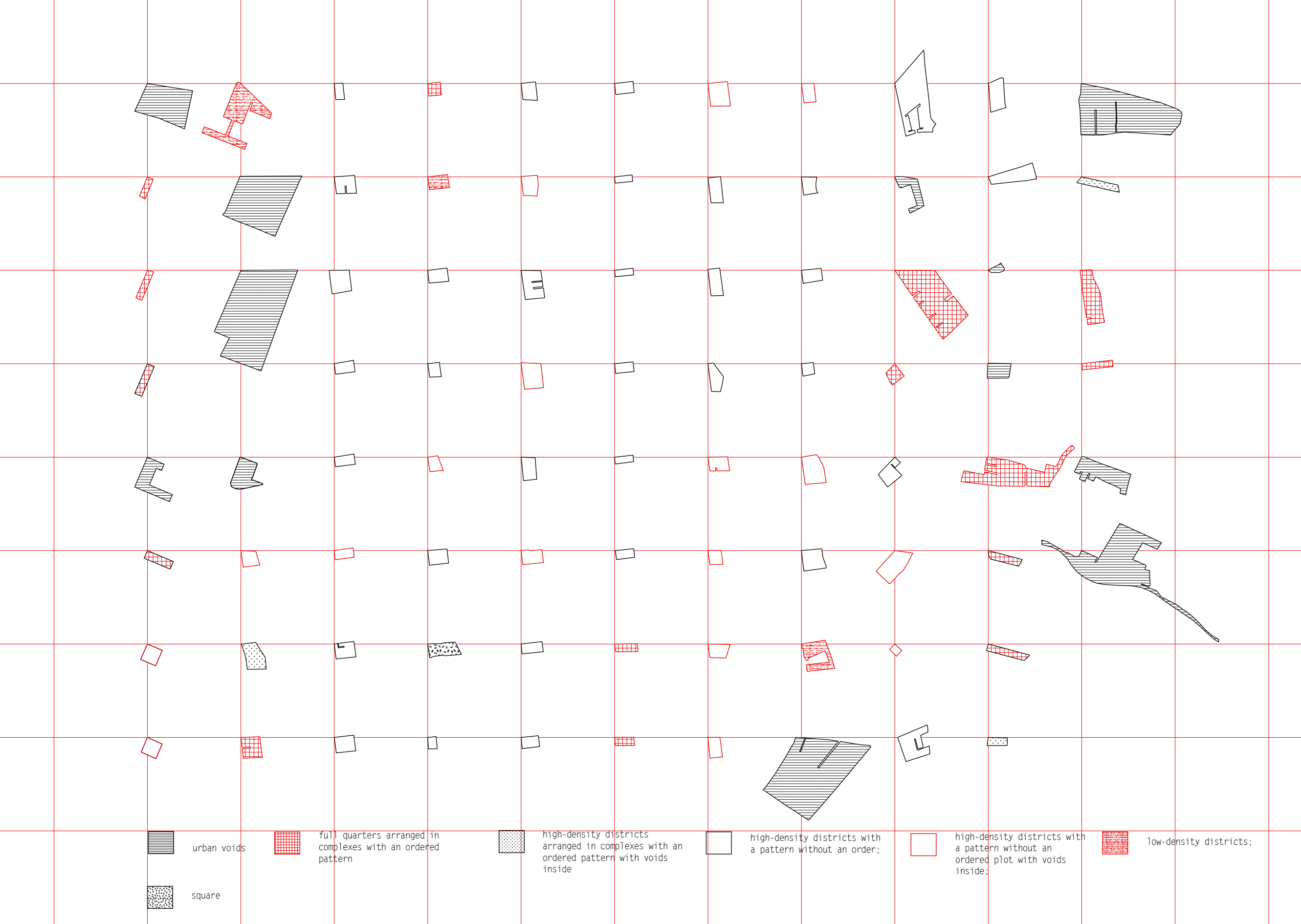
## The typology of the Santa Catarina plots

The maps analysed examined the isolates on the basis of their degree of uninhabitability. Initially, they were identified on the map and then studied according to their characteristics. Different typologies were identified according to the percentage of built-up area of the block and the building method adopted. The predominant typology consists of neighbourhoods built without formal urban planning, which originally arose informally and were subsequently regularised. This has led to the presence of empty spaces within the blocks, often abandoned and unused, located in the city centre.

Furthermore, residential complexes, often private in nature, built in series with a high percentage of built area and an orthogonal plot have been identified. The majority of suburban districts, on the other hand, consist mainly of urban voids located near industrial parks.

The analysis made it possible to understand the composition of these plots, thus providing indications on how to intervene on them. For each typology identified, a different approach must be taken according to specific needs. Then, in the next pages, in parallel to presenting a list of all neighbourhoods, an example has been selected for each category in order to illustrate their characteristics. Finally, the optimal design strategy for implementing the new housing model proposed above will be outlined.





urban voids



full quarters arranged in complexes with an ordered pattern



high-density districts arranged in complexes with an ordered pattern with voids inside



high-density districts with a pattern without an order;



high-density districts with a pattern without an ordered plot with voids inside;



low-density districts;



square



### urban voids

In this type of neighbourhood, the percentage of built-up area is relatively low, around 18%. These are urban voids located on the margins of the city centre, mostly in industrial areas; in this case, the 1887.09 m<sup>2</sup> of built-up areas have an industrial use.



### full quarters arranged in complexes with an ordered pattern

This typology is the most common in the municipality of Santa Catarina. It is the case of private complexes. These are a series of residential units, all similar to each other, that occupy the entire lot, with a built-up percentage of 42,21 %.



### high-density districts arranged in complexes with an ordered pattern with voids inside

This typology is very common. It presents itself with a rather defined urban texture and with abandoned urban voids inside, with the presence of ruins. The percentage of built-up area is within 38 %.



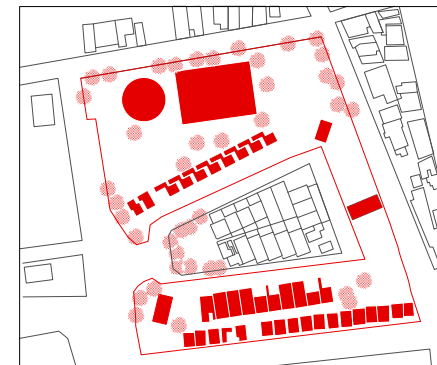
### high-density districts with a pattern without an order

This typology includes blocks that are very dense, but without a real urban plot. They are mainly residential and commercial buildings. They are not complexes, but sprung up informally and then regularised.



### high-density districts with a pattern without an ordered plot with voids inside

The typology analysed in this case is very similar to the previous ones, presenting an undefined plot in the interior of the isolated block with the presence of urban voids.



### low-density districts

This type of neighbourhood is among the least frequent within the municipality of Santa Catarina. It has a built-up percentage of 19 %. Inside, one can see large unused spaces and small residential complexes.



### square

It is the main square of the city. Within this space are buildings of a public nature, making it the centre of the city.

## Scenarios

The Santa Catarina context was the subject of an extensive analysis that revealed multiple modes of intervention, among which the use of the aforementioned strategy, urban acupuncture, stands out.

This synergetic approach combines context analysis with the study of the ViMo housing model, designed with the aim of adapting to different urban situations. The application of this model focuses in particular on the specific context of Santa Catarina.

The fusion of these two components resulted in scenarios involving some of the previously analysed neighbourhood types. The first scenario envisages a compact neighbourhood with an ordered plot, while the second envisages empty spaces within it with a well-defined plot. However, it is important to emphasise that these scenarios do not constitute defined projects, but rather constitute ideas for further research and investigation of great relevance to Latin culture.

The approach taken aims to feed into the research process, stimulating further studies and insights into urban acupuncture and its specific application in the context of Santa Catarina. This topic is of crucial importance for understanding and improving the way living spaces are conceived within this geographical area. By leaving room for future research, the development of innovative and sustainable solutions is encouraged, addressing the challenges present in the urban context of Santa Catarina with a view to progress and harmonious development.

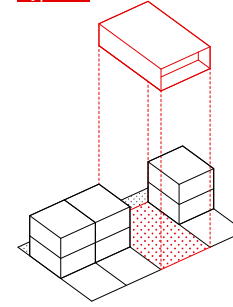


## sustitución (replacement)

Tb. substitución.  
Del lat. *substitutio*, -onis.

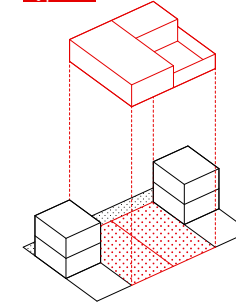
1. f. Acción y efecto de sustituir.
2. f. Der. Nombramiento de heredero o legatario que se hace en reemplazo de otro nombramiento de la misma índole.

Type 1



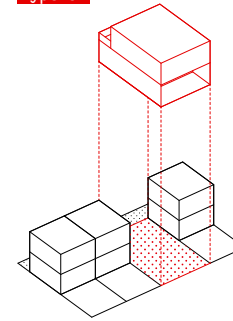
Replacement of a lot with **\*ViMo** along one floor.

Type 2



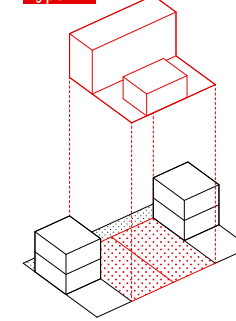
Replacement of two plots with **\*ViMo** along one floor.

Type 3



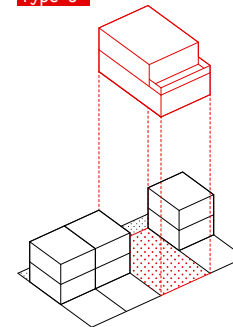
Replacement of a lot with **\*ViMo** along two floors.

Type 4



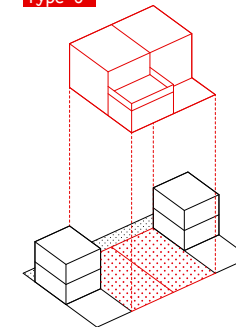
Replacement of two plots with **\*ViMo** along two floors for two units.

Type 5



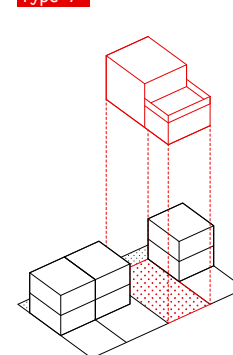
Replacement of one lot with **\*ViMo** along two floors

Type 6



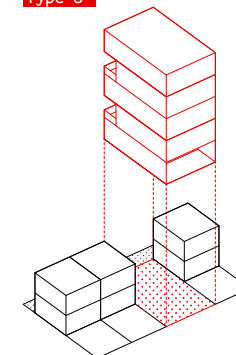
Replacement of two lots with **\*ViMo** along two floors + workshop

Type 7



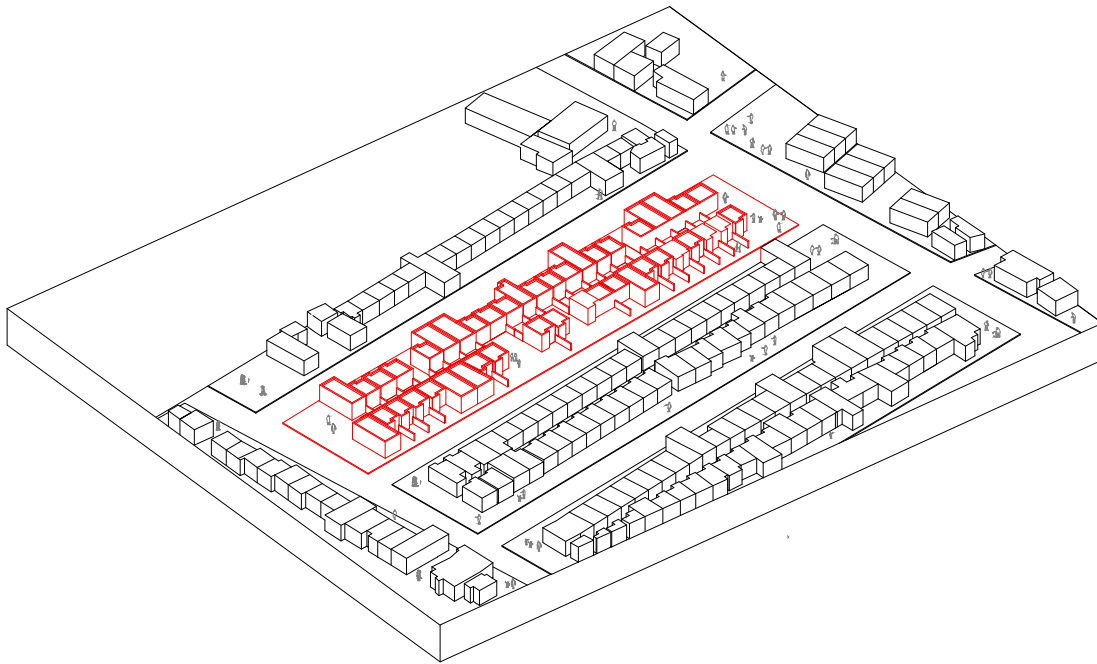
Replacing a lot with **\*ViMo** + workshop

Type 8



Replacement of two lots with **\*ViMo** along several floors.

**full quarters arranged in  
complexes with an ordered  
pattern**



This typology is the most common in the municipality of Santa Catarina. It is the case of private complexes. These are a series of residential units, all similar to each other, that occupy the entire lot, with a built-up percentage of 42,21 %.

## \*Strategy of action

The analysed neighbourhood represents a mini-housing complex, built with an orderly plot and characterised by the absence of surrounding walls. However, about 40% of the 48 dwellings are currently uninhabited. Faced with this situation, it became necessary to think of a targeted intervention in order to improve the liveability and functionality of the neighbourhood.

The proposed approach consists of replacing the existing buildings, keeping only the ground or lot area as a starting point.

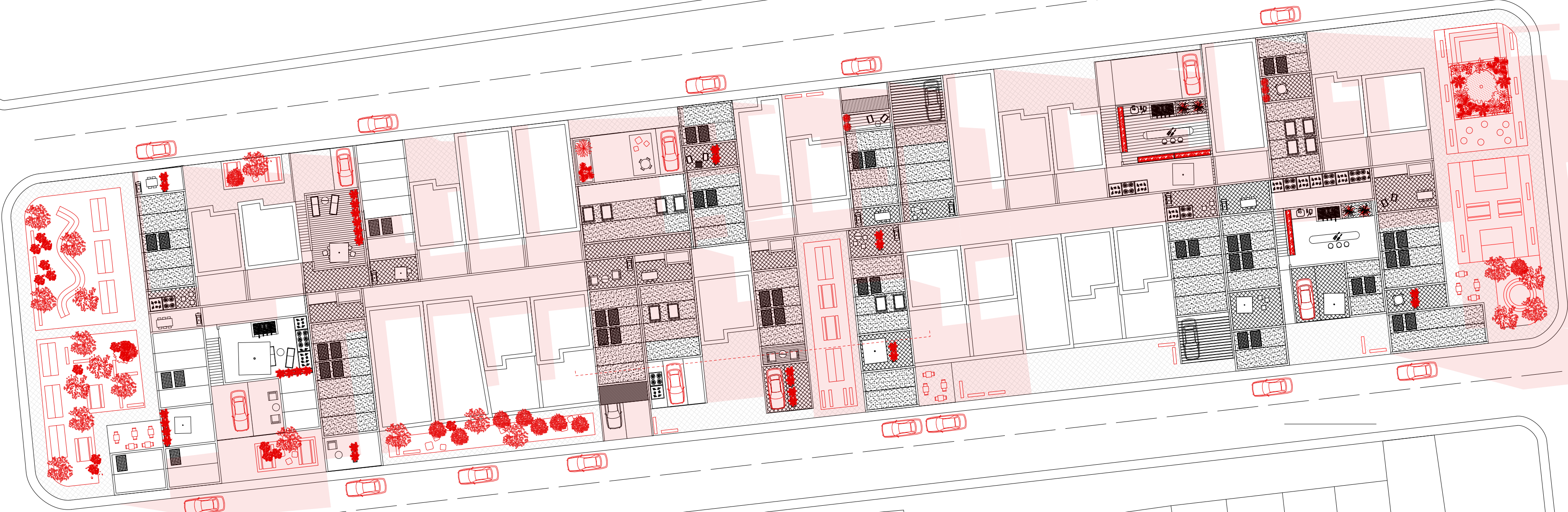
Various types of intervention were hypothesised to redevelop the area: both the replacement of individual plots and the interconnection and reorganisation of adjacent plots were considered. It was not only limited to the domestic dimension, but it was planned to include services and community spaces within the neighbourhood in order to create a healthy and functional environment for the local inhabitants.

The approach towards housing cannot disregard attention to the surrounding environment. Houses are certainly fundamental elements in the development of the city, but they must be integrated into their surroundings so that they can play their role to the full. The design focuses therefore not only on housing buildings, but also on the creation of public spaces, green areas, and services that foster a harmonious and sustainable community life.

Ultimately, the project aims to transform the existing neighbourhood

into a welcoming, functional and inclusive place that meets the needs of the inhabitants and contributes positively to urban life. The redevelopment of the area and the integration of services and public spaces will contribute to creating a liveable and pleasant urban environment in which people can develop and prosper.

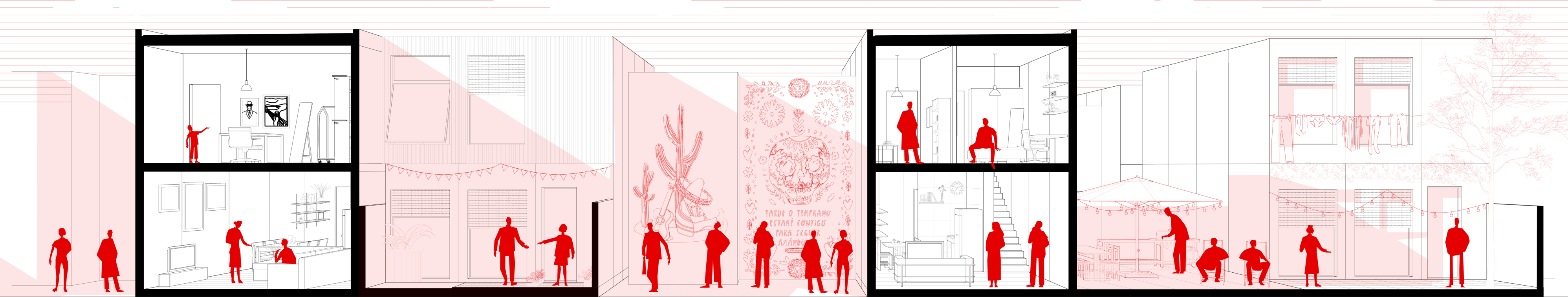
\*Masterplan



N

0 10m

\*Section

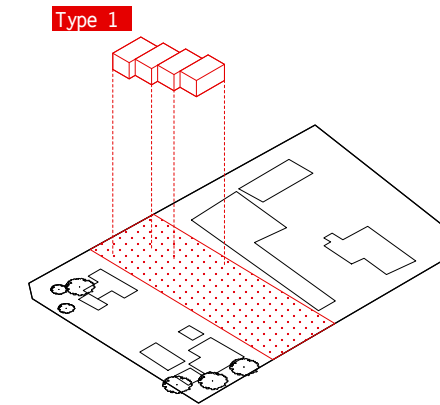




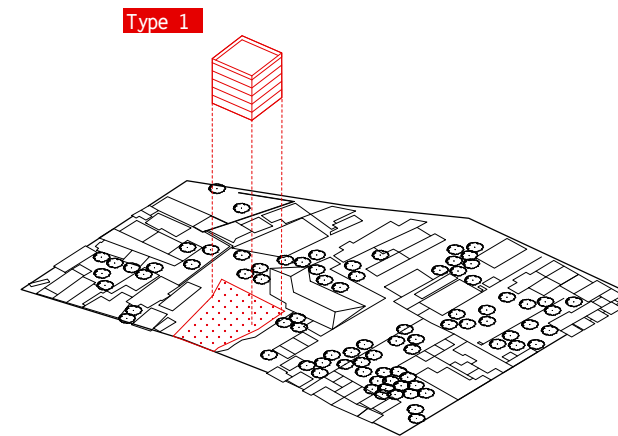
# composición (.....)

*Del lat. compositio, -onis.*

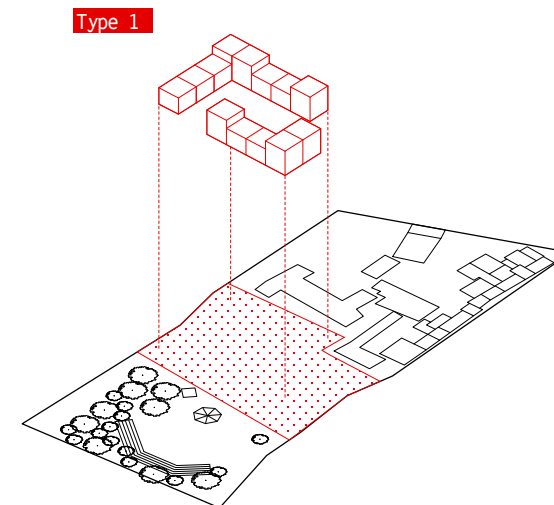
1. f. Acción y efecto de componer.



Composition of terraced type with \*ViMo units in an empty lot.



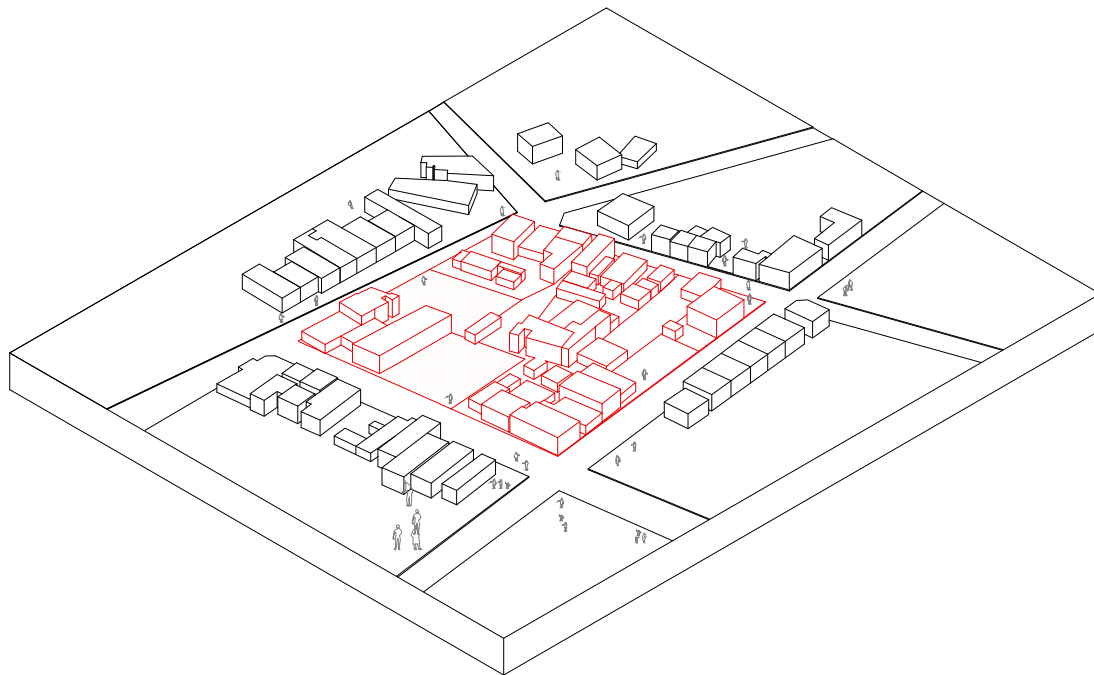
Composition of tower type with \*ViMo units in an high-density districts with avoid inside.



Composition of court type with \*ViMo units in large avoid.

## \*Strategy of action

high-density districts with  
a pattern without an ordered  
plot with voids inside



The typology analysed in this case is very similar to the previous ones, presenting an undefined plot in the interior of the isolated block with the presence of urban voids.

The neighbourhood examined presents a cluttered plot characterised by urban voids within it. This scenario proved highly favourable for the implementation of a small complex housing vertical vivienda. This innovative complex includes parking spaces and essential services on the ground floor, making the entire project highly functional.

The novelty of this proposal lies in the organisation of the dwellings on several levels, creating a kind of condominium. However, it should be pointed out that these are not tall towers, but a stacking of buildings in such a way as to ensure sustainable densification without compromising the harmony of the surrounding context. In fact, the decision to avoid very tall towers was dictated by the need to comply with health and hygiene regulations and maintain an appropriate integration into the surrounding environment.

Therefore, a more appropriate alternative was adopted, i.e. the creation of small apartment blocks, which represent a viable alternative to traditional single-family residences.

These condominiums were carefully designed, taking into account the special characteristics of the location and respecting the local architectural identity.

The building type considered here is the tower, but one can easily imagine scenarios in which cohort or terraced types are present.

This flexibility in the choice of housing types allows for a better adaptation to the specific needs of the neighbourhood and the preferences of the inhabitants.

The objective of this project is to provide an innovative and functional housing solution, while contributing to the enhancement of the existing urban environment. Planned re-densification with sensitivity to the context enables the creation of a cohesive and harmonious urban environment in which the community can enjoy a comfortable and pleasant living environment.

\*Ground attack



\*Section





## \*Authors' notes

The project represents the epilogue of comprehensive and in-depth multi-disciplinary research, focused on various areas, and the decline of architecture.

The initial question that triggered the entire investigation, i.e. "*What does good living mean?*", was addressed comprehensively and in-depth, through the analysis of the psychology of spaces and, above all, of human needs. This study included analyzing people's individual histories, examining current regulations in this area, and observing the institutions responsible for regulating these issues.

The theme of *vivienda* is a broad and complex universe, characterized by numerous interconnected components, which play a fundamental role in the success of any project. The right of every individual to enjoy quality living conditions within the spaces we frequent on a daily basis has been the main guiding light in the formulation of our objectives. The design of the ViMo model was conceived with the intention of fulfilling this fundamental right. The ViMo model is characterized by its simple yet flexible structure, offering an unlimited range of possible combinations according to the specific needs of its users.

It is important to emphasize that although the ViMo architectural prototype was not the subject of in-depth analysis from a technical and technological point of view, our research focused on the compositional aspect, recognizing this approach as the core of our proposal. The intrinsic strength of ViMo is in its real application in complex and

concrete contexts.

ViMo, although presenting an apparently elementary and unsurprising basic structure, reveals its true greatness in practical implementation within specific contexts, demonstrating its remarkable capacity for adaptation and transformation over time.

# *05. Futuros escenarios*

*Future scenarios*

## *Future scenarios*

At the conclusion phase of this investigation into the *vivienda* in Mexico, we are confronted with the question of whether this conclusion actually represents closure or rather the beginning of a new investigation focusing on these issues.

The issues addressed in the preceding pages are of a highly diversified nature and could equally prompt further investigation, since housing constitutes a subject that affects our lives on a daily basis, influencing our habits, the urban environment, psychology, sociology, and, above all, the political domain.

Although architecture may seem to be a circumscribed area of interest, it is actually a universal issue, since only through a comfortable living environment can one aspire to a satisfying quality of everyday life.

The *vivienda*, like all housing, requires deep process reflections and iterations. It is essential that these reflections are translated from conceptual abstractions to tangible ideas that subsequently take shape in reality. However, the complexity of this process often leads to deviations, given the set of variables intrinsic to architecture itself.

It is essential to highlight the needs of the users of the housing and to adopt an approach that permits a critical evaluation, making it possible to assess in-depth whether the premises underlying the design process have been formulated with the right degree of care and consideration.

The research as a whole has established the basis for an in-depth understanding of the housing phenomenon. The investigation and analysis of various case studies in the Mexican territory contribute to providing a more comprehensive view of Mexico's urban reality, offering the keys to understanding it.

From the beginning, the primary objective of this study was to present a wide range of possibilities and practical scenarios, in order to deepen the concept of living in the *vivienda*. The intentions that emerged during this phase of research played a crucial role in making sure that the ultimate conclusion, the architectural project, was in perfect harmony with the initially outlined objectives.

The reaching of this conclusion, although not without its challenges, was made possible through the analysis of a large body of documentation, which included a detailed examination of social, political, historical, urban planning, and architectural aspects. Interaction with the local community played a key role, and we hope that the ViMo project will comprehensively reflect all identified needs.

It should be noted that this type of research does not necessarily lead to definitive and conclusive results, but rather to scenarios that offer insights and suggestions for further debate.

The current challenge is to introduce innovative techniques and perspectives in a context that has so far followed parameters often far removed from the European approach. This is not limited to overcoming the geographic obstacle of the ocean but also extends to understanding and harmonizing radically different, sometimes opposite, thoughts, cultures, habits, and ways of conceiving reality compared to the European ones.

These divergences do not necessarily exclude the possibility of synergetic collaboration between different models of thinking, all oriented towards a common goal: the creation of high-quality living environments. Exploiting the variety of perspectives can lead to an integrated approach that enhances the strengths of each vision and results in innovative and sustainable solutions. In the end, the shared goal is wealth through a universal concept of habitability, overcoming geographical and cultural barriers that might otherwise be insurmountable.

Therefore, we conclude this study not as a definitive end, but rather as the start of a series of projects aimed at ensuring the proper centrality of the individual in these contexts. We would like this research to represent the beginning of a more extensive journey and to continue to contribute to the progress and improvement of living conditions through a constant focus on housing.



## Bibliography

Administración 2021 - 2024. «Plan Municipal de desarrollo. Adminstración 2021-2024.» 2021.

Aravena, Alejandro. *Elemental: manual de vivienda incremental y diseño participativo*. Hatje Cantz, 2016.

Augè, Marc, et al. “Le case dell’uomo Abitare il mondo.” In *Abitare, sostare, andare: ricerche e fughe dell’initmità*, by Francesco Remotti, 68 - 83. Novara: UTET, 2016.

Bianchetti, Cristina. *Corpi tra spazio e progetto*. Mimesis Edizioni, 2020.

Bilbao, Tatiana, Gabriela Etchegaray, Hilary Sample, y Ivonne Santoyo-Orozco. *A House is not Just a House*. Columbia Univ Graduate School, 2018.

Canales, Fernanda. *Vivienda colectiva en México. El derecho a la arquitectura*. Editorial Gustavo Gili, 2017.

Canales, Fernanda. *Shared Structure Private Space Housing in Mexico*. New York, Barcellona: Actar Publishers, 2020.

De Araujo, Victor, Fabricio Aguiar, Pedro Jardim, Fernando Mascarenhas, Lucas Marini, Vinicius Aquino, Herisson Santos, Tulio Panzera, Francisco Lahr, and André Christoforo. «Is Cross-Laminated Timber (CLT) a Wood Panel, a Building, or a Construction System? A Systematic Review on Its Functions, Characteristics, Performances, and Applications.» *Forests*, 2023.

DGPA , Secretaría de Bienestar . «Informe anual sobre la situación de pobreza y rezago social 2023. Nuevo León , Santa Catarina.» 2023.

Flores, Lourdes. «Instalación de “gigafactory” de Tesla generará la demanda de 13,000 viviendas en Nuevo León.» *El economista*, 2023.

Fomerrey, Instituto de la vivienda . «Programa especial de vivienda .» 2023.

Gobierno de México. «INFORME ANUAL SOBRELASITUACIÓN DE POBREZA Y REZAGO SOCIAL 2023 Nuevo León Santa Catarina.» Información general de población, condición de pobreza, marginación y rezago social, 2023.

Harvey, David. *Il capitalismo contro il diritto alla città. Neoliberalismo, urbanizzazione , resistenze*. Ombre Corte, 2012.

Heidegger, Martin. «Costruire Abitare Pensare.» *En Saggi e discorsi* , de Martin Heidegger. 1976.

Sector/Documents/Descripcion%20INFONAVIT.pdf. International Lotus. «Favelas, Learning from, vol. 143.» *Lotus International*, 2019: 55.

Lerner, Jaime. *Urban Acupuncture*. Island Pr, 2014.

Lopez, Kenji, entrevista de Jorge Diego Etienne. *Kenji Lopez (Urvita): Cómo hacer ciudad* (2020).

Moreno, , Ana Lilia. «Tesla, nearshoring y la salida del laberinto.» CE Think Tank Newswire Retrieved, marzo de 06 de 2023.

Municipio de Santa Catarina secretaria de desarrollo urbano y ecologia . «Programa de desarrollo urbano de centro de poblacion, Santa Catarina, Nuevo Leon. 2021 - 2030.» 2021.

Municipio de santa catarina secretaria de desarrollo urbano y ecología . «Programa de desarrollo urbano de centro de población, santa catarina, nuevo león 2021 – 2030 .» 2021.

SEDESOL - Secretaría de desarrollo social . «INFORME ANNUL SOBRE LA SITUACION DE POBREZA Y REGAZO SOCIAL 2015.» 2015.

Suarez, Karina. «Santa Catarina, la tierra prometida del millón de coches eléctricos.» *EL PAÍS*, 2023.

Taboada, Jorge. «Alta Densidad.» *Alta Densidad*. 2012.

Till, Jeremy , y Tatjana Schneider. *Flexible Housing*. Routledge, 2007.

Vassallo, Jesus, y Sebastian Lopez Cardozo . *Nueva Vivienda: New Housing Paradigms in Mexico*. Park Books, 2022.

Vitta, Maurizio. *Dell’abitare Corpi spazi oggetti immagini*. Torino: Piccola Biblioteca Einaudi Ns, 2008.

## Sitography

Ampudia, Pablo. *Los matices de la vivienda en México*. 2020. <https://futurociudades.tec.mx/es/los-matices-de-la-vivienda-en-mexico>.

Archdaily. *Casa Nueva Esperanza Community Center / Proyecto Reacciona*. 2022. <https://www.archdaily.com/991668/casa-nueva-esperanza-community-center-proyecto-reacciona>.

Archdaily. *Urvita Noe / Greenfield*. 2016. <https://www.archdaily.mx/mx/795344/urvita-noe-greenfield>.

Arquine. s.f. <https://arquine.com/obra/kalach-en-hermosillo/>.

Arquitectos, STC. *ARQA*. 22 de diciembre de 2015. <https://arqa.com/arquitectura/proyectos/u-n-a-c-a-s-a.html>.

Bilbao, Tatiana. *architectmagazine*. 2018. [https://www.architectmagazine.com/design/a-house-is-not-just-a-house\\_o](https://www.architectmagazine.com/design/a-house-is-not-just-a-house_o).

Bulgaria 533 / Dellekamp Arquitectos. 9 de Maggio de 2017. <https://www.archdaily.com/870851/bulgaria-533-dellekamp-arquitectos>.

Comisión Interamericana de Derechos Humanos. s.f. <https://www.oas.org/es/CIDH/jsForm/?File=/es/cidh/prensa/comunicados/2023/075.asp>.

CONEVAL. «Principales retos en el ejercicio del derecho a la vivienda digna y decorosa.» *Consejo Nacional de Evaluación de la Política de Desarrollo Social*. 2018. [chrome-extension://efaidnbmnnnibpcjpcglefindmkaj/https://www.coneval.org.mx/Evaluacion/IEPSM/Documents/Derechos\\_Sociales/Dosieres\\_Derechos\\_Sociales/Retos\\_Derecho\\_Vivienda.pdf](chrome-extension://efaidnbmnnnibpcjpcglefindmkaj/https://www.coneval.org.mx/Evaluacion/IEPSM/Documents/Derechos_Sociales/Dosieres_Derechos_Sociales/Retos_Derecho_Vivienda.pdf).

*Conjunto Volcanes I / SANTOSCREATIVOS + VTALLER*. 1 de Noviembre de 2016. <https://www.archdaily.com/797691/conjunto-volcanes-i-santoscreativos-plus-vtaller>.

*DISEÑO NORTEÑO ESPAÑA 8477*. 10 de Ottobre de 2016. <https://divisare.com/projects/327735-diseno-norteno-lorena-darquea-espana-8477>.

*FR43 / Alter Arquitectura*. 11 de Marzo de 2014. <https://www.archdaily.mx/mx/02-343225/fr43-alter-arquitectura>.

*FRENTE ARQUITECTURA*. s.f. <https://divisare.com/projects/18021-frente-arquitectura-teoloyucan>.

*GARDENIA we build a green future*. s.f. <https://www.gardeniasrl.com/cose-il-cross-laminated-timber/>.

*GOBIERNO DE MEXICO*. 9 de diciembre de 2021. <https://www.gob.mx/shcp%7Cgacetaeconomica/articulos/ciudad-de-mexico-estado-de-mexico-nuevo-leon-y-jalisco-aportaron-mas-del-40-del-pib-nacional-en-2020>.

*Gobierno de Santa Catarina*. s.f. <https://www.stacatarina.gob.mx/w1821/public/nuestra-gente>.

Greenfield. *Greenfield*. s.f. <http://greenfield.com.mx/principios.html>.

Hernández, Juan Manuel Ávila. *Mexico Business news*. 2023. <https://mexicobusiness.news/energy/news/nearshoring-huge-opportunity-or-missed-chance#:~:text=Nearshoring%20is%20defined%20by%20the,US%20businesses%20or%20any%20type>.

*In Progress: Integrara Iztacalco / arquitectura 911sc*. s.f. [https://www.archdaily.com/324582/in-progress-integrara-iztacalco-arquitectura-911sc?ad\\_medium=gallery](https://www.archdaily.com/324582/in-progress-integrara-iztacalco-arquitectura-911sc?ad_medium=gallery).

*Infonavit. Fondo Nacional de la Vivienda para los Trabajadores*. s.f. <http://micuenta.infonavit.org.mx/>.

INFONAVIT, INSTITUTO DEL FONDO NACIONAL DE LA VIVIENDA PARA LOS TRABAJADORES. *cnbv.gob.mx*. s.f. <https://www.cnbv.gob.mx/SECTORES-SUPERVISADOS/BANCA-DE-DESARROLLO/Descripcion-del-Sector/Documents/Descripcion%20INFONAVIT.pdf>.

*Las Torres / Hierve-Diseñeria*. 2012. [https://www.archdaily.com/293727/las-torres-hierve-diseneria?ad\\_medium=gallery](https://www.archdaily.com/293727/las-torres-hierve-diseneria?ad_medium=gallery).

Lopez, Kenji. «designaholic.mx.» s.f. <https://designaholic.mx/episodios/kenji-lopez/>.

Mexican Association of industrial Parks. *AMPIP*. 11 de 2022. <https://www.ampip.org.mx/ampip-en-numeros/>.

Mexico, Gobierno. «Programa para Regularizar Asentamientos Humanos.» 2022. [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.gob.mx/cms/uploads/attachment/data/file/759066/Diagn\\_stico\\_del\\_Pp\\_S213\\_PRAH\\_220907\\_VP\\_Publicar.pdf](https://www.gob.mx/cms/uploads/attachment/data/file/759066/Diagn_stico_del_Pp_S213_PRAH_220907_VP_Publicar.pdf).

Monterrey / *ELEMENTAL*. 31 de agosto de 2023. <https://www.archdaily.cl/cl/02-38418/elemental-monterrey>.

MUNicipium. «MUNicipium.» s.f. <https://issuu.com/municipium/docs/m33>.

NeedleAdmin. *Needle, Agopuntura urbana* . 20 de Febbraio de 2018. <https://needlecrowd.com/blog-agopuntura-urbana>.

Ott, Clara. *Un Cuarto Mas Extension / Taller ADG*. s.f. [https://www.archdaily.com/940627/un-cuarto-mas-extension-taller-adg?ad\\_medium=gallery](https://www.archdaily.com/940627/un-cuarto-mas-extension-taller-adg?ad_medium=gallery).

PAÍS, EL. *EL PAÍS*. 2022. <https://elpais.com/america-futura/2022-10-06/casas-abandonadas-y-vecinos-a-la-deriva-los-coletazos-del-boom-inmobiliario-en-mexico.html>.

Pérez Porto, J., Gardey, A. *Definicion.de*. 7 de ottobre de 2021. <https://definicion.de/vivienda/>.

Secretaria de Economia 2023. *Data Nuevo León*. 2020. <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://datos.nl.gob.mx/wp-content/uploads/Censo2020/048%20SANTA%20CATARINA.pdf>.

*Social Production of Habitat*. s.f. <https://hic-al.org/que-hacemos/produccion-social/>.

*SOLTECH s.r.l.* s.f. <https://www.cordoloventilato.it/blog/isolamento-attacco-a-terra-nelle-case-in-legno-ecco-perch--necessario-n3.ph>

*Tatiana Bilbao Estudio* . s.f. <https://tatianabilbao.com/projects/housing>.

*UN. unhabitat.org*. 2022. <https://unhabitat.org/wcr/>.

*Urvita Noe / Greenfield*. 15 de settembre de 2016. [https://www.archdaily.mx/mx/795344/urvita-noe-greenfield?ad\\_medium=gallery](https://www.archdaily.mx/mx/795344/urvita-noe-greenfield?ad_medium=gallery).

Vielma, Vanessa. *Después del 19S: Tres viviendas por Rozana Montiel, Fernanda Canales y Tatiana Bilbao en Ocuilan, Estado de México*. 2 de settembre de 2018. [https://www.archdaily.mx/mx/900961/despues-del-19s-tres-viviendas-por-rozana-montiel-fernanda-canales-y-tatiana-bilbao-en-ocuilan-estado-de-mexico?ad\\_campaign=normal-tag](https://www.archdaily.mx/mx/900961/despues-del-19s-tres-viviendas-por-rozana-montiel-fernanda-canales-y-tatiana-bilbao-en-ocuilan-estado-de-mexico?ad_campaign=normal-tag).

*wikipedia*. s.f. [https://en.wikipedia.org/wiki/Cross-laminated\\_timber](https://en.wikipedia.org/wiki/Cross-laminated_timber).

## Filmography

*Roma*. Dirigido por Alfonso Cuarón. Interpretado por Alfonso Cuarón. 2018.

Pinguini Tattici Nucleari. *Scatole*. 2019.

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